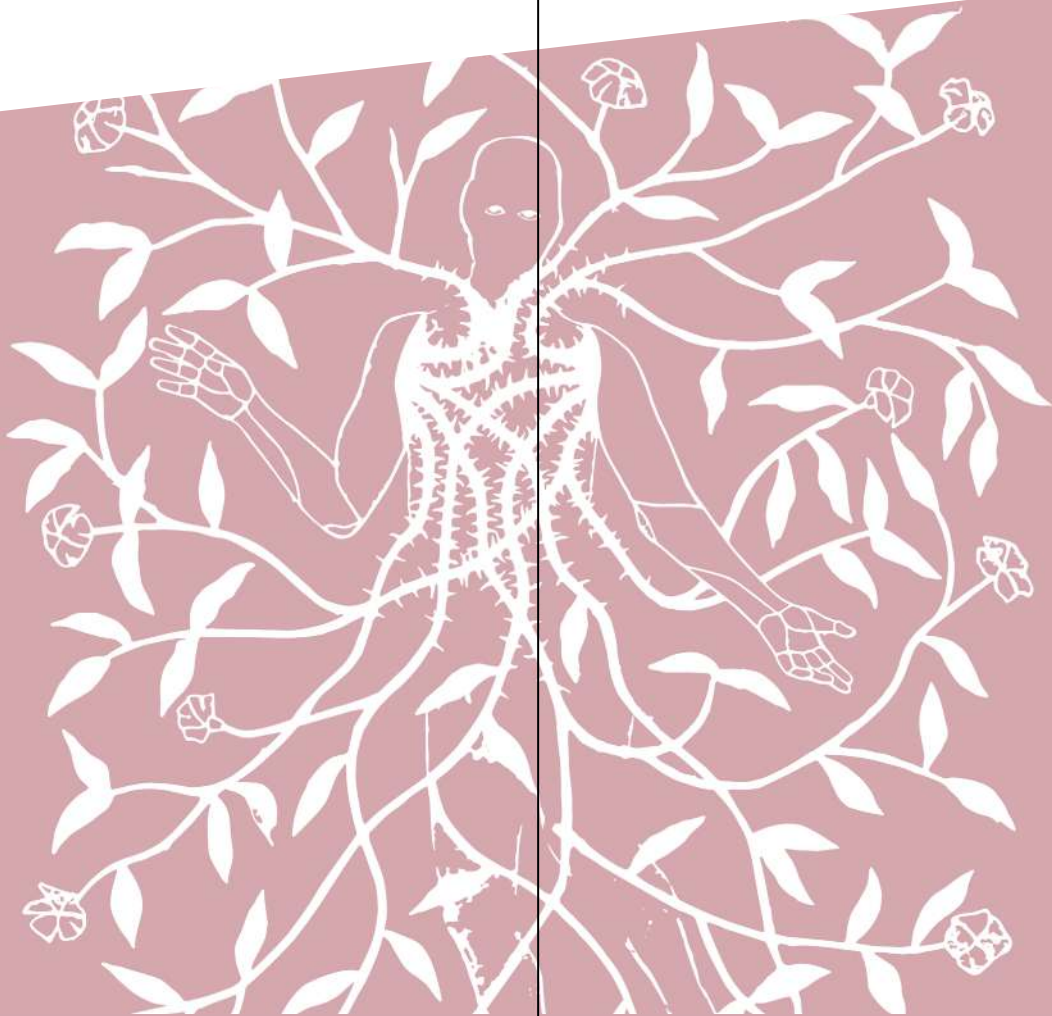


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As bare as open flesh (2022).

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PROSPERITY FASHION

International Conference

13 | 14 February 2025

Università degli Studi di Firenze
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PROSPERITY FASHION

Program

Thursday, 13 February 2025

📍 *Università degli Studi di Firenze - Department of Architecture*

**09.00 – 10.00 Registration and
Welcome Coffee**

**10.00 – 11.00 Institutional Greetings and
Welcome Speech**

11.00 – 13.00 Parallel Sessions

HISTORY 1 | Room 205

ETHNOGRAPHY | Room 207

DIGITAL TOOLS | Room 208

ETHICS AND AESTHETICS | Room 401

EDUCATION 1 | Room 402

13.00 – 14.00 Light Lunch

📍 *Museum of Costume and Fashion, Palazzo Pitti
Sala Bianca*

14.30 – 18.30 Plenary Session

14.30 Institutional Greetings and Lectures by the Museum of
Costume and Fashion, Palazzo Pitti

Simone Verde, *Director of Uffizi Galleries*

Debora Berti, *Università degli Studi di Firenze, Vice-Rector for
Research*

Vanessa Gavioli, *Curator of the Museum of Costume and
Fashion*

15.30 Prosperity is the land: nature relations, design and
fashion

Keynote speaker: KATE FLETCHER

16.30 Designing toward a posthuman subjectivity

Keynote speaker: RON WAKKARY

17.30 Tour of the Museum of Costume and Fashion

📍 *Educando Statale SS Annunziata Poggio Imperiale*

20.00 – 23.00 Conference Dinner

Friday, 14 February 2025

📍 *Università degli Studi di Firenze - Department of Architecture*

08.00 – 09.00 Welcome Coffee

09.00 – 11.00 Parallel Sessions

COMMUNICATION | Room 205

LIVING MATERIALS | Room 207

DESIGN | Room 208

LOCAL AND GLOBAL 1 | Room 401

RELATIONAL COMMUNITIES | Room 402

11.00 – 13.00 Parallel Sessions

CIRCULARITY | Room 207

SENSORIAL MATERIALS | Room 208

CULTURES | Room 401

HISTORY 2 | Room 402

13.00 – 14.30 Light Lunch

14.30 – 16.30 Parallel Sessions

EDUCATION 2 | Room 207

SYSTEMS | Room 208

LOCAL AND GLOBAL 2 | Room 401

CARE | Room 402

16.30 – 17.00 Conference Closing

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EDITORIALS

TOWARDS A NEW SUSTAINABLE AND RELATIONAL PARADIGM FOR THE FASHION SYSTEM

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The contemporary fashion system currently stands at a critical crossroads, caught between the legacy of a linear production model—often referred to as ‘disposable’—characterized by exponential growth and profit maximization, and the urgent need to redefine its objectives in light of the multiple environmental, social, and cultural crises of our time (Raworth, 2017). This scenario has reinforced the awareness of the need to transition from a linear economy to a circular one (Ellen MacArthur Foundation, 2013).

This transition can be built on three pillars inspired by the ethical and relational archetype of ‘care’: care for living beings (both human and non-human), for the environment, and for objects. In this sense, design is called upon to play a transformative role rooted in an ethics of responsibility (Tronto, 1993; Puig de la Bellacasa, 2017).

In recent years, the fashion sector has undertaken numerous efforts to reduce its environmental and social impact through a variety of strategies: the adoption of natural, organic, and recycled materials (Fletcher & Tham, 2019), zero-waste design, the promotion of the slow fashion movement, and product traceability via blockchain (Rogerson & Parry, 2020). Additionally, artificial intelligence has been employed to forecast demand and optimize production processes (Caniato et al., 2020); tools such as the digital product passport (European Commission, 2022) and the application of ecodesign principles (Bocken et al., 2016) have also emerged. However, these practices often remain confined to incremental and sector-specific approaches, without challenging the dominant paradigm of unlimited growth. This context is further complicated by greenwashing practices and ethical compromises that undermine the credibility of ongoing transformations (Delmas & Burbano, 2011).

Within this framework, new epistemological and design horizons are emerging: from reparative design (Fuad-Luke, 2022) to regenerative marketing (Tavanti, 2020), from the economy of sufficiency (Schneidewind, 2014) to post-industrial design (Tonkinwise, 2015). These approaches revolve around a redefined concept of prosperity, understood not as the accumulation of resources, but as relational flourishing, harmonious coexistence, and shared well-being. The *Prosperity Fashion* conference emerges from the recognition that transformation must be not only technical but above all cultural. Alongside

the digital and ecological transitions, a third and essential dimension must be addressed: the cultural transition. This involves a profound rethinking of lifestyles, values, and models of production and consumption (Vignoli et al., 2021). The conference thus positions itself as a critical space for imagining new relationships between fashion, economy, environment, and society. The challenge lies in overcoming fashion’s historical inclination toward the ephemeral and rapid consumption, and instead assigning it an active role in cultural and social transformation.

I would like to express my heartfelt thanks to all those who contributed to the realisation of the Prosperity Fashion conference and in particular to: The Scientific Committee, the Technical and Organising Committee, the Reviewers, the Session Chairs, the Keynote Speakers and all the speakers who attended and spoke remotely; Uffizi Galleries and the Museum of Costume and Fashion for co-organising and hosting the plenary session in the Sala Bianca of Palazzo Pitti. The Ministry of University and Research, the Region of Tuscany and the Municipality of Florence for sponsoring the initiative. The technical and administrative staff of the University of Florence and the DIDA Department of Architecture, for organisational support. MCR Conference, for administrative support. The ITS Mita Foundation, for making the shopping bags. The Professional Hotelier Institute ‘Aurelio Saffi’, Chianti Classico Wine Consortium and Lo Scalco for the catering services. The Educandato Statale della SS. Annunziata for hosting the conference dinner. To each of them I express my deepest appreciation for making this conference possible and for contributing to its success.

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The fashion system has been questioning for years how to decrease its negative impact on the environment and people, trying to improve individual elements: from natural, organic or recycled materials to zero-waste design methodologies, from slower production processes to socially responsible actions, from development of local supply chains to inclusive communication campaigns, from blockchain traceability of products to more reliable trend forecasts through artificial intelligence, from social engagement to large scale regulation. Thanks to the contribution of researchers, practitioners, and activists, a new awareness in civil society about the finite nature of materials and resources has been achieved, and the definition of standards and certifications regulating fashion processes and products towards circular and closed ecosystems has been refined and broadly disseminated.

This awareness, however, often conflicts with the need for constant and exponential economic growth, on which fashion brands base their creative direction, communication, branding, and sales decisions. The last few decades, marked by climate, humanitarian and health crises, have prompted debate about the prevailing economic model centred on ‘GDP Fetishism’ (Stiglitz, 2009), which consists of holding Gross Domestic Product (GDP) as definitive and universal, and thus pursuing it at the cost of dramatically burdening environmental, human, and social resources. Many researchers have gone back to the criticisms made by the Club of Rome in 1972 to verify and actualise them, fuelling the need not only for a new direction for economics and production, but also for new definitions and terminologies for this urgent change of pace: a-growth and post-development politics (Latouche, 2006), post-growth fashion (Fletcher, 2016), regenerative marketing (Sarkar, Kotler & Foglia, 2023), restorative design (Antonelli, 2019), sufficiency-based economy (Bocken, Niessen & Short, 2022) and post-industrial design (Cross, 1981), expressions of a new approach to nature, seen as our ally and subject of an ethic of care (Gambardella, 2024).

Underlying all these reflections is the ambitious goal of redefining the concept of prosperity, hitherto understood almost exclusively in its economic sense, but instead indicating etymologically what is in keeping with hope, what is preferable for the future. The concept of prosperity therefore requires a new interpretation consist-

ing of a fundamental rework of the relationship between the economic and the social (Moore et al., 2023), in a non-mercantile but relational prosperity. The dimension of relationality is a fundamental component of a new conception of prosperity, conceived as a resource of both economic and human value, generated by a community within environmental and ethical constraints. This idea of prosperity has as its objective the ‘common good’ (Sandel, 2021) not only of the community, understood as a group of people, but also of the trans-species, post-phenomenological (van Dongen, 2019) and more-than-human (Wakkary, 2021) relationships that coexist in it.

With its complexity, can fashion move beyond its singular profit-driven vision in order to develop the ideas of multi-faceted shared well-being? Can research into materials, processes, and fashion products shape new social and cultural models oriented towards prosperity? Can fashion be an example of this change that is capable of redirecting other knowledge and disciplines? Can the legal framework for sustainable development and the relevant legislation for the textile and fashion industries help drive the transition? Can fashion redirect the relationship between human and non-human, individual and territory, nature and technology? Can we move from the current ‘Fashion Prosperity’, understood as fashion’s pursuit of its economic growth, to ‘Prosperity Fashion’, a broad vision of the future and a transversal and contemporary focus on people, planet, economy, and technologies?

Based on these premises and questions, on 13 and 14 February 2025, Prosperity Fashion, the first international conference on fashion organised by Università degli Studi di Firenze, took place. The two days were enlivened by 94 contributions, selected through peer review, 147 speakers from 88 institutions around the world, 18 parallel sessions, and two keynote speakers—Kate Fletcher and Ron Wakkary—who spoke during the plenary session held in the Sala Bianca of Palazzo Pitti.

This special issue of Fashion Highlight Journal brings together a selection of the contributions presented during the conference, offering further reflection and insight into the oral presentations. This volume demonstrates the vitality and diversity of the themes addressed during *Prosperity Fashion*, serving as a concrete extension of the dialogue initiated during the conference.

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INTERVIEWS



KATE FLETCHER

Kate Fletcher (PhD) is a Professor at Manchester Metropolitan University, UK and Oslo Metropolitan University in Norway. Her work, including that on systems change, post-growth fashion, fashion localism, decentring durability, Earth Logic and nature relations both defines and challenges the field of fashion, textiles and sustainability. She has written and/or edited 13 books available in eight languages, and in 2022 she was identified by author Margaret Atwood as a visionary. Kate is a co-founder of the Union of Concerned Researchers in Fashion. Her most recent work is about design, clothing and nature.

The concept of prosperity is often associated with economic growth and the success of a product on the market, neglecting or downplaying the impact on the environment and people according to a model that has long been considered unsustainable. What is your definition of prosperity and what do you think are the tools and approaches to develop it?

In 1992, a book was published called 'Wealth Beyond Measure'. Its lead author was the ecological economist Paul Ekins, and in 200 highly illustrated pages, key concepts in economics and ecological economics are unpacked for non-specialist readers. In one illustration there's a wheel, an old wagon wheel style of wheel, with each of the spokes representing a different contributing factor to prosperity. In the illustration, the wheel is distorted, egg-shaped, with the one spoke bigger than all the others. This spoke is production and income and it is drawn like this to show that these factors have been exaggerated over others, like the quality of the environment, health and care for the future have been. This picture has been handed down to us in the global North and neoliberalism has normalised it. It is worth asking ourselves: how do we understand prosperity? Is it something related to economics? Or is it something broader? Does our notion of prosperity radically extend to include all species and care for the Earth? This is where I think prosperity finds its roots, in a non-hierarchical, respectful and reciprocal relationship with the living land. This, of course, is not new insight. First Nations and indigenous cosmology (which precedes the 17th Century Enlightenment) is typically based on inter-generational wisdoms that had always been tethered to lands, waters, animals and bigger worlds we cannot name or know.

How is it possible to rediscover and encourage new sensory and direct experiences with clothing and the body, creating a new relationship between the human and the non-human?

Clothing is a membrane between body and world. It mediates our experiences. It can be a route to greater understanding of where we are and how we are. Understood like this, fashion knowledge becomes situated knowledge, situated in the lived experience of the body moving through the living

world. The dressed body then becomes a way to unlock ontologies and epistemologies of connection and relationality to nature. It becomes about ways of being that are rooted in awareness of our deep dependence on the ecological systems that support our lives and our clothing lives. Granted this is not the traditional starting points for fashion scholars and practitioners. But I find it liberating. A literature review in this case is an engagement with what we wear and where we are realizing that the two things cannot be separated. And that when we work in this way with situated understanding we may begin to act as more resource-constrained members of the ecological community.

The debate on sustainability in fashion often only finds technocentric answers, focusing on individual aspects of change such as innovative materials, circular processes and lifecycle assessment. Do you think this is enough or is a deeper change in the cultural and symbolic models of fashion necessary? And, moreover, does it still make sense to use the term 'sustainability'?

Individual product improvements and technofixes are part of response to ecological and social injustice in fashion, but they are certainly not all of it. They are useful when deployed in time-bound, specific, targeted ways. But they will not deliver the systemic overhaul of the sector that is necessary for ecological health and more resilient communities. Without challenging the social objective of economic growth - without getting that deep - things will, at best, get worse more slowly. There is a dynamic future for fashion ahead, though it will necessarily become a sector with a smaller metabolism and it will need to serve new functions. It will also encompass different activities, different roles, different allocations of time between paid and unpaid work, different relations with nature.

Is the right term for this 'sustainability'? Perhaps. I don't mind so much what we call it - the thing that matters is the experience to which the word points. What is important is that action is enabled and we feel the effects.

For some time now you have been emphasising the link between fashion and the ecological crisis, highlighting the need to overcome the dichotomy between humans and nature. As you have written in your previous contributions, it is essential to be aware that the systems responsible for the serious

threat to our planet Earth are human-made. How can this change of perspective translate into concrete practices for designers and companies in the fashion industry?

It is about a switch from seeing things as separate, as isolated parts or elements organized in a hierarchy; to seeing things as connected and with no one thing more important any other. If the needs of humans are not outranking those of river, what happens to the design brief? If using all the fabric in a order – not wasting any – is essential in order to honour the resources invested in the making of this fabric, then what happens?

Do you think that fashion can stop being the cause of environmental and social crises and become a vehicle for shared well-being? Where can we start?

Certainly this is a shared endeavor - yet we have to start individually, we have to do our own developmental work of finding a link, a connection with the ecological systems that support our lives, no one can do this for us. And then from a place of deep understanding and connection we dress ourselves and start to think about and practice fashion from this changed starting point. This is not about needing to find wilderness or untamed nature. This is about recognizing that everything, including us, including fashion, is interconnected, and then acting accordingly.

You have long explored the concept of 'fashion localism' and design in response to the territory. How can we rethink the fashion system to incorporate dynamics more rooted in specific places and ecological contexts?

Localism is recognised as a central tenet of sustainability that will, it is hoped, solve at root many of society's theoretical and practical problems. Its promise arises from two main sources: first, the different ways power is divided when the scale of living is revised - smaller, local scales change the influence that people have over decisions that effect their lives; and second, the recognition that a community's well-being depends on the health of the ecosystems it lives within, which that same community is uniquely placed to understand and influence. So re-scaling fashion and adapting it to place offers the prospect of self-determined jobs, greater agency within communities and healthy

ecosystems. It is a holy grail of sustainability action and place of great hope and possibility for those invested in the work of deep and lasting fashion change.

Fashion design is often seen as a force for innovation and change. However, in a context of ecological emergency, design that slows down, reduces and simplifies may be necessary. How do you see the future role of the designer in this transition? And what is the role of fashion education in training more responsible professionals?

What we know about the future is that it will be less certain than ever before, more ambiguous, less predictable. And so in this future what we need are the skills of resilience, of grounded imagination and a willingness to engage in diverse experiments in living differently. These are, roughly speaking, design skills. The future has plenty of scope for designers, though not perhaps in the old places. Designers going forward will take roles as facilitators of change, as visualisers of new stories, as experimenters, as educators. Certainly fewer new material products will be made, but there will be plenty of manipulation and organization of existing material stocks...



RON WAKKARY

Ron Wakkary is a Professor in the School of Interactive Arts and Technology, Simon Fraser University in Canada, where he is the founder of the Everyday Design Studio (eds.siat.sfu.ca). In addition, he is a part-time Professor in Industrial Design, Eindhoven University of Technology in the Netherlands. Wakkary's research investigates the changing nature of design in response to new understandings of human-technology relations, multispecies worlds, and posthumanism. He aims to reflexively create new design exemplars, theory, and methods to contribute generously and expansively to understanding ways of designing that are more accountable, equitable, and foster more-than-human cohabitation. Wakkary's recent books include *Things We Could Design for more than Human-Centered Worlds* (MIT Press, 2021) and *The Importance of Speculation in Design Research* (Springer Nature, 2024).

The concept of prosperity is often associated with economic growth and the success of a product on the market, neglecting or downplaying the impact on the environment and people according to a model that has long been considered unsustainable. What is your definition of prosperity and what do you think are the tools and approaches to develop it?

I've not considered the term prosperity before the conference so I can't say I have an interpretation for myself. The term I use is *cohabitation*¹, the idea of living together well. Some qualify this further with the word "thriving", which I believe is a good addition, but the term is rich enough on its own. It takes more than compatibility or fair exchange to live together, to dwell in place among differences and similarities. It requires kinship and accepting entanglements to use posthumanist language. For me, it's important that cohabitation is collective or at least requires others and some form of collective participation. It is also active in that to live with others requires being there together, creating shared places, and lastly it is temporal or durational—the length of time together defines in part the cohabitation. To prosper and to thrive can be seen as an individual matter, separate from place, even exclusively about the interiority of the mind or self. I don't mean that as a critique but more as a comparison to highlight what cohabitation as a term brings.

In terms of approach, I see cohabitation as the goal for designing or what I call designing-with to invoke a more-than-human context for designing. In other words, it can be a measure for the success of what and how well we design. If a thing is designed, how does it contribute to living well together throughout its life and after, well past human use (which we then call "waste"). Further, we can ask how the thing designed existed in the world but also what it took to create a thing and its effects on cohabitation.

I want to be careful about methods, so we don't view emerging techniques as fixed and immediately teachable. This is a necessary area of design research that is difficult given the fullness of the challenge to design from a decentered position and as a relational subject (as required by

designing-with or posthumanist understandings of design). Nevertheless, there are compelling theoretical starting points that we have explored (along with other design researchers) such as noticing (Tsing 2015), translations (Latour 1999), landscape ethnography (Watts 2019), diffraction (Barad 2014; Haraway 1994), and learning to be affected (Lorimer 2015). The work is to move these methods from the analytical to generative considerations of design: the actions and commitments required of designers². I've conceptualized this as repertoires, to signal a more-than-human inflection on methods based on attunement and embodied actions. I have with others explored these in our practices in designing-with plants, pollination ecologies, textiles, networked devices, mycelium, and bioplastics³. These are early explorations and as I said in the end of my keynote, I caution against rushing to instrumentalize what we know now into practice. This caution is inspired by Isabelle Stengers' ideas of cosmopolitics (Stengers 2005) and slow science (Stengers 2018) that ask us to fully accept the challenges to know and further not to resolve differences so easily, especially in the context of neo-liberal pursuits. Rather to take the time (it will take time if done properly) and keep differences of knowing intact.

The concept of 'designing-with' that you propose challenges the tradition of anthropocentric design. What was the main motivation that led you to develop this more relational and inclusive approach? What are the limits of traditional design and how can 'designing-with' overcome them?

My motivation was to engage the community that I was doing much of my research in, namely human-computer interaction (HCI). On a high level, HCI is a fascinating enterprise to understand the relationship between humans and computers. Its starting points were between technical and human cognition but over time evolved to include social,

2 See for example Nicenboim, Iohanna, Doenja Oogjes, Heidi Biggs, and Seowoo Nam. 2023. "Decentering Through Design: Bridging Posthuman Theory with More-than-Human Design Practices." *Human-Computer Interaction* 40 (1–4): 195–220. <https://doi.org/10.1080/07370024.2023.2283535>.

3 See for example Oogjes, Doenja, and Ron Wakkary. 2022. "Weaving Stories: Toward Repertoires for Designing Things." In *CHI Conference on Human Factors in Computing Systems*, 1–21. CHI '22. New York, NY, USA: Association for Computing Machinery. <https://doi.org/10.1145/3491102.3501901> and Tomico, Oscar, Doenja Oogjes, and Ron Wakkary. 2025. "Constituency as a Matter of Practice: Moving a Plant Studio." In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, 1–17. CHI '25. New York, NY, USA: Association for Computing Machinery. <https://doi.org/10.1145/3706598.3713916>.

1 The many concepts discussed in this interview in italics come from Wakkary, Ron. 2021. *Things We Could Design: For More Than Human-Centered Worlds*. Cambridge, Massachusetts: The MIT Press.

philosophical, and political questions about human-technology relations. This has led to fascinating and constructive tensions in HCI between those who pursue a science of technology and generalizable models of users and those who focus on power in the relationships as a matter of race, gender, ethnicity or decoloniality, as examples. What fascinates me in these discussions of who we are putting at the center of our research or what is the appropriate technology, or which technological needs are addressed, is the relations between these questions and perspectives. How these concerns are connected, not only reveals what brings them together but what governs them or shapes them. What is “appropriate” for whom; whose “needs” are we concerned with; and which beings and matter are included in the question of “who”? In HCI, these relations are governed by human-centeredness. What is not said does not need to be said since we can readily assume we are talking about humans.

Human-centered design or user-centered design is an instrumentalized or practical implementation of human exceptionalism. In design, and this instrumentalization goes well beyond HCI to include design and its many variants, the humanist notion of humans as the privileged actors in the world is how we conceive of (and educate) designers; and human concerns are privileged over others in constructs of users and consumers. In professional design or the corporate world of design, late-capitalism and consumerism merge tightly with human-centered design to form the governing force of what is design, its values, and its aims. It's worth noting that Rosi Braidotti makes clear that despite the marketing rhetoric, corporate bodies and the global economy have long gotten over the exceptionalism of humans, flattening all life to be various sources of extraction whether human biology, labour across species, agriculture, or mining (Braidotti 2013).

My earlier research was timid given all this but set the tone. It questioned the concepts of user and designer, i.e., who designs and what do we mean by use (and for whom)? I later adopted a counterfactual strategy of inverting the privilege of humans over technology inherent in most HCI and design to decenter designers and users to ask what it means to be a thing? This question cannot be answered but it revealed other approaches: how things can be designed to ask that question that points toward a decentered form of designing; and how the notion of things is “leaky” to cite Donna

Haraway (Haraway 1985) or more vividly described by Nancy Tuana as having a “viscous porosity” (Tuana 2008). Whatever is designed is not discrete but becomes entangled, not in the sense of the social conditions of things, that is well researched, but in feminist and cyber-feminist realizations that reveal posthumanist and new materialist relations. I would trace these entanglements as best I could to of course find that humans are entangled with nonhuman actors and forces⁴. This revealed to me the problematic of designing with a relational ontology, in which humans and nonhumans (myself, the things we designed, and other things, and the world) co-mingle, shaping each other into meanings and actions. And that a relational ontology made effects and meaning dynamic, changing or in a constant state of becoming to use another post-humanist term. It is from this point in my design research and writing of *Things We Could Design* (Wakkary 2021) the ideas of designing-with, much of what we have been discussing here, came to be articulated. Of course, there were others in my field (HCI) that were also exploring these concerns (Forlano 2017; Light, Powell, and Shklovski 2017).

I don't have the space here to discuss the limits of traditional design, but I can comment on how designing-with can inform directions. I will say that I increasingly came to see human-centered design as defuturing, to borrow Tony Fry's term (Fry 1999), in that it was obscuring and precluding other more expansive possibilities for designing. Designing-with can be seen in this light.

Designing-with can contribute to change in a variety of ways and along a continuum. At one end it asks for a radical change since the governing assumptions are very different than status quo and where our attention should be is also radically different. I tried to outline some starting concepts in *Things We Could Design* that we might get to in more detail later. It is in this sense aspirational but with some conceptual tools for making change.

While radical change may be required, I want to be clear that this does not put all the efforts within human-centered design in opposition. For example, a common point of departure in efforts related to decoloniality, race, or gender in design and more-than-human is a critique of the modernist position of oppression, the privileging of white European male as the idealized and universalized

4 See for example Wakkary, Ron, Doenja Oogjes, and Armi Behzad. 2022. “Two Years or More of Co-Speculation: Polylogues of Philosophers, Designers, and a Tilting Bowl.” *ACM Transactions on Computer-Human Interaction*, January. <https://doi.org/10.1145/3514235>.

human that determines all others to be less-than or “inhuman” as Kathryn Yusoff refers to the historically oppressed of European colonization (Yusoff 2018). This understanding of the historical and ongoing work necessary when invoking the notion of humans is part of my understanding and others in more-than-human concerns. Building on feminist thinkers and indigenous ways of knowing grounded in interdependencies⁵, this position is expanded upon, made more generous to include other species but also seeing technologies in cyber-feminist terms and so a part of more-than-humans. The shared needs and urgencies in this relational and expansive sense are seen to be matters of concern of designing. In the end, more-than-human is inclusive of humans with all the inherent power relations and new ones as well.

To move to the other end of the continuum, the most minimal change, is to affect a realization of the human exceptionalist enterprise of traditional design. And framing practice this way may instill a degree of humility or caution that leads to limiting some actions and engaging the most general level of ethics—just because we can doesn’t mean we should. Whereas concepts like more-than-human biographies that speak to the fullness of the life of things we make can be made part of current design practices, extending sustainability efforts.

Lastly, designing-with has pedagogical value. It and other approaches can be integrated into design education as change is typically generational. Again, there are varying degrees of integration but one emphasis I would make is to shift the focus of the designer from an individual autonomous actor to a collective more-than-human assemblages, a form of infrastructuring (Ehn 2008) as it’s called in participatory design (and what I call constituency). This translates to ongoing collective structures to support designing before designing occurs but inclusive of more-than-humans.

In your work you talk about ‘posthuman subjectivity’. Can you explain how this idea redefines the role and responsibility of the designer? How does the creative and decision-making process of a designer who adopts this perspective change?

I think this is the central challenge. How we move past human subjectivity as cultivated by human exceptionalism from the enlightenment to modernism. A form of subjectivity that fosters the

idea of the autonomous self. A sense of self that creates separation between us and the world around us. A self that is individual and leads to the pursuit of mastery and control. In many respects that is the humanist or modern subjectivity we reproduce in and ask of designers. By contrast, a posthuman subjectivity is not conceptualized as autonomous but relational or interdependent with the world. To the point that mastery and control are not available but also not desirable. Rather the pursuit is humble and seeks kinship and shares agency with other matters and beings. In philosophical terms it is a subjectivity that is decentered and relational, meaning we are one of many actors working in relation to each other in shaping and cohabiting the world and achieving subjectivity through our interdependencies in the world. And further, subjectivity is an ongoing process, even pluralistic, that is both dynamic and requires attentiveness in its constant formation and reformation (Foucault 2005).

In the most general terms, designing as a posthuman subject requires a shift toward listening and working alongside. Metaphorically, it is to embody a position of horizontality to increase contact points with others and sense degrees of difference across the body as opposed to verticality that privileges vision from a single viewpoint above and minimizes points of contact. To be horizontal to work alongside is to embrace the relationality (and humility) of the subject, how as a designer one responds and changes in relation to the situation we are embodied within and with those we cohabit. The metaphoric framing of this points to the need for exploration to meet what is quite a challenge to reorient and re-embodiment from human to posthuman subjectivities. Having said that, we discussed earlier methods or repertoires which are there to support the posthuman subjectivity in designing.

The concept of ‘more-than-human worlds’ implies a vision of design that takes into account non-human agents. What do you think are the main challenges in integrating this perspective into design practice? How can we translate these concepts into concrete tools for designers working in industrial or technological contexts, where a functionalist approach often prevails?

I prefer to turn the question upside down. Since the prevailing functionalist approach will exhaust and destroy the earth’s current habitat, especially the critical zone (the biomes just above

⁵ A wonderful read that ties much of this together is Liboiron, Max. 2021. *Pollution Is Colonialism*. Durham: Duke University Press.

and below the surface of the earth we cohabit), the question is what concepts and tools can support radical change in how we design? The point is that privileging functionality, efficiency, and commerce is not a viable choice going forward. Equally important and relevant, is that designing in more-than-human worlds is also not a choice. Regardless of what approach one takes, one is always designing in more-than-human worlds. Worlds that contest much of what we do but also suffer great harm through the way we currently design.

On the one hand the challenge is great in that the change required is significant and complex. Of course, human-centered design similarly called for radical change from technocentric practices of the 1960s and took some thirty years or more to become a firmly established practice. Creative practices like in textiles for centuries were guild practice for elite classes. It was not until the early 20th century that creative practices were more broadly practiced for wider, less economically privileged classes. In this sense, the challenge is eased when seen as a generational change of integrating more-than-human thinking into design practices. Of course, the patience for change is challenged by the urgencies of our climate, biodiversity, and injustice crises.

Over time you have talked about concepts such as 'speaking subject', 'biography' and 'constituency' in design. Can you elaborate on how these elements redefine the relationships between designed objects and their users (human and otherwise)? How do these concepts help us see objects not just as tools, but as subjects with which we enter into a relationship?

I'm happy to go over these concepts in turn. They also help to address your previous question in more detail. But first I would like to address the last part of your question. I see things or objects, as you refer to them, as lively, meaning they can have agentic effects independent of us, and are dynamic. This liveliness contests the narrow definition of tools, things in stasis but more importantly, as you suggest, we are in dialogue, in an active relationship with things. This is readily obvious with living matter and species (think viruses and animals) but ideas like Haraway's cyborg or Ihde's co-shaping includes technologies (Haraway 1985; Ihde 1990). Things and us are co-constituted, we create meaning and actions in relation to each other. We

form in relation to each other. I use the example of mountaineering to illustrate this point in *Things We Could Design*. Technological clothing shapes humans into mountain climbers and extends to shape mountains into climbable terrain. Of course, the challenge is to design to c-shape in ways that aspire to cohabitation rather than human mastery. This *shared agency*, as commonly referred to in posthumanism, adds to what I referred earlier to the need for designers to listen and work alongside. I distill this into the idea of participation. The need to accept and invite the participation of nonhumans in designing, whether its matter as materials, technologies, or other living beings. This idea of participation is what each of the concepts you asked me to elaborate on are in response to. For example, the speaking subject is about our human role in fostering nonhuman participation; biographies speak to the participation of things in their meaning and effects on the world; and constituencies are about the gathering of humans and nonhumans to participate in the infrastructuring or structures by which we design before designing.

To elaborate, let me begin with the constituency. It refers to a gathering of humans and nonhumans from which designers of things come together to go on to design things. Constituencies are an ongoing concern that are continually configured and reconfigured. A kitchen is a good analogy for a constituency. It is where humans are gathered with nonhumans like food ingredients, cooking utensils, pots and pans, ovens, stoves, and recipes. Cultural and political commitments are made such as veganism, non-GMO, halal, ethnicity, history, and place. This metaphor easily extends to the design studio or other forms of collective structures for designing.

Relatedly, the speaking subject describes the unique role of the human designer in amongst the more-than-human constituency that designs. The speaking subject is accountable for speaking on behalf of, maintaining, caring for, and refining the gathering of humans and nonhumans. There is an inherent ethical dimension to the speaking subject, the ongoing need to address the challenges of representing, caring with, and seeking participation from more-than-human others in ways that do not misrepresent or instrumentalize. For example, Latour talks about a "parliament of things" in which we politically represent humans and nonhumans to other humans (Latour 1993). This inspired the Embassy of the North Sea in the Hague, that seeks

to give inhabitants of the North Sea across all species political representation⁶. In this representation of others, the speaking subject acknowledges the inherent politics and inequalities in assuming such a role. It is important to say that it is impossible to fairly represent and maintain relations with all in a constituency and to speak on behalf others that cannot be fully known or seen. This underscores the need for accountability within the unresolvable ambivalence of the role. Hence, the speaking subject relies on repertoires that we discussed earlier to gather and engage more-than-humans to participate more fully and to make explicit actions to be held accountable.

More-than-human *biography* is the human and nonhuman life force (agencies) that come together to design or form a thing. It signals that shared agencies are dynamic and continually inscribe themselves into the world through their lifetime. A more-than-human biography operates across human and nonhuman temporalities that can challenge our human-scale of time. The concept argues that the value of a thing can be assessed by its more-than-human biography that directly relates to cohabitation, namely its consequences beyond human use and what it leaves behind. For example, the *Bag with handle of weldable plastic material* or more commonly, the plastic bag, patented in 1965 by the industrial designer Sten Gustaf Thulin and the company Celloplast, became a global product of convenience but also one of ongoing colossal waste and toxicity, environmental injustices, and belated legislations to curb its use. All this together, form the shared biography of the plastic bag, Thulin, and Celloplast. We may be closing in on the end of the plastic bag biography—yet its last chapter has the resiliency to last for up to 1,000 years that result in microplastics that do not decompose. In my own research, an example is a project to explore relational technologies with local pollination ecologies of solo bees. It aims to situate the materials and technological choices within the specific locale in terms of ecological cohabitation. Part of that is designing the technological forms in terms of their biography, where do the materials come from to design-with, how do they exist within the ecologies, and how do they end, in terms of decomposition and removal, but also along the different ecological timelines such as long enough for the nesting cycle of mason bees or the foraging

season after which parts decompose on site⁷.

How does the design and the narrative around objects change when we consider them as having a biography or as part of a wider constellation of agents?

This is something we have been exploring recently. In part, the notion of more-than-human biographies like the example of the plastic bag enlists narrative to frame a thing anew. This reveals the necessity to discuss and engage things differently. For example, I've explored how biographies shift the focus of designing from creating something new to creating how something will end—what it will leave behind. I've written about this theoretically in how the endings of things construct futures⁸. I've also encouraged students to design for the end of the thing they are making. And we've explored this in our design research. In any designed thing there are a plurality of endings we might consider: how will the thing or its parts disassemble, fragment, decompose, or become irreducible matter? The narrative framing makes explicit more-than-human temporalities that are not governed by human use or values and exist across different scales.

In the pollination ecologies project, I mentioned earlier there are different endings to consider along different temporal cycles of the ecology and its locale—which happens to be my backyard. Part of what we are designing allows for cavity nesting of the different solo bees in our area. The nesting cycles vary widely so this part is designed for year-round stability. While another part is made of bioplastics that house electronics that are removed in the Fall as they monitor foraging. The bioplastic housing begins to decompose late summer and is left in place to fall apart and decay through to late Fall. Here, we also consider the beginning of the biography. The bioplastic is mostly composed of ground spruce cones collected nearby and so as decaying matter it is not new to the site or ecology. The research surfaces the relations and effects that

⁷ This is an ongoing project but partly discussed in Wakkary, Ron, Doenja Oogjes, Oscar Tomico, Nazmus Sakib, and Ege Kökel. 2025. "Backyard Practices: A Liminal Approach to Designing in More-than-Human Worlds." In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, 1–18. CHI '25. New York, NY, USA: Association for Computing Machinery. <https://doi.org/10.1145/3706598.3713291>.

⁸ See Wakkary, Ron. 2024. "More-than-Human Biographies: Designing for Their Endings." In *Designing More-than-Human Smart Cities: Beyond Sustainability, Towards Cohabitation*, edited by Sara Heitlinger, Marcus Foth, and Rachel Clarke, 305–26. Oxford University Press. <https://doi.org/10.1093/9780191980060.003.0017>.

⁶ <https://www.embassyofthenorthsea.com/>

occur over different timelines that affect how what we design cohabits within the ecology. Much of the focus is in determining what we don't know or cannot know and finding the humble path through.

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ESSAYS

HISTORY

THE WARDROBE AS COLLECTION

A RESPONSE FOR PROSPERITY FASHION

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Abstract

The Italian fashion journalist, Anna Piaggi (1931-2012) offered a potential response for prosperity fashion through her singular approach to self-fashioning. Her wardrobe collection, containing approximately 3,000 garments and accessories, contained museum-quality objects which could be likened to the holdings of major museum collections such as the Victoria and Albert Museum, the Metropolitan Museum of Art and the National Gallery of Victoria. Consequently, through my PhD thesis, I have argued that the wardrobe collection can be likened to the museum collection. The positioning of the wardrobe as collection then offers opportunity for intersections with broader ideas around slow fashion (Fletcher, 2010). For Fletcher, slow fashion need not solely be the slow manufacture of garments in an artisanal process but can incorporate broader ideas. This research proposes that Anna Piaggi offers a revised consideration of what the slow fashion wardrobe can be and that the wardrobe can become a slowly assembled collection, on par with or likened to a museum collection, that is continuously reinterpreted.

Keywords: *Wardrobe, Collection, Rapid Curation*

INTRODUCTION

The Italian fashion journalist, Anna Piaggi (1931-2012) offered a potential response for prosperity fashion through her singular approach to self-fashioning and collecting. Her wardrobe collection, containing approximately 3,000 garments and accessories, contained fine art museum-quality objects which could be likened to the holdings of major museum collections such as the Victoria and Albert Museum, the Metropolitan Museum of Art and the National Gallery of Victoria. Consequently, through my PhD thesis, I have argued that the wardrobe collection can be likened to the museum collection and that the rearrangement of it on the body can be likened to continued object interpretation and display as

practiced in exhibition curating. Whilst it is not necessarily realistic for personal collections of fashion to contain as many items, the positioning of the wardrobe as collection offers opportunity for intersections with broader ideas around slow fashion (Fletcher, 2010). For Fletcher, slow fashion need not solely be the slow manufacture of garments in an artisanal process but can incorporate broader methods and ideas. This paper proposes that Anna Piaggi offers a revised consideration of what the slow fashion wardrobe can be and that the wardrobe can become a slowly assembled collection, on par with or likened to a museum collection, that is gradually and judiciously collected over an extended period and continuously reinterpreted. This paper will discuss what a

collection is, how it intersects with the wardrobe, and how the wardrobe can be interpreted as a collection to then be continuously reinterpreted on the body. This practice of collecting and display is also modeled by museums, as they assemble permanent collections which are consistently reinterpreted through temporary exhibitions or permanent collection changeovers over the long lifespan of a collection. Within that time, preventative measures are taken to extend the life of the object, and conservation is undergone, if required. The same approaches can also be applied to the wardrobe collection. This paper uses a methodology that combines my own personal experience as a curator for over 20 years, along with material object analysis supported by art and fashion history, image and object analysis and study of Anna Piaggi through journalistic articles and interviews (Mida & Kim, 2015; Palmer, 2013; Steele, 1998; Taylor, 2013).

WARDROBE AS COLLECTION

Typically, collections, regardless of the subject matter, are slowly and thoughtfully assembled over an extended period time (Carl, 2024). For the museum, this is often over generations, for the individual, it is more likely over a lifetime. The verb to collect derives from the Latin word *colligere*, which denotes to select, gather and assemble. However, rather than just to gather, what distinguishes a collection from mere accumulation is specificity, discernment and connoisseurship. Connoisseurship refers to a person with expert knowledge able to distinguish original work from forgeries (Preziosi, 1998). Discernment is practiced as collectors make selections based on accumulated knowledge gained through constant research on the subject area and context (Preziosi, 1998). The collection is also often defined by parameters of interest and defining conventions, often to do with a particular type of object, or an overriding ideology. The fine art museum collects representative fine art from across centuries. Modes of selection and criteria are based on a high art context, and from this context terms such as encyclopaedic, museum-like and museum quality recur which reflect various criteria of selection curators apply often around aesthetics, placement in cultural context and condition (Druesedow, 1987). Conversely, the private collector collects to their specific taste (Carl, 2024). Time is invested in sourcing and securing prized objects that meet

the collector's specific ambitions defined by their specific and refined interests. For example, Anna Piaggi travelled to far off locations to seek fine art museum quality vintage garments by designers such as Charles Frederick Worth or Jeanne Lanvin (Clark, 2006) and other lesser known collectors such as Neil Taylor, paid for early 1980s Vivienne Westwood Hypnos and Witches collection items in slow installments as "Taylor diligently purchased each piece, week after week, on lay-by from Elle Boutique in Perth" (Di Trocchio, 2004, para. 8). Over several years Taylor acquired a remarkable collection whilst he worked as a hairdresser and wore his treasured items to nightclubs. Consequently, collecting is defined as "the selecting, gathering and keeping of objects of subjective value" (Muensterberger, 2014, p. 4). The value of the collection is defined by the collector's subjective tastes and what they value. This application of value means that time is invested in the locating, sourcing and acquiring, which then leads to a prolonged relationship with the object. This subjectivity also points to a particular ideological taste, individually developed and tailored. For the museum, this points to a set of objectives of what they represent. For the individual, this is a personally tailored output of their view.

This paper proposes a shift in attitude towards the wardrobe, from one of reactivity in response to fashions, trends and events, to one where the wardrobe is framed as a collection that is accumulated slowly through deep consideration, meaning and attachment, using the framework of a collection to do so. The collection becomes more permanent than transitory and slow considered accumulation can lead to greater attachment to clothing. Benjamin (1969) argues that possession is the deepest relationship one can have with things. The collector is a utopian figure who frees objects from having to be useful, to instead imbue them with history and accumulative meaning (Benjamin, 1969). This aspiration to a deep connection to objects built over time can in turn resolve feelings of anxiety for consumers who feel guilt and shame around excessive and ill-considered purchasing (Petersson McIntyre, 2021) but also relies on a grounding of knowledge around fashion objects and a collector's mindset informed by what items culturally mean and how they relate to the collector and the greater collection. This method suggests a thorough engagement with the objects, where the collection is framed as representative of the

individual, but it also defines one's relationship within society, and position within it and other individuals (Baudrillard, 1994). This approach has intersections with wardrobe studies, a methodological approach that focuses on the use, life cycles and connections between items in a wardrobe, analysing the way clothes relate to each other on the whole or in parts of the wardrobe (Klepp & Bjerck, 2014). But this suggested approach is more specifically aligned with material culture studies in that material culture consists of studying objects and the meaning they hold for people (Gerritsen & Riello, 2015) in the way they are made, used, reused and the meaning they hold within culture. More than the use by the individual as in wardrobe studies, material culture considers the significance of the broader culture and how that then relates to the individual. For Anna Piaggi, she referred to her clothing as friends, as they were all things with many lives (Blanchard, 2005). Her wardrobe items were astutely selected objects that had a broader significance within culture. She selected representative pieces by Zandra Rhodes, Manolo Blahnik and Missoni (Piaggi & Lagerfeld, 1986) to name just a few. In her view, her fashion objects had already lived and would continue to live as long as she continued to wear them (Blanchard, 2005). Han Byung-chul (2022), metaphorically uses the figure of the collector as one who removes things from their commodity character and elevates them to the status of staples of the human world. He reflects on contemporary society's elevation of experience over objects, lamenting the loss of objects and the relationship they have to self, acknowledging that 'Products are charged with emotion by way of storytelling' (Byung-chul, 2022, p. 13). Objects in turn acquire histories over the course of being used over a long time, giving them soul (Byung-chul, 2022) and echoing Anna Piaggi's sentiments that objects can be imbued with many lives through their uses. The reading of a garment as material culture object is also adopted within museums and galleries (Anderson, 2000, p. 375). Within fine art museums, garments are considered for their aesthetic qualities, representative of the designers who made them, how they were used and what they meant within society. Within the model of wardrobe as collection, objects are selected for their aesthetic values, cultural meaning and for the way in which they reflect the greater collection, its narrative and parameters, assembled as a collection to be repeatedly reinterpreted.

Some contemporary fashion commentary invites consumers to rethink their wardrobe in terms of capsule curated wardrobes with a focus on quality and longevity over quantity and trends (Xidias, 2023). This commentary suggests a shift in value to endurance as opposed to instant novelty. Yet, this often leads to an understated selection of items in black, beige, grey and white (Waterhouse & Lai, 2024) that are not distinctive and may not be individually representative. Instead, the collector typically selects items which are distinctive, significant and individual. The art magazine, *See all this*, dedicated its summer 2024 issue to the wardrobe as art collection (Edelkoort, 2004), proposing the wardrobe as a collection. Five collectors were featured, including a couture client, a design curator, a gallerist, a sculptor and an investor. Whilst the couture collector is an unrealistic aspiration for most, the design curator and gallerist provide a more achievable template for the wardrobe as collection, as each amassed idiosyncratic clothes over an extended period of time by designers each collector feels an affinity with (Edelkoort, 2004). Connection, affinity and uniqueness are recurring qualities within the wardrobe as collection which point to a unique attachment, that pleases and represents the collector. This idea of connection also echoes Benjamin's sentiments around possession as the greatest means of connection (Benjamin, 1969). Proposing the wardrobe as a collection addresses the invitation to question existing systems around consumption whilst proposing a novel solution. The mindset of the collector encapsulates an approach, an attitude, a shift in mindset from reactive consumption to slow collecting with the consideration of a personal connection representative of an overall grand collection narrative, often to do with representing the individual. Anna Piaggi provides a precedent for this approach to building a wardrobe as a collection, accumulating it over time, and reinterpreting it repeatedly. This approach provides a potential solution around attitudes of building future wardrobes. For example, Anna Piaggi accumulated her wardrobe of fashion historical and contemporary fashion objects of both high and low fashion from 1967 to her passing in 2012, selecting items for their aesthetic qualities from a variety of historic periods from the eighteenth century to the present day, regardless of overriding fashions or trends. She then coordinated and re-coordinated items on her body in diverse

combinations over her lifetime.

She also assembled her collection in a similar way to many major museums, sourcing objects from comparable sources. For example, she collected regional dress from markets, vintage stores and auctions through the late 1960s to early 1970s. She purchased iconic Ballet Russes costumes at auction alongside Gallery Director James Mollison who purchased a significant collection of Ballet Russes costume for the National Gallery of Australia (Bell, 2010). Anna Piaggi also acquired garments directly from designers, dealers and donors (Piaggi & Lagerfeld, 1986) as museums do today.

Along with Anna Piaggi, a selection of individuals also collected museum-like fashion collections to wear, demonstrating additional applications of this idea. For example, the interior designer Iris Apfel collected and wore vintage and contemporary fashion throughout her life (Horwell, 2024). Contemporary fashion icons, such as Kate Moss and Alexa Chung, are amassing significant fashion collections (Bakshi, 2023). Cate Blanchett owns important pieces of Armani with her use and reuse of them becoming increasingly common (Legardye, 2023). However, the practice is not limited to fashion insiders and celebrities. The increase worldwide of online and retail second-hand marketplaces for the purchase of high quality fashion objects, in combination with increased knowledge and interest in historic and contemporary fashion opens opportunities more broadly for the expansion of collecting wardrobes as collections.

COLLECTION ON THE BODY

Collecting is an infinite pursuit, with the collection never realised (Baudrillard, 1994). This circumstance ensures the economic continuation of the fashion consumption, albeit at a slower more considered pace. In addition, the possession of a collection enables the collector to arrange and reorder their intimate personal microcosm (Baudrillard, 1994). The collection enables the collector to reorder objects to themes and representative ideas. Taking objects out of their original contexts can create new trajectories and displace orders of time (Baudrillard, 1994; Crimp, 1993). The act of possessing a collection invites the freedom to re-narrate the story, context, origins and interpretation of objects, through first selecting and then rearranging. Collectors can create new orders by collecting objects and then displaying them,

not just once, but many times over. This repeated interpretation and display adds to the multiplicity of meanings of an object (Ventzislavov, 2014).

Translated to the wardrobe, garments can be continuously collected serving the purpose of transforming an existing collection through regular rearrangement on the body. Edelkoort reflects on how “one new item can ignite a wardrobe and give new life to oldish garments, as one new artist’s drawings can change an entire room” (Edelkoort, 2004, p. 70). Likewise, within the fashion collection, the addition of a new item, can reinterpret an ensemble. In the example of Anna Piaggi, an alternative hat can change the context and narrative of her ensemble. For example, in 1998 to the book launch of *Anna Piaggi’s fashion algebra: DP in Vogue*, she wore a dress mimicking a book by Jean Charles de Castelbajac with a cape made of printed paper, and a hat by Stephen Jones imitating a folded newspaper boat hat with an Italian flag hovering above it. Using an interpretative methodology derived from fashion curatorial practice, object interpretation combining material culture research, dress and art history and image and interview analysis (Mida & Kim, 2015; Palmer, 2013; Steele, 1998), I interpreted the change in the meaning of the ensemble like so. The folded paper hat celebrated the quality of paper that was being highlighted at the book launch and the Italian flag celebrated her culture. In 2003, she wore the dress again with a different hat. The paper hat was exchanged for the more sophisticated miniature top hat also by Stephen Jones, which was becoming her signature accessory. By 2003, she was more closely honouring her affiliation with London, through the top hat prototype, made miniature to add whimsy and playfulness. The new hat was overprinted with black and white text as if from a newspaper, celebrating the paper-like qualities of the dress, however, the message was one of increasing sophistication and British allegiance. The exchange of headpieces expanded the object biography (Kopytoff, 1986) of each piece in her ensemble. Within the wardrobe, objects can build layered, textured, narratives through repeated use, varied association and layered and accumulated personal stories.

Claire Wilcox commented in 2001, ‘The history of museums is as much made up of its exhibitions as by the sum of its permanent collections. These events mark moments in time and changes in attitude, for curators collect ideas as

well as objects' (Claire Wilcox in Taylor, 2004, p.2). Thus, the presentation of objects within exhibition is as important as the collection contained and collected by the museum. As discrete moments in time, with a clear opening date and closing date, exhibitions mark changes in contemporary attitudes through objects (Claire Wilcox in Taylor, 2004, p.2). Ultimately, the exhibition is about object analysis and interpretation primarily with the use of other objects. Converted to the context of the wardrobe, the ensemble that is created with the reordering of the collection becomes a mark of a time as well. It is reinterpreted and made new through the combinations and readings made with other objects in combination.

Anna Piaggi's practice also addresses the notion of whether fashion needs only be concerned exclusively with the "new" (Clark, 2008, p. 429), providing an example where newness can be achieved through arrangement and thus provides a model for prosperity fashion, where fashion can be rethought in terms of collection, arrangement and reinterpretation over a lifetime, rather than as transient and disposable. Such practice operates outside the dominant fashion system, which is based on the modern concept of novelty and change (Kant, 1974; Svendsen & Irons, 2006) and dictated from above (Simmel, 1904).

In order to maintain the collection, care must be exercised. Such care includes the careful storage of items and appropriate care around cleaning. Tears and abrasions can be mended, with layers of history and historical use built into garments. This calls to mind the aesthetic of Maison Martin Margiela which celebrates the past use of fashion items (Debo, 2008).

CONCLUSION

Anna Piaggi has been described as a work in progress (Blanchard, 2005), pointing to the fact that Anna Piaggi is being forever made and being remade, using her fashion collection to continuously remake herself. This analogy or view, might suggest how we can all continuously aim to remake ourselves with our slowly built, considered and evolving wardrobe collections, that fundamentally represent our own tastes, informed by expertise, aesthetic judgement and intellect to do with materials, fibres and broader aesthetic and cultural ideas. The collection is slowly built and evolves with us. Through this, Anna Piaggi proposes a rethinking of the fashion wardrobe as a collection, not

as capsule collection of beige, but as a representative collection of the self, shaped and informed by cultural history and aesthetic objects. This model is aspirational. It presents a shift in attitude and imagines an alternative attitude to garments, where they are revered, considered and lovingly collected to be repeatedly rearranged on the body over a lifetime. As New York Times fashion writer and journalist Guy Trebay wrote, "the core function of most creative people in an information-glutted age is not innovation but rearrangement" (Trebay, 2004, p. 271). This new fashion model is based on collection and then rearrangement of the individually and affectionately acquired personal fashion wardrobe collection.

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BEYOND DOMESTICITY

REVALUING GENDERED TEXTILE ARTS IN THE CONTEXT OF RELATIONAL PROSPERITY

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Abstract

This paper examines the historical undervaluation of textile crafts in Western societies, largely due to their association with female labor. Often dismissed as “women’s work,” textile arts have been marginalized despite their rich cultural and social significance (Nochlin, 1971). This study challenges these perceptions by emphasizing the value of textile crafts in fostering a more relational and ethically grounded vision of prosperity in fashion. Through an analysis of communal practices like knitting groups, the paper explores how textile arts function as forms of relational art (Newmeyer, 2008). These practices nurture community, preserve cultural heritage, and act as platforms for social and political expression. They embody a prosperity rooted not in commerce but in social connection and collective well-being. A case study of Italian textile artist Maria Lai illustrates how textile arts can reshape relationships with urban space and reframe fashion as inclusive and sustainable. Lai’s work, grounded in personal narrative and community engagement, highlights the potential of textile crafts to move from the margins to the center of a more ethical fashion discourse. Ultimately, this paper calls for a revaluation of textile material culture as a path toward sustainable, relational prosperity in the fashion industry.

Keywords: *Heritage, Gender, Textile, Relational art, Community*

INTRODUCTION

Throughout history, certain artistic and cultural practices have been undervalued, often because they are linked to gendered labor. Textile crafts—like knitting, weaving, embroidery, and quilting—are prime examples. These forms of creativity have often been dismissed as “women’s work” and confined to the domestic sphere, leaving them excluded from the domains of high art and economic recognition (Gullickson & Hafter, 1997). This pattern reflects deep-seated societal biases that devalue activities associated with femininity, seeing them as less important. In Western cultures, the connection between textile crafts and the domestic realm has further entrenched their marginalization, limiting their acknowledgment as valuable

contributions to culture or the economy (Costin, 2012).

Yet, textile arts are far more than decorative or utilitarian objects. They hold profound cultural, social, and political significance. These crafts carry rich histories and narratives, often embodying the traditions and struggles of entire communities. As creative practices, they foster human connection, build social ties, and even create spaces for political expression, especially when pursued collectively (Corbett & Housley, 2011a). By dismissing textile crafts, society misses the opportunity to recognize their artistic power and their potential to contribute to more inclusive and ethical cultural and economic systems.

This paper seeks to challenge these entrenched biases by reframing textile crafts as central to a more relational and ethically grounded concept of prosperity in fashion. Unlike conventional ideas of prosperity, which are often tied to economic metrics, relational prosperity focuses on human relationships, community well-being, and cultural sustainability. By examining textile arts as a form of relational art, this study emphasizes their ability to connect people, preserve heritage, and inspire sustainable practices within the fashion industry.

The analysis begins with an exploration of the historical and gendered biases that have long marginalized textile crafts, setting the foundation for revaluing their cultural and economic importance. Using relational art theory, the paper argues that communal textile practices represent a unique kind of prosperity—one that transcends material wealth and emphasizes shared human experiences. To illustrate this, it examines the work of Maria Lai, an Italian artist whose textile creations demonstrate the transformative potential of these crafts. By situating Lai's art within the broader framework of relational prosperity, the research highlights the vital role of textile arts in shaping a more inclusive, ethical, and sustainable future for fashion.

Ultimately, the paper advocates for a paradigm shift in how textile material culture is valued within the fashion industry. It calls for a move away from profit-driven priorities and toward a model that centers on relational, ethical, and sustainable practices. By embracing this perspective, the fashion industry can redefine prosperity in a way that supports both human and environmental well-being.

HISTORICAL CONTEXT AND GENDERED PERCEPTIONS OF TEXTILE ARTS

The history of textile arts is deeply woven into the cultural and social fabric of gender dynamics, particularly in Western societies. Textile crafts—knitting, weaving, quilting, and embroidery—have traditionally been linked to domestic labor and femininity (Chen, 2019). Consequently, they have often been dismissed as secondary to other artistic forms, viewed as practical rather than expressive, and confined to the private realm. This marginalization stems not from a lack of skill or creativity in textile work but from deeply ingrained biases

that equate women's labor with lower cultural and economic value (Hermkens, 2007).

These attitudes are rooted in historical narratives that elevated male-dominated forms of artistic and economic production. As feminist art historian Linda Nochlin famously noted in her 1971 essay *Why Have There Been No Great Women Artists?*, systemic barriers excluded women from participating in elite cultural spaces (Nochlin, 2021). Textile crafts, predominantly practiced by women, were categorized as “craft” instead of “art”—a distinction that diminished their perceived value. Industrialization further reinforced these biases, divorcing textiles from their artisanal origins and associating them with mechanization and alienated labor (Dragicevic Curkovic, 2021).

Despite this, textile arts have long been a powerful medium for cultural preservation and innovation. Throughout history, they have served as tools for storytelling, identity formation, and community cohesion (Kelly, 2014). Medieval embroidered textiles, for instance, were far more than decorative objects; they encoded genealogies, religious stories, and historical events (K. Rudy & Baert, 2007). Similarly, the long-debated history of African American quilting traditions in the 19th century combined practicality with resistance, with patterns often embedding symbols of freedom along the Underground Railroad (Kimberly Wulfert, 2010). Is worth mentioning the scholarly dispute on Underground Railroad patterns.

These examples challenge the simplistic view of textile arts as mere domestic handiwork, highlighting their depth and cultural significance.

In the 20th and 21st centuries, feminist artists and scholars have worked to reclaim and redefine textile crafts as a form of resistance against patriarchal norms (Kelly, 2014). Feminist art movements of the 1970s, for example, elevated the status of “women's work,” integrating it into the broader art historical canon (Felshin, 1995). Artists like Judy Chicago and Miriam Schapiro disrupted traditional hierarchies by incorporating textiles into their art, asserting their place within the fine arts arena. More recently, scholars have highlighted how textile crafts operate as subversive aesthetic strategies, offering tools for feminist critique and political expression (Wells, 2021).

Yet, the perception of textile arts remains complex and contradictory. On one hand, they are celebrated in certain contexts as high art or vital cultural heritage. On the other, they continue to be

undervalued in mainstream artistic and economic discourses (Nelson et al., 2005). This tension reflects larger societal struggles to fully recognize traditionally feminized labor and its intersections with cultural identity, heritage, and economic equity.

By critically examining the historical and gendered biases surrounding textile arts, we can begin to unravel the prejudices that have long marginalized these practices. Reframing textile crafts as central to cultural production—not peripheral—creates space for a more inclusive and equitable understanding of their artistic and social contributions. This reevaluation is vital, not only for honoring these crafts but also for developing relational prosperity models that celebrate their role in fostering community, preserving heritage, and promoting sustainable cultural practices.

RELATIONAL ART AND ITS ROLE IN PROSPERITY

Relational art, as theorized by Nicolas Bourriaud in *Relational Aesthetics* (1998), shifts the focus of art from creating objects to cultivating social experiences and connections (Martin, 2007; Nicolas Bourriaud, 1998). This perspective provides a compelling framework for examining textile arts, particularly their ability to foster relationships, build communities, and create spaces for collective engagement. Textile crafts, often practiced in communal settings, exemplify relational art by emphasizing human interaction and the shared process of creation (Burisch, 2016). This quality aligns naturally with a reimagined concept of prosperity—one rooted in relationships rather than transactions.

Traditional definitions of prosperity tend to focus on material wealth and individual achievement. In contrast, relational prosperity prioritizes social cohesion, cultural sustainability, and ethical practices (Diwan, 2000). Textile arts, through their inherently relational nature, offer a tangible model for this alternative understanding of prosperity. Consider communal knitting groups: the act of creating together fosters meaningful connections among participants, turning individual artistic efforts into shared experiences. These gatherings often become spaces for storytelling, mutual support, and even political expression, transcending the physical outcomes of the craft to generate invaluable forms of human wealth (Michna, 2020).

The political dimensions of relational art

within textile crafts are particularly noteworthy. Crafting has historically been intertwined with resistance and social critique. During the suffragette movement, for example, embroidery and banner-making were powerful tools for visibility and empowerment, embedding messages of solidarity into fabric (D. Jones, 2020). In recent years, movements like craftivism have emerged, combining traditional crafting techniques with activism to address contemporary issues such as climate change, labor rights, and gender inequality (Corbett & Housley, 2011b). These examples demonstrate how the relational nature of textile practices can foster not only social prosperity but also systemic change.

In addition to their political relevance, textile crafts play a vital role in preserving cultural heritage. Practices such as weaving, embroidery, and quilting often pass down through generations, creating a living archive of communal knowledge and tradition. By engaging in these crafts, practitioners reaffirm their ties to their communities and histories, transforming individual acts of creation into collective acts of memory (Sotomayor & García, 2019). This relational dynamic is particularly profound in Indigenous and marginalized communities, where textile arts frequently serve as tools for cultural resilience and identity preservation (Newmeyer, 2008).

Within the fashion industry, the principles of relational art present a radical alternative to the commodification and alienation that dominate conventional production models. By adopting relational practices, the industry can pivot toward a concept of prosperity that centers ethical relationships over profit. This might involve re-centering the role of craftspeople, fostering transparency in production processes, and embracing the collaborative potential of textile arts. Such an approach would not only elevate the cultural value of fashion but also align with sustainability goals, promoting human-centered and environmentally conscious practices (Senanayake & Gunasekara Hettiarachige, 2020).

Relational prosperity, as embodied in textile arts, offers a vision of the future where creativity, community, and ethical practice are deeply interconnected. By valuing the relational dimensions of these crafts, we take a step toward redefining prosperity in ways that honor both human and environmental interdependence. Textile arts thus transcend their status as cultural artifacts;

they become active agents in shaping a more inclusive and sustainable understanding of wealth and well-being.

REIMAGINING PROSPERITY IN FASHION

The concept of prosperity has traditionally been tied to economic growth and material accumulation. Within the fashion industry, this paradigm manifests in the prioritization of profit-driven practices, mass production, and conspicuous consumption. However, these models often exacerbate social inequalities and environmental degradation, prompting the need for alternative frameworks. Reimagining prosperity in fashion involves shifting the focus from mercantile success to relational, ethical, and sustainable values. Textile arts, with their emphasis on community, heritage, and shared creativity, provide a blueprint for this transformation.

At the core of this reimagined prosperity is the recognition that wealth is not solely material but also relational. Textile crafts exemplify this principle by fostering human connections and cultural exchange. Practices like communal knitting circles, embroidery workshops, and weaving cooperatives create spaces where individuals come together, collaborate, and share knowledge (S. Jones, 2022). These interactions generate forms of social wealth that cannot be quantified in economic terms but are essential for individual and collective well-being. By integrating such relational practices into the fashion industry, we can move toward a model of prosperity that values people and their connections as much as products.

Sustainability is another critical dimension of this reimagined prosperity. The fast fashion industry has long been criticized for its unsustainable practices, from exploitative labor conditions to excessive waste generation. By contrast, textile crafts are often rooted in principles of resourcefulness and longevity. Many traditional crafting techniques, such as hand-weaving and natural dyeing, rely on renewable resources and prioritize quality over quantity. Incorporating these practices into contemporary fashion production not only reduces environmental impact but also reinforces the idea of prosperity as stewardship of shared resources.

Ethics plays a vital role in this new vision of prosperity. Revaluing textile arts requires addressing the systemic inequities that have marginal-

ized these crafts and their practitioners. The global fashion industry often relies on the labor of artisans and craftspeople in the Global South, yet their contributions are frequently undercompensated and undervalued (Bick et al., 2018). Reimagining prosperity involves recognizing and fairly compensating the skill and creativity of these workers, ensuring that the benefits of their labor are equitably distributed. Additionally, it calls for greater transparency and accountability in fashion supply chains, fostering relationships of trust and mutual respect between brands, makers, and consumers.

Maria Lai's work offers a compelling example of how textile arts can embody this reimagined prosperity. Her projects, deeply rooted in community engagement, demonstrate how fashion and art can serve as tools for fostering social cohesion and cultural resilience (Huang & Anderson, 2019). By using textiles to narrate local histories and engage with urban spaces, Lai's work transcends the aesthetic to address relational, ethical, and environmental concerns. Her practice highlights the potential of textile crafts to inspire a more inclusive and sustainable approach to fashion, one that values collaboration over competition and legacy over short-term gain.

Reimagining prosperity in fashion is not merely an aspirational goal; it is a necessary response to the crises of inequality and unsustainability that plague the industry. By drawing on the principles exemplified by textile arts—relationality, sustainability, and ethics—fashion can redefine its purpose and role in society. This shift requires a collective effort, involving brands, designers, policymakers, and consumers in the creation of systems that prioritize human and environmental well-being over profit. In doing so, fashion can become a conduit for a more inclusive and equitable prosperity, one that reflects the interconnected nature of our global community.

CASE STUDY: MARIA LAI'S CONTRIBUTION

Maria Lai (1919–2013), an Italian textile artist from Sardinia, serves as a profound example of how textile crafts can embody relational prosperity in fashion and art. Her work challenges traditional hierarchies of artistic value, emphasizing community, heritage, and the interplay between the personal and collective. By integrating textile arts into public and participatory practices, Lai redefined the role of

craft in cultural production, illustrating its capacity to foster social connections, preserve traditions, and inspire ethical approaches to creation and consumption.

Lai's artistic practice was deeply intertwined with her Sardinian roots. Her works drew on the traditions, narratives, and landscapes of her native region, transforming them into universal expressions of relationality. One of her most iconic projects, *Legarsi alla Montagna* (*Binding to the Mountain*, 1981), exemplifies her approach to art as a communal experience. Commissioned by the mayor of Ulassai, a small Sardinian village, the project engaged the entire community in a symbolic act of connection (Iannelli & Marelli, 2019).

For this performance, Lai invited villagers to bind their homes to the nearby mountain with ribbons, creating a physical and metaphorical thread that united the community. The project was inspired by a local legend about a girl who was saved from a collapsing mountain by following a ribbon. By referencing this story, Lai linked the collective memory of the village to a shared creative act, transforming an abstract concept of unity into a tangible and participatory experience. *Legarsi alla Montagna* illustrates how textile materials, when used relationally, can transcend their utilitarian origins to foster connections and build social prosperity.

While Maria Lai's work is often celebrated for its poetic and communal qualities, it is equally crucial to acknowledge its political implications. Her practice, though not explicitly framed within traditional political discourse, performs a form of soft resistance—one that challenges dominant narratives of authorship, power, and value through relational and material means. In "Legarsi alla Montagna," for instance, the act of binding a village together with fabric becomes a metaphor for social cohesion, but also for reclaiming agency in the face of institutional and cultural fragmentation. By inviting collective participation, Lai subverts the hierarchy between artist and audience, and by using textile—a medium historically relegated to the private, feminine, and marginal—she reclaims and elevates a mode of expression often excluded from dominant art and political arenas.

This politicization of care, memory, and community through textile art resonates with contemporary forms of craftivism, where traditional crafts are employed as tools for social critique

and protest. Lai's work prefigures these movements, using the language of thread, stitching, and weaving to construct a counter-narrative to both patriarchal art histories and capitalist frameworks of production. Her pieces become sites of micro-political intervention: slow, embodied, and rooted in place, but deeply critical of systems that displace, silence, or commodify. In this sense, Lai exemplifies how textile arts can operate not only as cultural or aesthetic contributions, but as instruments of political imagination and communal empowerment.

Maria Lai's work exemplifies the transformative potential of textile arts when applied to urban and public spaces. Her projects not only blurred the boundaries between art, craft, and social practice but also redefined the role of public spaces as sites for connection, storytelling, and collective memory. Through her innovative use of textiles, Lai demonstrated how urban spaces could become relational environments, fostering a sense of community and cultural identity.

URBAN SPACES AS CANVASES FOR CONNECTION

Lai's *Legarsi alla Montagna* (*Binding to the Mountain*, 1981) is perhaps the most striking example of her impact on urban and communal spaces. By asking the villagers of Ulassai to participate in binding their homes to a mountain with fabric ribbons, Lai transformed the town into a living artwork. This act turned the village into both a literal and metaphorical tapestry, connecting individuals to each other and their shared environment. The ribbons, with their fluid, colorful presence, reimagined the village as a space of unity and creativity, transcending its physical boundaries to engage with natural and symbolic elements.

This project highlights the potential of textile arts to redefine urban spaces as places of relational prosperity (Price, 2015). By involving local communities in the creative process, Lai challenged the conventional top-down approach to public art, which often imposes external visions onto communities. Instead, her work emphasized co-creation, weaving together the narratives of individuals into a shared, collective story. This approach not only strengthened the community's ties to their environment but also fostered a sense of ownership and pride in their cultural heritage.

While Lai's work is rooted in the context of Sardinia, her methods and principles have broad applicability. Textile-based interventions in urban

spaces have the potential to address a range of global challenges, from fostering social inclusion to promoting sustainability (Gasparini, 2021). In contexts of urban fragmentation, for instance, participatory textile projects can serve as tools for bridging divides between different social, cultural, or economic groups (Suarez-Visbal et al., 2023). By inviting diverse communities to collaborate on shared creations, such projects generate dialogues and connections that transcend barriers (Scher, 2007).

Textile arts also offer unique possibilities for environmental awareness in urban spaces. Fabric-based installations can draw attention to issues of waste and sustainability by utilizing recycled or locally sourced materials. Temporary textile works, such as large-scale banners or installations, can engage urban populations in conversations about resource conservation and the environmental impact of the fashion industry.

Lai's use of textile materials was not incidental but deeply intentional. She understood textiles as carriers of cultural heritage, particularly in Sardinia, where weaving and embroidery have long been central to local identity. Her works often incorporated traditional Sardinian techniques and motifs, blending them with contemporary artistic approaches. For Lai, the act of weaving symbolized both the preservation and reinterpretation of tradition, bridging past and present.

One notable example is her *Geografie* series, in which she used sewn thread to create intricate maps on fabric. These maps were not literal but abstract, representing emotional and narrative landscapes rather than geographic ones. Through these pieces, Lai emphasized the importance of storytelling and personal memory in the preservation of cultural identity. Her *Geografie* demonstrated that textile arts are not static artifacts but dynamic practices capable of evolving while retaining their connection to heritage.

Textile arts, as illustrated by Lai's work, can play a significant role in cultural preservation and urban renewal. Sardinia, Lai's homeland, has long been characterized by a rich textile tradition, which she integrated into her projects as a way to celebrate and preserve local heritage. In doing so, Lai elevated crafts historically associated with rural and domestic spaces, bringing them into urban and public contexts.

This repositioning of textile arts challenges the traditional divide between "high" and "low"

culture, offering a model for how urban spaces can become platforms for the celebration of diverse artistic practices. For cities grappling with issues of cultural erasure and homogenization, such approaches provide a framework for integrating local traditions into urban renewal projects. Textile installations, for example, can transform public spaces into dynamic arenas that celebrate communal identity and historical continuity while encouraging creative engagement from residents and visitors alike (Price, 2015).

BEYOND THE URBAN: THE BROADER INFLUENCE OF LAI'S METHODS

Lai's approach to textile arts extends beyond urban spaces, offering insights into the broader potential of textiles as tools for social and cultural transformation. Her methods—grounded in participation, storytelling, and relationality—highlight the ability of textile crafts to foster connections across different scales, from intimate, localized interactions to broader societal movements.

In rural or underserved areas, textile-based projects inspired by Lai's work can be used to strengthen community ties and preserve cultural traditions. For instance, workshops or collaborative art-making sessions can provide spaces for intergenerational dialogue, ensuring that traditional techniques are passed on while fostering innovation. Similarly, the relational aspects of textile arts can inspire new approaches to community-driven design, emphasizing co-creation and inclusivity in both urban and rural settings.

The legacy of Maria Lai underscores the profound potential of textile arts to reshape how we understand and use urban spaces. By incorporating textiles into public and communal art projects, designers and artists can redefine these spaces as dynamic environments that prioritize relationality, inclusivity, and cultural sustainability.

In this way, textile arts become not only vehicles for aesthetic expression but also catalysts for broader societal change. They encourage us to view cities and communities as interconnected networks of people, histories, and practices, woven together in a shared tapestry of human experience. Lai's work invites us to imagine a future where textiles, long associated with the domestic and the personal, take on a central role in shaping public and collective life.

Her approach stands in stark contrast to the exploitative practices of the fast fashion industry, which often deplete natural resources and

marginalize artisanal labor. Lai's art highlights how textiles can embody an ethical relationship with the material world, promoting practices that prioritize care and stewardship.

Furthermore, Lai's commitment to collaboration and inclusivity serves as a model for ethical relationality in artistic and fashion contexts. Many of her projects involved collective participation, transforming audiences from passive observers into active co-creators. This participatory element disrupted traditional notions of authorship and authority, reflecting her belief in art as a shared human endeavor. Such an approach aligns with the relational prosperity model, which values community engagement and shared responsibility over individual profit or recognition.

Lai's contributions provide a compelling case for how textile arts can inform a reimagined fashion industry rooted in relational prosperity. Her work illustrates that textiles are not merely raw materials for clothing but carriers of cultural, social, and ethical value. By integrating the principles exemplified by Lai's art—community engagement, sustainability, and cultural heritage—fashion can move toward a model that prioritizes human connection and environmental stewardship over commercial gain.

Through her visionary approach, Maria Lai not only elevated the status of textile crafts but also demonstrated their potential to shape more inclusive and sustainable futures. Her work serves as both a critique of and an alternative to the profit-driven paradigms of the fashion industry, offering a roadmap for practices that honor relational, ethical, and cultural dimensions of prosperity.

CONCLUSION

The undervaluation of textile crafts in Western societies, rooted in gendered biases and industrial commodification, has long marginalized these practices as peripheral to cultural and economic discourse. Yet, as this paper has demonstrated, textile arts are far more than decorative or functional pursuits; they are profound expressions of cultural heritage, social connection, and creative resilience. Reframing textile crafts as central to a relational and ethically grounded concept of prosperity challenges traditional hierarchies and highlights their transformative potential within the fashion industry.

By exploring the historical context and gendered perceptions of textile arts, we have uncovered the systemic biases that have excluded these crafts from broader recognition. At the same time, relational art theory illuminates how textile practices foster human connections, build communities, and serve as platforms for political and cultural expression. The case study of Maria Lai exemplifies how textile arts can bridge the personal and communal, the past and the future, offering a compelling vision of prosperity that prioritizes relationships and sustainability over material gain. Textile material culture provides the fashion industry with a framework for innovation, sustainability, and equity. It encourages a shift from profit-driven models to practices that respect the cultural, social, and environmental dimensions of fashion. By valuing the labor, skill, and stories embedded in textiles, the industry can move toward a system that honors both the artisans who create these materials and the communities they sustain. This approach aligns with a broader reimagining of prosperity as a relational concept—one that sees wealth not in terms of accumulation but in terms of connections, shared resources, and mutual care. As the fashion industry faces mounting pressures to address issues of sustainability, cultural appropriation, and labor exploitation, the lessons of textile arts are more relevant than ever. Revaluing textile crafts offers a path forward, demonstrating how fashion can reconcile creativity with responsibility, heritage with innovation, and profit with ethics. This shift requires a collective commitment to challenging entrenched hierarchies, amplifying marginalized voices, and fostering collaborations that prioritize inclusivity and sustainability. Ultimately, the future of fashion lies in embracing its interconnectedness with culture, community, and the environment. Textile crafts, long relegated to the margins, are poised to play a central role in this transformation. By recognizing their value and potential, we can not only redefine prosperity in fashion but also contribute to a more just, equitable, and sustainable world.

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RELATIONAL RECORDS

EXPLORING HISTORICAL PROSPERITY FASHION WITHIN BUSINESS HISTORY

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Abstract

The profit-centric mentality within much of the global fashion industry causes great harm to societies, environments, and international economies. This focus has come under stark criticism from academia, industry, and consumers who call for broader, more inclusive definitions of success. These should consider people, places, interconnections, and relationships, alongside financial gain. This paper explores how our engagement with fashion's future can be expanded by looking into its past. This backwards gaze employing a 'sustainable prosperity' approach can provide both context and examples for current and future industry application. Focusing on fashion businesses established prior to the rise of fast fashion, we indicate the value of non-traditional sources and viewing business success from a more holistic perspective. We ask how 'prosperity' might be defined for a more diverse range of fashion firms. Utilising examples from the 19th and 20th centuries, we suggest that the boundaries of business history of fashion methodologies and sources should be extended. These should account for social, environmental, and collective as well as economic and technological success. If we wish fashion to extend the concept of prosperity, this approach should also be applied within historical contexts as well.

Keywords: *Business history, Collectivity, Prosperity, Education, Methodologies*

INTRODUCTION

The profit-centric mentality within much of the global fashion industry causes great harm to societies, environments, and international economies. This focus has come under stark criticism from academia, industry, and consumers who call for broader, more inclusive definitions of success to be applied to business models globally. These should consider people and places, interconnections, and relationships, alongside financial gain. This burgeoning approach to fashion is vital to the industry and continued global development. In this paper we explore how our engagement with fashion's future can be expanded by looking into its past, addressing the industry's history with the same extended lens through which we examine

current and future practices. This backward gaze employing a 'sustainable prosperity' approach can provide context and examples for current and future industry application.

The business history of fashion has developed within the past twenty years, focusing predominantly on famous firms, global brands, key institutions, and international conglomerates in the upper tiers of the fashion industry. Studies have typically addressed businesses with established archives. Recent work has begun to explore a broader range of geographies, products, markets and peoples engaged within international fashion networks, helping to expand our definitions of prosperity (BassKrueger et al., 2021; Bide, 2020; Dyer et al., 2022). However, approaches are often

limited by source availability and methodological scope. In this paper we query how researchers can better understand the sustainable prosperity of fashion businesses and sectors historically, how these businesses might have defined prosperity, and how their approaches might help us reconceptualise success. We propose the use of several methodological lenses which can be applied within business history research to better acknowledge prosperity beyond profit.

SUSTAINABLE PROSPERITY

One way that prosperity can be measured beyond profit is through a 'sustainable prosperity' framework. Typically, 'prosperity' is understood as economic. Whilst this is significant, and businesses need to turn a profit, prosperity is not solely reliant on economic growth. Many factors can influence success, and a variety of internal and external stakeholders can benefit (or indeed suffer) from these. As Tim Jackson (2009) has argued, 'A meaningful approach to prosperity must certainly address the plight of the 2 billion people across the world who are living on less than \$2 a day' (2009, p.5). True prosperity, Jackson argues is hinged upon 'the ability to participate freely in the life of society' (2009, p.30).

Williams et al. (2021) suggest that sustainable prosperity is a 'state of personal, cultural, societal and environmental thriving within planetary boundaries,' drawing attention to the 'critical interdependencies between culture, society, environment and economy.' Whilst sustainable prosperity considers typical measures including turnover, growth and media mentions, it also encompasses other 'measures of success' (2021, p.15). These may include social and environmental impact, personal and creative integrity, fulfilling work and delighting others (Williams et al., 2021). This approach centres the well-being of people (and nature) directly or indirectly involved with businesses. Conceptions of sustainable prosperity are shaped by local conditions, and we account for the political, social, economic and cultural climates within the examples below.

Our current concept of 'sustainability' began to develop in the 1970s, and there were already early proponents of environmentally-conscious fashion in the 1960s and 1970s. Whilst the 19th and 20th century fashion entrepreneurs we examine would not have thought of their efforts as employing a 'sustainable prosperity' approach,

many of their business decisions did have notable positive impacts which our contemporary fashion industry can learn from.

BUSINESS HISTORY APPROACHES

The 'sustainable prosperity' concept, and its application to fashion leads us to consider whether historical fashion may be viewed through a similar lens. As Twigger Holroyd et al. (2023) suggest, 'a deeper understanding of the past is crucial to our grasp of the present and the development of sustainable futures' (2023, p.1) The profit-driving systems which have enabled the growth of billion-dollar fashion conglomerates have developed since the outsourcing of fashion production during the mid-20th century. As a result, focus addressing historical sustainable prosperity has often looked towards these later periods (Błaszczuk & Pouillard, 2018). However, the second half of the 20th century is not the only period which proves of interest.

The business history field has fixated for most of its existence on the role of profits and management. Following its birth as a discipline, initial research explored forms of business administration, the development of multinational enterprises and the growth of modern management methods, alongside capitalism's structures and characteristics. Later work, employing a Chandlerian approach, focused on management actions, but not on the personal, social and cultural milieu around these. This resulted in a lack of engagement with smaller industries, societal trends, women, minorities and the environment (de Jong et al., 2015; Błaszczuk & Pouillard, 2018).

Developments within parallel fields brought about a cultural turn in Business History from the 1980s which allowed space for increasingly successful consumer sectors including fashion. By the early 2010s, publications, including *Reimagining Business History*, called for further change, appealing for increased consideration of cultural, social, personal and institutional roles in small and large businesses (Scranton & Friedenson, 2013; de Jong et al., 2015; Pinchera, 2018). Work within the business history discipline is now tending towards assessments of environmental sustainability, green business, ethical capitalism and Corporate Social Responsibility, employing value-driven approaches (Bergquist, 2017; Fredona et al., 2024; Jones, 2017). Extensive studies such as that of Jones (2023) account for the importance of bottom lines alongside social,

political and environmental contexts. While these highlight businesses that have not been driven purely by profits, many of these cases still explore large, multinational firms with extensive records of their philanthropic and social actions.

THE BUSINESS HISTORY OF FASHION

The business history of fashion, (a subfield of business history) has developed within the past twenty years, focusing predominantly on famous firms, global brands, key institutions, and international conglomerates forming the upper tiers of fashion. Typically, businesses with extensive archives have been the focus of studies for accessibility reasons. In 2018, Blaszczyk and Pouillard, proposed a new approach employing an interdisciplinary lens informed by business, culture and society. Their edited volume examines social and cultural components engaged in the creation of both artistic and commercial value, highlighting the roles of a range of fashion industry figures. Pinchera described this as 'a successful first step in tracing a new pathway in fashion studies, and a useful instrument for the research agenda of business history, marketing, management and cultural history scholars' (2018, p.162).

Following works have expanded this approach, accompanied by an influx of publications from authors adjacent to the business history field - most often from fashion history, fashion studies, geography and cultural history. Studies and exhibitions have explored a broader range of geographies, products, markets, social groups, professional networks and personalities engaged within international fashion networks, helping to expand our definitions of prosperity (Bass-Krueger et al., 2021; Roldán & Encarnación Miranda, 2023; Pouillard, 2021; Bide & Whitmore, 2023; Jones, 2022). These works often highlight fashion city characteristics, taking from geographic analyses of fashion hubs (Pouillard, 2021; Bide & Whitmore, 2023; Jones, 2022; Rantisi, 2004; Green, 1997; Breward & Gilbert, 2004; Crewe, 2017; Steele, 1988). Yet studies examining these networks, still often explore successful luxury and haute couture businesses and the role of competition in driving industries forward. This, accompanied by limitations resulting from source availability, continues the focus on profit and traditional conceptions of success.

METHODOLOGY

The association of fashion prosperity with profits and large international business structures, means that success is most associated with luxury and haute couture. The financial reports, advertisements, and campaigns of such firms become headline news despite their often-unethical practices which, if examined through a sustainable prosperity lens, would decrease conceptions of their success (Ryan 2024; Bloomberg, 2024). Meanwhile 'lower' levels of fashion are seen as somewhat murkier - a reputation often based on luxury and high fashion advertising, rather than business decisions and practices.

From a historical approach, this association limits our understanding of sectors and the diversity of practices across varying levels of production. Studies focusing on historical 'everyday fashion' are growing in number outside of the business history field, (Bide, 2020; Bide & Whitmore, 2023; Buckley & Clark, 2017; Clark & Downing Peters, 2024), but business history is yet to significantly follow this approach. If business history studies do focus on mid-range brands, they are often largescale analyses of multinational firms exploring more traditional conceptions of business development (Spoerer, 2016; Roldán & Miranda Encarnación, 2023).

Accounting for this, we propose an extended viewpoint focusing on mid-tier fashion sectors established prior to the rise of fast fashion and mass production outsourcing. Through this, we aim to explore how 'prosperity' might be defined by a more diverse range of fashion firms and how practices might indicate 'sustainable prosperity'. As depicted in Figure 1, we argue that prosperity may be viewed through a number of lenses including organisations and collectivity, education, environment, social benefit and industry events, providing examples for two of these. We apply these lenses to the German fashion industry and its British counterpart during the late 19th and early to mid-20th centuries. Their selection rests on their position as ready-to-wear centres and the capacity to compare the two due to their proximity, competition, interlinking histories tied to migration, and relationships to the global fashion capital, Paris. They further merit exploration due to the growing, but still insufficient body of research focusing on their histories. Examples from Germany are taken from the late 19th century up to 1939 to account for the heyday of German ready-to-wear (Guenther, 2004; Westphal, 2019;

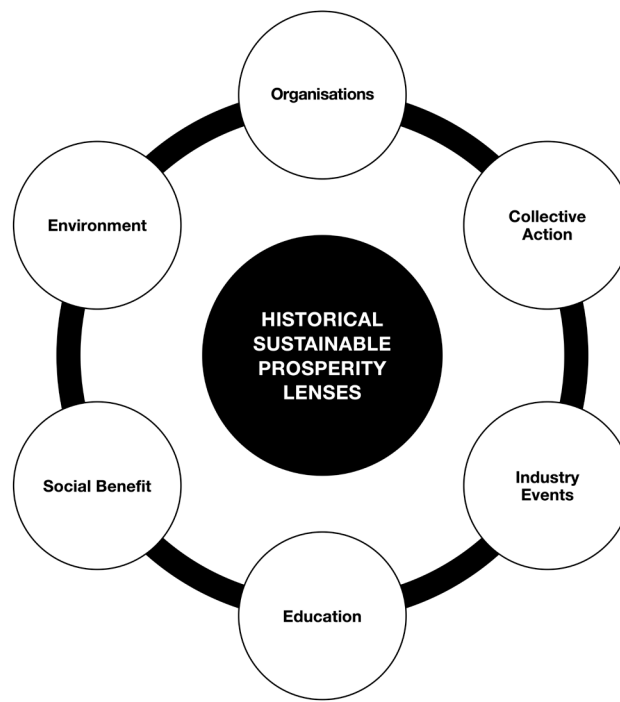


Fig. 01

Schnaus, 2017), while those from London focus on the wholesale couture and popular price sector between 1945-1960 (Bide & Whitmore, 2023; Boydell, 2010; Breward, 2006; Nyburg, 2020) (Fig. 01).

CASES

Germany is well-recognised for its extensive historical textile industry which featured a mid-tier fashion sector with strong connections to the Jewish community (Köster & Schnaus, 2018). The German ready-to-wear (*Konfektion*) sector consolidated from the 1830s around Berlin. Studies from art and design history, Jewish studies, political history and sociology have focused on the records of key entrepreneurs and businesses, but they only begin to paint a picture of the sector and its success. Meanwhile business history studies have touched on the sector in analyses of the broader German clothing industry (Köster & Schnaus, 2018; Schnaus, 2017). Regarding prosperity beyond profits, it is nigh impossible to separate society, culture and geography from *Konfektion* due to the strong role of social trends, community, clustering, and family networks. However, these connections

remain weak in business histories of German fashion.

The mid-twentieth-century British fashion industry has received increasing academic attention over the past twenty years. The majority of studies consider fashion from a holistic perspective (Biddle-Perry, 2012; Bide & Whitmore, 2023; Horwood, 2005; Howell, 2017) or focus on polarising ends of the trade, considering either the haute couture bespoke trade (Ehrman, 2015; Jones, 2022; Ness, 2021) or the mass-production clothing industry (Worth, 2007; Roberts, 2023). Less attention has been given to the medium-range popular price and wholesale couture fashion industries in Britain, which has the most in common with German *Konfektion*. These connections are particularly important as Jewish refugees from the *Konfektion* trade went on to play pivotal roles in mid-tier British fashion.

Scarce business records survive for mid-tier fashion businesses in both countries. This is primarily as the importance of maintaining documentary sources was typically not recognised. Often those that exist were rescued as businesses closed or discovered in personal archives. The most accessible holdings are firm registration

and bankruptcy records. However, these typically document the few years around a business's birth or demise, pointing to failure rather than success. WWII contributed to this source dearth in both instances. In Britain, many paper records were destroyed as part of the salvage effort. In Germany, the division of the country broke apart supply chains and international connections which had not already disappeared, while the earlier 'Aryanization' of the sector by the Nazi government forcibly removed Jewish businesses from their owners and decimated the population involved in *Konfektion* production (Kreutzmüller, 2015; Guenther, 2004). How then might we seek to understand a business or a sector's 'prosperity'? This requires a meticulous approach tracing businesses in myriad ways. For example, looking to sources such as newspaper situations vacant advertisements, trade press editorials and fashion magazine interviews. This also involves combing through records of organisations, groups, trade bodies, committees and events. Adding sustainable prosperity lenses to this approach can help build our understanding of the state of businesses and sectors, while providing a broader view of success within historical contexts and beyond the balance sheet. The following examples employ 'organisations' and 'collectivity' and 'education' lenses to examine sustainable prosperity in German and Britain.

ORGANISATIONS AND COLLECTIVITY

Both formal and informal organisations provide a key lens through which we can explore sustainable prosperity within fashion. The goal of many organisations has traditionally been and often remains, the solidifying of industries to decrease competition, standardise production and increase financial success. However, they serve other purposes including the development of community and social good.

Germany is well recognised as an early centre for the formation of industrial organisations. By the early 20th century, the fashion industry had several key associations representing both the broader sector and specialised trades. The purpose of these was largely to develop German design independent from the power of French fashion dictates, rendering them political, especially following 1933. But they also played a role in the communication of design to a broader public through events and exhibitions, mutual support, and community development (Fiege, 2009; Rasche,

1995; Vatter, 2018; Mengay, 2018). The *Verein Modemuseum* (Fashion Museum Association), for example, was founded in 1915 to support the development of the fashion museum in Berlin targeted at both industry and public (Rasche, 1995).

Collective action provides a similar lens through which we may examine sustainable prosperity. From a profits-based perspective, the Berlin fashion sector was flourishing during the late 19th century. However, influenced by broader social, political, and industrial upheaval, German fashion manufacturing during this period was characterised by industrial action. Strikes were driven by abhorrent working conditions within the garment industry where the reported average mortality age of female workers was 26 (Masur, 1974). These deathly conditions resulted in a mass strike by textile workers in 1896 which brought about a period of industrial action focused on working conditions, hours and pay (Rowe, 2013). Tensions continued throughout the early 20th century, catalysed by political, social and economic movements, hyperinflation, and general strikes, but calmed slightly with the 1924 currency stabilisation (Weipert, 2015; Biernacki, 1995). Analysis of working conditions and tensions during the late 19th and early 20th century provides us with a more nuanced view into how prosperous the sector was.

During the 1940s several industry groups were formed in Britain with similar aims to those in Germany - seeking to decrease dependence on French inspiration and increase exports. One of the most important groups was The Guild of Creative Designers (founded 1944). Partially representing the top-end of the London ready-to-wear industry, the Guild sought to re-establish Britain as a centre of international fashion importance. The 1940s were an extremely challenging decade for manufacturers, with the post-war situation more difficult for some manufacturers than it had been during the conflict. There were still extreme shortages of labour and cloth, clothing was still under ration and price-control meant garments could not be sold above fixed prices. These trading conditions made group membership more important. Because manufacturers could produce only limited ranges of garments, collaborative action - often in the form of fashion shows for the trade or general public - offered the opportunity to show full garment ranges pulled together from several different manufacturers.

Through a 'prosperity' lens The Guild's October 1946 Midnight Parade of Fashion is particularly significant. This event, featuring over 130 garments from twenty-two firms, was held at the Royal Albert Hall. The parade was designed as a spectacle for members of the fashion trade. However, owing to newspaper and newsreel coverage, the public certainly could have 'consumed' images of these garments. The parade was not intended as a sales tool, rather it was a prestige event. At a time when manufacturers were operating under extremely straitened circumstances, the parade was designed to fortify the Guild's position as the tastemakers for the top end of the ready-to-wear trade. Whilst there were no direct financial benefits to the parade (it likely cost manufacturers a considerable amount of money to be involved) taking part enhanced firms' cultural capital. Furthermore, the spectacle element of a parade ensured press coverage and that the names of the businesses involved remained in the public eye.

The parade also had charitable concerns. Attendees purchased tickets with profits divided between the Purley Schools (an education charity providing schooling for children of those in the fashion and textile trades), the Linen and Woollen Drapers Institution and the General Porters (*Fashion Trade Weekly*, 1946). We argue that donating to charity was a marker of prosperity in this period. Many individual firms also donated large sums to educational causes and particularly those related to their Jewish heritage (*The Times*, 1981). Profits were unquestionably important to firms after WWII, however in strained circumstances financial prosperity was beyond most manufacturers. Instead, they had to reimagine prosperity - taking part in prestige events to encourage long-term profitability.

Collective activity was not restricted to trade-specific activities. In the postwar period manufacturers looked at new ways to encourage brand loyalty. One way was through establishing specialist groups or clubs. In some instances, these had genuine positive community impacts. The 'Large Girls Club' founded by 'outsize' clothing manufacturer Louis Mintz in London in 1958 typifies this. This club offered regular meetups for members, a specialist newsletter for the outsize woman, and free advice from the London headquarters of Louis Mintz's brand, Linda Leigh. Group membership quickly grew and by 1961 the

group had at least 10,000 members (Segal, 1961). This club was particularly successful because it supported clothing consumers who were typically excluded. The aims of the club were not entirely altruistic, it was designed to sell Linda Leigh garments, but contemporary newspapers also point to the positive impact the club had on members while enhancing engagement with, and loyalty towards, the business.

EDUCATION

Another lens for the analysis of prosperity is the provision of education. In the German fashion industry, up to the beginning of the 20th century, much skill development was handed down through family and social networks. The development of educational institutions which served the sector and beyond was linked to broader societal shifts driven by ideas of social reform. These organisations, *Kunstgewerbeschule* (Schools of Applied Arts or Schools of Arts and Crafts), acted as technical trade schools (Sonnenberger, 1981). Through the history of these and similar institutions, we can see evidence of the increasingly flourishing sector's need for a growing pool of well-trained employees, interest from industry figures and organisations in providing educational opportunities to society, and the industry's sponsorship capacity.

One organisation with a directly traceable link to the clothing sector is the Lette Verein founded in 1866 with Germany monarchy sponsorship as a technical school for girls. Its school for trades and industries offered dressmaking, machine-sewing, linen cutting, artificial flower creation and glovemaking among other subjects (Guenther, 2004; Lette Verein; Clarke, 1892). Unfortunately, we do not have easy access to records of Lette Verein graduate careers. Yet, Guenther (2004) indicates that the school's workshops produced a range of products for Germany's top fashion houses.

The number of technical schools feeding the sector rose and by 1928, American industry reports detailed the development of a Fashion University in Berlin sponsored by the City of Berlin, Prussian State Government, Federation of the German Fashion Industries, Arts and Crafts Museum and custom tailoring organisations. The institution's aim was to 'developed exports capable of meeting the artistic and creative demands of all branches of the garment and allied industries' (*Women's Wear Daily*, 1928). While free attendance was limited to

Federation members, external students could also attend. By 1930, the institution offered a three-year programme providing key industry skills such as garment model creation, textile production and bookkeeping alongside subjects targeted more towards general public good (Women's Wear Daily, 1928). While this is representative of broader educational shifts, it provides details about the nature of the Berlin fashion industry and its investments. From 1933, industry organisations and educational institutions became increasingly tied up in politics with top executives, teachers and students expected to be affiliated with the Nazi Party, or at minimum, not Jewish (Guenther, 2004). While the provision of education continued, it shifted to serve a more politically targeted purpose.

Fashion professionals in Britain worked with many colleges and trade schools, inviting them to their showrooms and hosting them for placements. The Royal College of Art archive contains calendars and prospectuses which indicate the important role played by industry professionals in establishing its fashion course in 1948 and training emerging fashion designers. Fredrick Starke, founder and director of Frederick Starke Ltd., was closely associated with the RCA fashion course. In 1947 he was on an ad hoc advisory committee for the college from which external lecturers were drawn and between 1952-1955 he was a regular visiting lecturer. He also gave short term work placements to students and set up a yearly scholarship in his name. Other professionals from the wholesale couture trade also acted as visiting lecturers. Olive O'Neill, designer and director of Rose and Blairman taught on the course in 1949 and Marjorie Field-Rhoades a designer for Matita was also a visiting lecturer in the 1950s (Royal College of Art Archive, 1947-58). This close contact with emerging design talent offered mutual benefits; an opportunity to cherry-pick staff for their businesses and allow students hands-on experience in fashion to jump-start their careers. These connections between higher education establishments and fashion businesses were important in the developing the prestige associated with fashion design careers.

CONCLUDING SUGGESTIONS

As can be seen above, sustainable prosperity lenses can provide a depth of understanding about the nature of industries which cannot be found purely through financial and management data. While our

examples are far from exhaustive and are limited in geographic scope, applying sustainable prosperity lenses to German and British ready-to-wear industries can account for source availability issues, and provide further details about the success of these sectors. Organisations and collective actions can show connections and collaboration between firms, the development of prestige, and engagement with consumers and the public. They can also highlight sectoral issues which might not be visible otherwise. Education as a lens can highlight industry growth and needs for further employees, show what disciplines are necessary for workers, and indicate altruism and social care from industry leaders. These are only three of myriad sustainable prosperity lenses, including environment, social benefit, industry events and more. We propose that future authors exploring a range of geographies, employ these lenses as part of their business history approaches to account for source availability, deepen their understanding of sectoral situations and allow them to explore diverse manifestations of success.

CAPTIONS

[Fig. 01] "Figure 1: Historical Sustainable Prosperity Lenses (Authors' Own Model)"

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ETHNOGRAPHY

PROSPERING DRESS

EXPLORING “TEXTILE_KNOWLEDGES” AND “SITUATED_FASHIONS”

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Abstract

Dress cultures are more extensive than Fashion (Niessen, 2022), and their diverse dimensions are conceptualized here as *situated_fashions* and *textile_knowledges*. Drawing on Haraway's concept of *situated knowledges* (Haraway, 1988), such dress enables rich belongings with more-than-human worlds, grows interdependent prosperity and sustains intra-active relationships (Barad, 2007). The paper presents and discusses the results of the seminar *NatureCultureFashionStudies – Autoethnographic Field Research*, which took place in spring 2024 at the Institute of Material Culture, Carl von Ossietzky University of Oldenburg. The aim was to find a certain language for the relations between nature, culture and fashion that expresses the vibrant materiality (Bennett, 2004) of these fields. During the research-based learning other functions of textiles became important, and with them the material, the cut, the processing. On this mental, sensually perceptible and fertile soil, textile literacy grows, and other fashions prosper.

Keywords: *Autoethnography, Situated knowledges, More-than-human worlds, Textile literacy, Education for sustainable development (ESD)*

INTRODUCING TEXTILE CIRCUMSTANCES

The prosperity of 'capital-F Fashion' (Niessen 2022, p. 440) is based on an economic understanding of growth that ignores the finite nature of natural resources (Fletcher, 2022). This 'world's mainstream fashion system' (Holroyd, Farley Gordon & Hill, 2023, p. 129) favours the abundance of everyday textiles and their inherent obsolescence to drive their production and thus global trade. It is easy to see that this involves materials that produce profits during their processing, which are ultimately not used to maintain their sources. Also, only a few people in the global north really get their money's worth. The actual added value of Fashion is largely

symbolic (Barnard, 2020, 1996), and it can be renewed and sold indefinitely (Mitterfellner, 2020). Currently, the sustainable values of Fashion are in high demand because they promise consumption without harmful consequences (Perry et al. 2025). Although there are increasingly sustainable design strategies (Bye, 2020, p. 25) the textile materials themselves are finite and cannot be reused over and over again. Our overload of Fashion symbols materialises in an ever-growing mountain of textile waste, in a flood of micro plastics, whether sustainably or conventionally produced (Kedron et al., 2024). But although this knowledge is available, it is not concretely tangible. The public lacks general knowledge about textiles and an understanding of materials. The function of clothing as an expression

of human communication needs is contrasted by the impoverishment of the perception of other vestimentary needs and agencies. Hardly any other term is more multifaceted in its implications than that of sustainability, especially in the field of Fashion (Henninger et al. 2024). Its unwieldiness is its potential (Grober, 2013 p. 17), on the one hand, for a continued rapid growth in profit-maximizing greenwashing, but on the other hand, for a slow, sustaining and developing environmental education. Therefore, in the context of education for sustainable development (ESD), ways must be sought to enable genuine experiential knowledge. Material literacy is one of the key concepts that is invoked in the cultural-anthropological academic training of textile educators (Becker, 2005), as well as curators (Lehmann, 2012) and cultural scholars (Cooke, 2022). And it is not only historical biographies of various things that are meticulously written down using the methods of detective-like acquisition of knowledge (Mida & Kim, 2015). A wide range of methods (Fletcher & Klepp, 2017) enables intensive research into the material of textile things (Woodward, 2020). In this way, the most diverse contexts of Fashion production, distribution and use are explored, and important cultural, social and technological knowledge is generated. The question is whether this knowledge affects us in such a way that it provokes transformative action. The Earth Logic plan of Kate Fletcher and Mathilda Tham (2019) is inspiring to me when I think of the urgent changes needed in fashion design. But why do we always start from the point of creation? This question arises for me around textile education in schools, as I have been training textile teachers more and more in recent years. I think this is an important field for initiating different attitudes towards fashion, dress and textiles. To imagine other fashion futures, speculative imagining is certainly useful. But do these 'fashion fictions' (Holroyd, 2020), these wonderful and smart alternative worlds, really change our everyday actions or do they remain small refuge utopias, like green fashion?

SITUATING PROSPERITY FASHIONS

In many years of critical working as a researcher and teacher in the fields of cultural studies, fashion design and textile education, I have not yet been able to recognise or effect any major change in practice. And although I have increasingly focused

on questioning the roots of the Fashion system, particularly in the way we teach the theory and practice of designing textile goods, this radical attitude (Gardner & Mohajer va Peseran, 2023) has had little impact on the general academic education system. In my opinion, the teaching of fashions and textile material knowledges is still more about maintaining a comfortable economic prosperity and less about the urgent change to an ecological prosperous sustainability. I think that an important reason for this is that we disregard general education in the field of textiles and fashion. In my view, we cannot achieve a fundamental transformation of the Fashion system just by changing the design, production, distribution and use of products. Without a broadly informed, enlightened society, the change will not succeed. And with that, I am not focusing on consumer education in the sense of a class of buyers, but the imparting of cultural fashion knowledge by establishing personal relationships with direct and concrete environments. This vision of textile knowledge transfer is aimed at each single persons and their relationship to the more-than-human world, it can and should take place in all possible learning situations. That is why I have been looking for other ways and places to engage with fashion, dress and textiles. I found these other perspectives outdoor, during my two-year advanced training in nature-based environmental education¹. And now I combine outdoor teaching (Au & Jucker, 2022; Huppertz & Schatanek, 2021; Scheidegger 2018) with autoethnographic research methods (Ellis & Bochner, 2003) and share both in research-based learning settings. At the same time, I am drawing on Donna Haraway's well-known concept of 'situated knowledges' (1988), which is no less relevant after almost four decades:

Situated knowledges require that the object of knowledge be pictured as an actor and agent, not as a screen or a ground or a resource, never finally as a slave to the master that closes off the dialectic in his unique agency and his authorship of 'objective' knowledge (p. 592).

From this, I derive the following founding figures for my research: *situated_fashions* and *textile_*

¹ The certificate course that I completed is offered by SILVIVA in collaboration with the Zurich University of Applied Sciences (Certificate of Advanced Studies, NUB/Naturbezogene Umweltbildung): 'SILVIVA has been enabling education providers to connect nature and learning effectively since 1985. The foundation has an evidence-based approach: using the best available data to develop a practical and innovative methodology that also includes the advantages of digital tools.' (<https://www.silviva.ch/en/> 29.12.2023)

knowledges. The situatedness of the diverse fashions of the past, present and future reminds us that the Eurocentric understanding of Fashion is a fallacy of globalised modernity. The countless textile knowledges worldwide need to be preserved, rediscovered and respectfully included in the canon of a sustainable understanding of our co-worlds. I wonder how a sustainable understanding of the agency of all participants can be achieved: How can relationships of this kind be perceived at all? – I am trying to find this out by investigating the *NatureCultureTransfer in Textile*. Here, too, I refer to the early Haraway (1985), the Cyborg Manifesto, whose call for a rework of nature and culture has not yet materialised in such a way that our textile activities have changed accordingly: “nature is still the almost inexhaustible resource for appropriation or incorporation through culture” (p. 67). To truly dismantle this polarity and hierarchical dominance, they must remain identifiable as long as the dominant culture of Fashion flourishes on a hegemonic, anthropocentric and dualistic power structure. For me, *NatureCultureTransfer* is therefore about the continuous transfer of one into the other and vice versa. This reciprocal performative practice of permanent transfer between nature and culture has a special epistemological potential. The conditionality of materialities and meanings of Fashion and its textile transfer provides insights into the relationship between people and their environments. It can be viewed with Karen Barad (2003) as a “dynamics of intraactivity” (p. 807). The textile is thus a discursive space of thought and an essential tool in nature-cultures research (cf. Gesing et al., 2019). The concept of the *fashion-agency* (Venohr, 2020) is thus extended to include the essential sphere of the transfer between nature and culture, which locates the self and the textile in a relational and intra-active space. The aim is to make the textile dimensions of one’s own situatedness and the respective partial perspective tangible. The attempt to expand the spheres of fashion into the outdoors is not about proclaiming a return to nature or following a romanticised yearning for nature. Rather, it is about the direct bodily and sensual experience of the connection with what already exists around us and about leaving the cultural, comfortably arranged comfort zone, let’s call it prosperity as we know it. In my opinion, this is why textile education is essential right from primary school. Situated fashions and textile knowledges must be firmly anchored and further

developed as an essential content with transformative potential in education for sustainable development (ESD).

RESEARCHING FASHION OUTSKIRTS

The seminar *NatureCultureFashionStudies – Autoethnographic Field Research*, held in spring 2024, was an experiment in this sense. The aim was to find out whether the framework concept outlined above could be applied in practice in the form of specific teaching and research-based learning settings. As this was my first semester as an interim professor at the Institute for Material Culture at the Carl von Ossietzky University of Oldenburg, neither the students nor I knew what we could expect from each other. However, based on my own experiences, I had the following assumptions: The environment itself is perceived differently, more consciously; direct, regular contact with a personally selected outdoor environment would provide insights into various physical needs; the protective function of textiles becomes more important, and with it the material, cut and processing; clothing can perhaps even be understood as a mediator between humans and non-human kinds of being; ultimately, Fashion itself takes a back seat in the more-than-human world experienced in this way and becomes culturally questionable. The announcement in the course catalogue read as follows:

NatureCultureFashionStudies – Autoethnographic Field Research

What is culture? What is nature? What is fashion? Why does it make sense to consider these three concepts in their interdependency when searching for possible answers? We will try to find out by means of autoethnographic research methods. The aim is to explore one’s own experiences in such a way that they can be conveyed, shared and thus gain social weight. The presentation of the research path to be explored is both a process and a product, it is literary, documentary, fictional and speculative. The aim is to find a language for the connections between nature, culture and fashion that expresses the materiality of these fields. This is achieved through direct and unusual engagement with the things that surround us, both inside and outside.

In the seminar, we will study relevant cultural texts, visit natural sites, research fashion stories, appreciate the dynamics of discussions, engage in informative dialogues and cultivate self-effective

individual paths. We question scientific conventions and find a somewhat resistant research format that ultimately fits into the form of a term paper. I speak of 'we' here because, in addition to my role as a teacher, I also participate as a learner and an autoethnographic researcher.

Participants were students from the BA Textile Studies, MA Museum and Exhibition and MA Cultural Analyses, a very diverse group, which I very much welcomed. First, I introduced some methodological basics of ethnography, which we tried out together, and then we did exercises on autoethnographic writing (Fig. 01). Above all, however, all participants chose a place, a kind of *NatureCultureFashionSpace*, outside of the university and everyday life, and visited it regularly. In between, we read theoretical texts such as Haraway's *Situated Knowledges* (1988), went to the Haarenniederung, a nearby nature reserve, and reported on changes to our place over the course of the seasons. And again and again, we tried to find out what all of this might have to do with fashion, dress and textiles. In autoethnographic explorations, we sensually captured our perception, the needs and the belongings in the natural space and cultural place. We did this by engaging directly and unusually with the vitality of the things (Bennett, 2010) that surround us, both inside and outdoor (Fig. 02). Among other things, we used mindfulness methods from nature-based environmental education to train our sensual attention. Some students were initially unsettled by not knowing where the process would lead them. They were accustomed to fulfilling clearly formulated tasks or creating and substantiating theses based on objective knowledge. That is why they had difficulties with the autoethnographic writing. It was only later in the semester, when we had built up sufficient trust, that they were able to formulate their partial perspective through a consciously placed 'I'.

In the following, I will present three different approaches and results, using excerpts from the term papers of the participants Olivia Reents, Jule-Schirin Lüthans and Hareth Mufleh as examples². As the works provide a special insight into the process of changing your perception and attitude, they are very meaningful and valuable for my research. In the following, I will refer to their specific perspectives as *bareness*, *protection*



Fig. 01



Fig. 02

² All participants have given me written consent to use their results in my further research, and I did the translation into English.

and *extension*, according to their own respective focus. All of them found their own tone of voice to critically reflect on their experiences and present them as acquired knowledge. I consider this to be particularly remarkable. Based on these examples of research-based learning using auto-ethnographic methods, it will be shown that the human-centred basic understanding of fashion must be transformed into a material and ecological esteem of textile, so that prosperity fashion can be understood as rich and diverse belonging to more-than-human worlds.

BARENESS

At the beginning of the seminar, Olivia was very sceptical about whether it would be of any use to her at all. She found it very difficult to engage in the open-ended, uncertain process of her own research. Unlearning the usual completion of clear work tasks in teacher training was a particular challenge for her. When one of the seminar sessions took place in the Haarenniederung and some participants walked barefoot through a tall meadow with stinging nettles, she felt great aversion (Fig. 03). This was very noticeable to me and made me feel insecure. For her, the stinging nettle was, as she later wrote in her essay, the biggest hurdle, the “final opponent” (Reents, 2024, p. 10), which made her question everything at that point. It was here, at the latest, that her personal process of unlearning began. And I had grasped what it actually means to accept all participants in their different approaches and at their different speeds.

Olivia's *NatureCultureFashionSpace* is a small patch of self-sown wildflower meadow in her new shared garden. She befriends it, visiting and observing it regularly, and calls it “Bean” (p. 3) because of its shape, or elsewhere the “Wild Unknown” (p. 15). She notes, that “even in a seemingly bare landscape, such as a freshly sown meadow in April, there was a strong potential for emotional resonance through the promise of growth and renewal that it embodies” (p. 11). In the sense of a ‘thick description’ (Geertz, 1973) she compares the initial bareness of the soil and the slow flourishing of the plants with the progress of her autoethnographic writing. An important realisation is that in both there is a structure that is not static and predetermined, but grows organically, and that things takes their times. Finally, she dares to go barefoot and realises:

In my self-experiment, I became aware of



Fig. 03

the importance of clothing. I overcame my fear of walking barefoot through a field that was not completely visible. So, my usual companions in such places – shoes and socks – were no longer necessary. This way, I was able to experience an environment similar to my nature/culture place in a different way. Despite my fears and the thought ‘Do I really have to do this?’ I bravely persevered. I’m proud of myself for overcoming my concerns, even though it was the second attempt (p. 12).

Barefoot, Olivia feels “strangely free, but also a bit vulnerable” and can “experience the world directly, without the filter” of socks and shoes (p. 10). Overcoming her fears of walking barefoot has strengthened her rationally and emotionally, and she now wants to do it more often. Through this very simple experiment, she has gained a different access to herself and her environment. I hope that she will take this experience with her and, later, ideally conduct similar experiments as a textile teacher. Textile lessons have the potential to open *NatureCultureFashionSpaces* for unlearning.

PROTECTIVE

"I don't like good clothes for bad weather," is how Jule begins her work, in which follows the question "What significance do clothes and fashion have for my individual well-being in nature?" (Lüthans, 2024, p. 1). She also had difficulties in getting involved with the method of autoethnography and reflected on it very precisely, which I will come back to later. At the same time, she wrote an enthusiastic text about the development of her *NatureCultureFashionRelation* during this one semester:

My research is particularly exciting because I don't have much of a connection to nature and it doesn't have much relevance in my life as a place to stay. By contrast, I am very interested in fashion as a form of self-realisation and self-expression (p. 1). In her intensive examination, she finds that she is particularly interested in the protective function of clothing in its various objectives. Apparently, she often did not feel comfortable outside because she felt exposed to the weather. In an interview with her mother, she found out that she was outside a lot as a child and that at home they acted according to the generally known motto 'there is no bad weather, only bad clothing' (p. 8). When exploring her *NatureCultureFashionSpace*, she consciously faced the different weather conditions without special clothing or equipment to collect data for her research. This had the effect that she increasingly relaxed and appropriated specific protective clothing and ultimately designed a speculative personal vision of an all-rounder jacket. Another result of her autoethnographic exploration is that she has found the topics of 'outdoor fashion' and 'smart textiles' that are important to her, and she could now explore them in more depth in further research. As a conclusion she writes: "I can definitely leave my comfort zone in nature, and being unprotected in nature can be fun for me" (p.14). And she revises her initial observation as follows: "I want my clothing for bad weather to provide me with the same comfort as my clothing for good weather. Because for me there is good and bad weather" (p.14).

EXTENSION

Hareth describes his *NatureCultureFashionSpace* as a 'lost place' (Mufleh, 2024, p.1). It has no 'urban functionality' (p. 1) and yet there are indications that this place is used by others as a retreat or hiding place. It is a small 'playparadise' (p. 2) with

a kind of tree house and a swing made from an old car tyre. He perceived the 'hidden nature of the place' as protection and his regular visits provoked the "idea of seeing the surrounding nature, as well as the nature shaped by humans, as an extension of one's clothing" (p. 2). In his work, he impressively describes how the connection between him and his *NatureCultureFashionSpace* becomes increasingly closer. With reference to Baptiste Morizot (, for Hareth it is a matter of 'Sich Einwalden' in the outside world, whose 'lasting sensual impact cloaks' (Mufleh, 2024, p. 9) him. During his intensive autoethnographic explorations, Hareth refers to Michel de Certeau's canonical statement to conceptually distinguish between 'place' and 'space': 'In short, space is a practical place' (Certeau, 1984, p. 117). After numerous encounters with other beings and things here during the day and at night, he gradually develops the desire not only to visit and observe this space, but also to 'design the hidden green space' (Mufleh, 2024, p. 13). After a few unsuccessful attempts at furnishing, he finally realises, through a disturbing encounter with a stray dog, that what he is really seeking here is freedom in the sense of mobility, not property:

This experience helped me to see that the feeling of being part of a place or owning a space is only an illusion. [...] However, I can have access to nature if, instead of striving for selfish claims of ownership and use, I enter appreciative communication with nature and a cooperative relationship with other beings involved (pp. 15-16).

Hareth also comes up with the idea of carefully designing his 'small natural cosmos' (p. 15) from the observation that people, just as they "treat their own body negatively and badly, do the same to our immediate space, but also to the surrounding nature" (p. 17). At the end of his housework, he realises that he will continue his visits to "observe the changes in the annual cycle" (19 p.). He plans to remove the ropes from the tree, as they prevent it from growing. And he plans to properly dispose of the old tyre, which has long since outlived its usefulness as a swing. By collecting rubbish during many of his visits and by taking small things with him as soulful mementos, he extended his sense of responsibility for careful treatment and social care into the *Mitwelt*, "because it is our only great space" (p. 17).

AUTOETHNOGRAPHY IS ENCOURAGING

The greatest difficulty for the students was not learning the ethnographic methods but rather leaving their usual academic paths (Fig. 04). Unlearning the familiar and taking a leap into the unknown were the hurdles most often mentioned during the seminar. On the one hand, this requires confidence in oneself, in others, and in the teacher. On the other hand, it takes courage to engage in a possible change of one's own thinking and acting. All participants described their participation as a constant rollercoaster of insecurity and empowerment. What was also particularly difficult to them was not knowing which aspect of fashion they should focus on. This concern also troubled me, but I avoided focusing on the textile or clothing aspect in conversations. I am even more satisfied that the participants found very individual approaches for themselves.

In Jule-Schirin Lüthans' work, it becomes very clear how much she was concerned about the feeling that her own point of view was not relevant enough for a scientific research approach. She impressively describes how the feedback from the other participants actually gave her the courage to address her own concerns. She quotes from a feedback card that she received after her first presentation of her research findings: 'Your thoughts and feelings have a claim to truth! Trust both, you inspired me and gave me courage' (Anonymous, cited in Lüthans, 2024, p. 5). I think that saying 'I' encourages saying 'you', and that this is what makes dialogue and intra-actions possible.

Although a period of just over three months is by no means sufficient to conduct ethnographic research, the results of a seminar of this kind are more than satisfactory: all participants have acquired basic ethnographic methods, tested them and critically reflected on the aspect of objectivity; they started to write autoethnographically, some with very good results; and they experienced and articulated their different difficulties in research-based learning.

PARTIAL PERSPECTIVES ON PROSPERITY

Fashion prosperity was not the conceptual focus of the seminar, but relevant aspects for the transformation of Fashion can be derived from the above presented and only seemingly subjective results, once again with Haraway (1988): "So, not



Fig. 04

so perversely, objectivity turns out to be about particular and specific embodiment and definitely not about the false vision promising transcendence of all limits and responsibility. The moral is simple: only partial perspective promises objective vision" (p. 583). The partial perspective that the students experienced through the application of autoethnographic methods enables an objectification of prosperity independently of primarily economic interests. The participants from different degree programs each developed their own perspective, which allowed them a different approach to their prospering environment. This in turn led them to a transformed relationship to their clothing. Thus, the material and the environmental esteem for the textile was fundamentally increased so that prosperity fashion could be understood rich and diverse belongings to the more-than-human world. This result shows that in a more sustainable future, it is essential to impart textile knowledge using different methods: we must reconnect with the material and our own perceptions in order to appreciate textiles. As part of education for sustainable development, teaching textile knowledge must

be an important part of general education and should ideally begin in primary school.

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CAPTIONS

[Fig. 01] Autoethnographic writing exercises in outdoor learning. Credits: Olivia Reents.

[Fig. 02] The thing-power (Bennett 2024) of the tissue represents the spatially, previous presence of another human being at this place. Credits: Dagmar Venohr.

[Fig. 03] One participant walks barefoot and with closed eyes through tall grass. Credits: Dagmar Venohr.

[Fig. 04] Without hesitation one of the students lies down in the meadow. Credits: Dagmar Venohr.

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CO-CREATING SUSTAINABLE FASHION

A PARTICIPATORY APPROACH FOR INVOLVING USERS IN THE DESIGN PROCESS

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Abstract

The fashion industry is dominated by the mass-market sector, characterised by extremely short production times, low manufacturing costs and high volumes of garments driven by short-lived trends. In this process, the profits are prioritised over users' needs, while the negative effects of overproduction are overlooked. Despite raising awareness of fashion production's detrimental consequences, the design process often remains a mystery and there has been little research on including co-design approaches into it. Can involving users in the design process contribute to a behaviour change towards more sustainable fashion consumption? This paper adopts a research-through-design approach to bridge the gap between co-design and fashion. Drawing from design for behaviour change, we strive to redefine the concept of prosperity from a profit- and trend-motivated to focusing on the needs of the users through inviting them to participate in the design process. We propose a five-step framework for a collaboration between fashion professionals and users. The framework elements - brand research, understanding the user, defining function, building identity, and user test - facilitate an exchange of perspectives and encourage participants to become researchers of their relationship with clothing. The findings of this research invite designers and researchers to further explore this emerging field.

Keywords: *Fashion design, Co-design, Participatory methods, Sustainability, Design for behaviour change*

INTRODUCTION

Can involving users and their needs in the design process contribute to a change in behaviour towards more sustainable fashion? The fashion industry prioritises short-lived trends and profits over the needs of the users, and the link between fashion and consumerism is tight.

Fashion has an impact on both environmental and social systems. In this context, sustainability presents numerous challenges for the fashion industry, many of which threaten the sector's roots and structures (Fletcher, 2016). Markard and colleagues (2012 cited in Maier and Cash, 2020, p. 21) claim that: 'Sustainability transitions refer to long-term, multi-dimensional and fundamental transformation processes through which

established sociotechnical systems shift to more sustainable modes of production and consumption.' Therefore, the issue of sustainability in fashion cannot be solved with a single intervention, and rather than focusing on product-level improvements, the focus should shift to systemic innovation (Clune and Lockton, 2017). Rather than developing and evaluating individual interventions, understanding the value of those interventions in relation to the overall system is required (Maier and Cash, 2020). Similarly, as prosperity thinking involves a shared, inclusive view of prosperity and a focus on a planet-centred growth (Vignoli et al., 2021), it suggests a systemic, multidimensional shift of perspectives and behaviours.

In order to contribute to the changing of systems, the most desirable approaches focus on solutions that impact consumption rather than improving recycling and waste management methods (Clune and Lockton, 2017). To remain relevant and develop long-term sustainable solutions that anticipate future needs, companies must enhance collaboration among stakeholders and integrate creativity into their design processes (Monestier et al., 2024). Cramer (2011) suggests that implementing elements of participatory design can lead to the implementation of more sustainable behaviours among fashion customers. As more engaged users, with the power to choose garments that better meet their needs, they can start taking more conscious, motivated decisions, therefore changing their consumption behaviours and contributing to the change in the industry (Cramer, 2011).

This paper explores the implementation of co-design approaches into the fashion design process and their potential to influence sustainable consumer behaviours. We propose a participatory framework for collaboration between fashion industry professionals and users, exploring its role in shifting consumption habits towards sustainability.

THE MEANING OF FASHION IN SOCIETY

Fashion can be understood as clothing, the material covering the human body, but its significance goes beyond that, allowing people to express their personality, status, cultural associations, and political statements. Dressing style is seen as a language that allows others to connect and relate (Chon, 2014). According to Fletcher (2016), all users are fashion practitioners because the act of wearing garments qualifies one as a fashion practitioner. Fashion objects have meanings assigned to them by designers, and users consume those meanings through the consumption of clothing (Chon, 2014). Clothing that is worn and kept frequently adds value to the process of constructing identity (Connor-Crabb and Rigby, 2019). As the users' identity, values, and self-perception evolve over time, so does their fashion sense. Rather than being motivated by visible technological changes in the development of new products, purchasing new clothing is seen as a way of refreshing identity. New trends emerge as a result of users' desire to reinterpret clothing, giving them the freedom to develop a personal style that reflects

their identity (Fletcher, 2016). As a person's identity evolves, so does their clothing.

MASS MARKET FASHION AND CONSUMERISM

The perception of fashion is linked to cycles of change: invention, acceptance, and discard (Fletcher, 2016), and the availability of fast, mass-produced clothing has only increased individualised consumption of fashion, driven by fast-lived trends (Munasinghe et al., 2021). Moving production to low-labour-cost countries allowed producers to lower prices, letting users to buy more. It also caused the *quality fade* (Connor-Crabb and Rigby, 2019). Because the quality has decreased, clothing degrades faster, forcing people to buy it more frequently. Today's fashion is linked to economic growth due to excessive production and consumption, and retailers compete in newness (Fletcher, 2016).

The mass-market segment of the fashion industry is the largest, offering large quantities of clothing at low prices. It is profit-driven and fiercely competitive (Munasinghe et al., 2021). Due to time constraints, designers rarely have the opportunity to fully explore and develop completely new concepts, which has a negative impact on creative innovation within the design process. Instead, they look for inspiration in current fashion trends, and clothing is mass-produced by replicating others' work but using lower-quality materials.

Munasinghe et al. (2021) identify five major steps in the mass-market fashion design process: trend research, trend pack development, design development, prototype development, range finalisation, and approval. The process is being worked on by multiple teams at various levels, including design teams, creative directors, technologists, buying and merchandising teams, and management teams. Significant decisions are frequently made based on profit rather than design potential, limiting the role and innovation of designers.

RESEARCH GAP: CO-DESIGN APPROACHES IN FASHION

Before the mass-production of garments was introduced on a large scale, dressmaking and tailoring were highly participatory, engaging the customers in the process of making garments (Cramer, 2011). Collaborative-participatory design entails designing with the user as an active contributor to each step of the design development process

and co-creator of the project with the designer. Instead of simply benefiting from the project, the user becomes an expert in their experience and plays an important role in extending knowledge, generating ideas, and concept development (Scariot et al., 2012).

The co-creative approach is based on collective creativity, which allows for more insights and connections due to the collaboration of participants with different ways of thinking. Team diversity has the potential to boost creativity (Sanders and Stappers, 2012). The emphasis of design work shifts towards seeing creativity and innovation through multiple perspectives; however, designers' roles are still considered necessary due to their highly developed skills (Scariot et al., 2012).

Ericson and colleagues (2016, p. 972) mention that 'it is not straightforward to involve common people in the creative stages of idea generation and concept development.' Appropriate approaches have to be adopted in order to allow for exchange of ideas and thoughts within the teams. Because of their different backgrounds, both users and designers have different ways of approaching the issue, with the users often more responding to everyday aspects, and designers being interested in the tangible aspects (Lee et al., 2006).

According to the user-centred approach, the greater the user involvement and the more insights can be gathered, the better the product design will be, as it will be suitable for its purpose (Scariot et al., 2012). Allowing the user to participate in the design process lets them invest something of themselves in it, establishing a bond between the user and the product that is likely to result in keeping it for a longer period of time (Cramer, 2011).

The limited innovation in the fashion design process, as well as the negative impact on consumerism, provide an opportunity to investigate collaborative-participatory approaches to shifting customer behaviour in a more sustainable direction. However, little research has been done on co-design specifically in fashion, leaving a gap for investigating how it can be integrated into the design process, and what effect it would have on users' habits.

To address these gaps, this paper will address the following research questions: How can participatory approaches be implemented into the fashion design process, in order to centre the industry around the real needs of the users?

How can the implementation of participatory approach into the fashion design process lead towards developing sustainable behaviours?

FRAMEWORK FOR THE IMPLEMENTATION OF PARTICIPATORY APPROACH INTO FASHION DESIGN PROCESS

In order to facilitate introducing a participatory approach to the fashion design process, we propose a five-step framework (Fig. 01). The framework was developed based on user research, as well as adaptation of design methods and tools, and is intended to be applied as a workshop session with designers and users.

Systemic innovation in fashion requires not only new design approaches but also actionable steps that can be realistically integrated into current professional practices. Therefore, the framework was structured around a recognisable design process to ensure its feasibility and ease of adoption within existing industry contexts, increasing its potential for real-life implementation. It involves users in the early stages of the design process, and puts focus on exploring their needs and an exchange of perspectives. The direct result of the framework is not necessarily ready designs, but rather it serves as a set of inspirations and suggestions that can be later used to create a new collection. The framework aims to balance user participation with the expertise of designers, ensuring that users contribute meaningfully to the process while designers retain their specialised skills in translating insights into feasible designs. In the following sections we provide a summary of each component of the framework.

STEP ONE: RESEARCH AND BRAND DNA

The goal of this stage is to prepare diverse visual materials that can serve as an inspiration in the participatory session, and reflect the core of the fashion brand. This task is assigned to designers, as it allows them to use their skills and experience to conduct research, find the direction and choose materials. The visual materials that can be prepared in this stage include: silhouettes, shapes, prints and patterns, examples of garment details and finishings, and imagery conveying specific mood they want to evoke. This can be achieved through collecting images, fabric and colour swatches, examples of trims or any other finishings they find

relevant.

STEP TWO: UNDERSTANDING THE USER

The aim of this stage is to allow for an exchange of users' needs and values, and the values and niche on the market represented by the designers. This can be facilitated through creating a user profile, which allows all participants to engage in working together and bring in multiple perspectives into creating a target user persona. This step encourages discussions on users' fashion consumption habits, emotional connection to clothing, and sustainability concerns, integrating these perspectives early in the design process. The user profile will also be used in the following stage.

STEP THREE: DEFINING FUNCTION THROUGH STORYTELLING

This part reverses the traditional fashion design process, which firstly focuses on the visual aspects of a collection, and instead concentrates on outlining the function of the designed clothing through a storytelling approach. Prioritising function over aesthetics shifts the focus from trend-driven consumption to purposeful design, promoting versatility, durability, and more conscious fashion choices. The participants build a short story using the user profile from the previous stage. While visualising the activities the user encounters in daily life, they are able to match them with specific clothing needed for such occasions. Adding prompts here can direct the participants to discuss and define specific garments, fabrics or other elements, in order to keep their focus on the fashion aspect of the activity.

STEP FOUR: BUILDING IDENTITY THROUGH AESTHETICS

The goal of this stage is to create a visual representation of previously defined clothing in a form of a mood-board, that can later serve the designers to develop a collection and balance the visual brand identity to the users' style. By aligning aesthetics with user needs this stage can reinforce longevity and mindful material selection. It also allows the users to identify with the brand through visual representation. Through creating a moodboard, participants can build up on the ideas from the previous exercise but make them visual, and match functions to specific styles, colours, prints and fabrics. In this stage, they can use the materials prepared by the brand in the pre-workshop stage, as

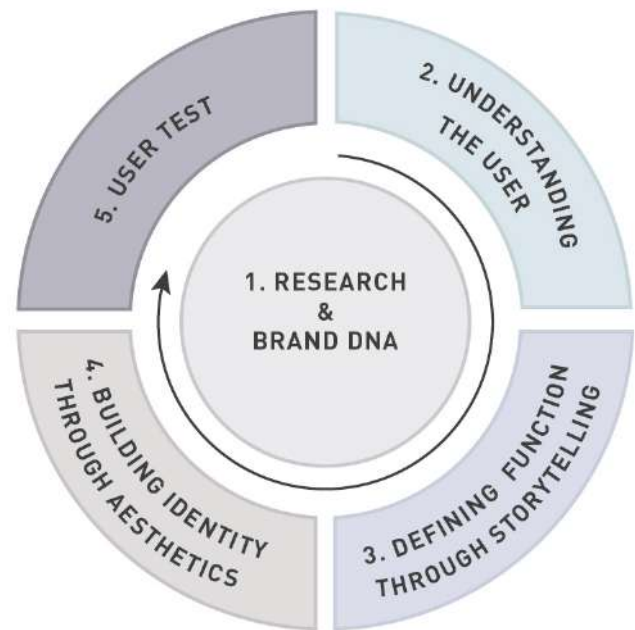


Fig. 01

well as their own notes and sketches.

STEP FIVE: USER-TESTING

The final step is an element of user-testing, which is not traditionally conducted within the fashion industry. The garment test probes evaluate the garments against user needs and expectations and allow them to interact with finished prototypes. By incorporating user feedback on quality, functionality, and aesthetics, this step can help brands refine designs to better align with sustainable user preferences. The users who participated in the session, receive a garment from the developed collection, together with a questionnaire about their insights referring to the functionality, quality and aesthetic aspects. This step can allow the brand to gather feedback and further improve their prototypes before the release.

METHODOLOGY

GATHERING USER DATA

A survey was conducted to gather sample insights about the users and their unmet needs in the context of fashion. The survey's questions ranged from yes/no to multiple choice to open-ended to

opinion scale, collecting both quantitative and qualitative data.

The questions were shaped to first observe general shopping behaviour, and consequently dive into experience with materials, sizing, quality and overall satisfaction with the clothing available on the market. The survey was concluded with questions about potential interest in participatory design.

The analysis of quantitative data allowed us to observe trends and patterns on fashion behaviours, satisfaction and the opinions of the users. The data used for the qualitative analysis was collected from the open-ended questions of the survey. The answers were clustered using the bottom-up approach and grouped into four main themes: user satisfaction, user needs, fabrics and user involvement. Some of the repeating patterns in this section included users who believe that they do not possess enough knowledge on fashion; those concerned with the relationship between price and quality; looking for functionality, quality and comfort; looking for diversity on the market; emphasising the importance of sustainability in fashion and users concerned with the fabric choices.

ADAPTING FASHION DESIGN METHODS

The traditional fashion design process begins with research and design development. In order to replicate trends for the upcoming collection, trend research is conducted to identify leading fashion brands and designers. Design teams conduct desk research by analysing design shows, forecasting services and social media. Shopping trips to major fashion cities or trade shows can be used for primary research (Munasinghe et al., 2022). Trends are later used to establish main themes of new collections. Moodboards with silhouettes, colours, fabric swatches, inspiration images and keywords are created for each theme. Fabrics play a crucial role in the process, as they require time to produce (Munasinghe et al., 2022). In further stages of the design process, more technical aspects such as specific shapes, finishes and sizing are defined. After designs are finalised, garment technical documentation is prepared with all necessary details about each design.

Recognising the key steps of the fashion design process was necessary to establish the opportunities for including the users in the process, and to find methods and tools that can be adapted

for the use of both design professionals and the users. The comparison of conventional elements of the fashion design process with the user needs highlighted by the survey allowed us to recognise the gaps that can be filled through the framework contribution.

SCHEME FOR ESTABLISHING THE FRAMEWORK

Drawing from the fashion design methods and the co-design approaches, the scheme of the framework for a participatory approach for fashion design has emerged (Fig. 02). The scheme is built around the participation of designers, users and facilitators, where a designer can also serve as a facilitator. While designers bring in their expertise on traditional design techniques and methods, the users, as *experts of their experience* (Scariot et al., 2012) contribute by expressing their needs, habits and expectations. The role of facilitator is to enable better communication between the two groups.

We applied a generative design approach to the process of designing garments in order to help create a framework that will facilitate participatory approach through accessing collective creativity. It enables recognising more insights because of collaboration of participants with various ways of thinking.

The proposed framework has to fit the unique aspects of the fashion industry - the nature of materials used (fabrics), the goal of applicability on the human body and the physical aspects of the final products: garments. The aim is to inspire designers to later create final garment designs, help discover users' needs in the process, raise their awareness about the fashion industry and foster sustainable behaviours.

TESTING THE FRAMEWORK

As the next step in framework development, two workshops were held to investigate how the participatory approach can be incorporated into the fashion design process, test the framework developed, and gather insights from the participants. The first session was held in person, with integrated design students and a designer-facilitator representing a fictitious brand. The second one was held online, with a fashion brand - a small business focused on size- and gender-inclusive clothing and accessories, incorporating sustainable practices such as the use of ethically sourced fabrics and repurposing of reclaimed textiles. A designer, a group of customers, and a facilitator-ob-

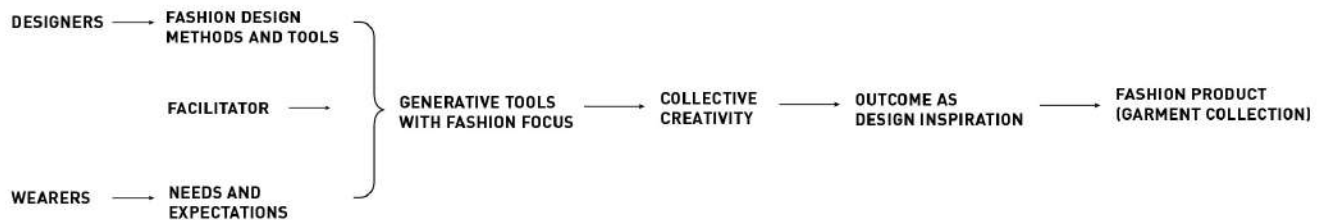


Fig. 02

server joined the second workshop. Participants in each workshop were introduced to the framework's steps and given access to materials prepared before the session. At the end participants filled out an anonymous feedback form. Workshop overview is summarised in Table 01.

WORKSHOP RESULTS

Through observation of participant interactions, analysis of workshop outcomes, and feedback forms, the workshops enabled us to gain additional insights into the research field and framework. Each workshop created a set of inspiration boards, including a user profile, storyboards, and moodboards (Fig. 03).

Through the duration of the workshops, certain freedom of interpretation was allowed in order to observe how participants interact with prepared tasks. Both groups were introduced to the objectives of the workshop and the details of each stage.

The comparison of the workshops revealed that the framework itself is adaptable and can be tailored to the specific needs of a project. While in workshop one, participants created three separate story-lines related to their character, which could

be interpreted into three separate product groups, in workshop two, participants developed a story with three consecutive steps, which could be further turned into one product with versatile aspects. Depending on the desired outcome, the workshop facilitators could either allow for flexibility of interpretation or guide the participants in a specific direction.

The brand presence was crucial to the course of the workshop. Knowing the brand brought the participants together, as they not only recognised its style and visual language, but also identified themselves with its values. This allowed for a smoother collaboration.

The users' limited previous experience with design tools and methods was beneficial to gathering information on their needs. While completing the steps of the workshop, the users focused on bringing their real-life experiences into the process, which allowed the teams to address specific issues. In contrast, design students, despite having no previous fashion background, continued to detach themselves from their own personal experiences and focus on creating a specific persona and their story.

Based on participants' engagement in the

Participatory workshops	Format	Participants	Duration	Outcome	Focus
Workshop 1	In person	6 design students Designer-facilitator	2h	User profile, 3 situation story boards, Moodboard	What mechanisms allow the users to be integrated into the fashion design process through active participation?
Workshop 2	Online	Designer, Facilitator-observer, 3 users	1,5h	User profile, 3 consecutive story boards, Digital moodboard	How to facilitate a dialogue between a fashion brand and the users through the proposed framework?

Tab. 01

workshop, as well as their feedback, we observed their interest in learning about the fashion design process. Interest in the end product was also expressed by participants of the workshop with users.

DISCUSSION
OPPORTUNITIES AND IMPLICATIONS
FOR FURTHER RESEARCH

This paper contributes to the development of the co-design approach to fashion design by introducing a participatory framework to explore its impact on the development of sustainable behaviour change. Combining theoretical exploration and user-research enabled us to recognise how co-design, specifically a participatory approach, can be applied to the process of fashion design. The framework was created using a research-through-design approach, with the goal of encouraging designer-user collaboration.

The framework intends to engage participants in investigating user needs through a fashion lens. Users and designers who take part in a participatory decision become researchers of themselves, their needs, and their relationship with clothing. After the session, the designers are left to create

garment designs, giving them creative freedom, though limited by the use of resources created during the workshop. At the same time, they can apply their field-specific knowledge, skills, and experience.

While this framework integrates participatory design within existing industry structures, its long-term potential lies in evolving beyond conventional business models. By shifting the role of users from passive consumers to active contributors, it challenges the conventional designer-user dynamic and aligns with broader discussions on systemic change. From a Transition Design perspective, systemic change in fashion requires interventions at multiple levels, from individual behaviour to industry-wide practices (Odabasi et al., 2023). The framework currently focuses on integrating users into the design process within existing structures, yet its potential lies in contributing to a broader paradigm shift that challenges dominant production-consumption habits and redefines user engagement beyond conventional industry standards.

CHALLENGES, LIMITATIONS AND

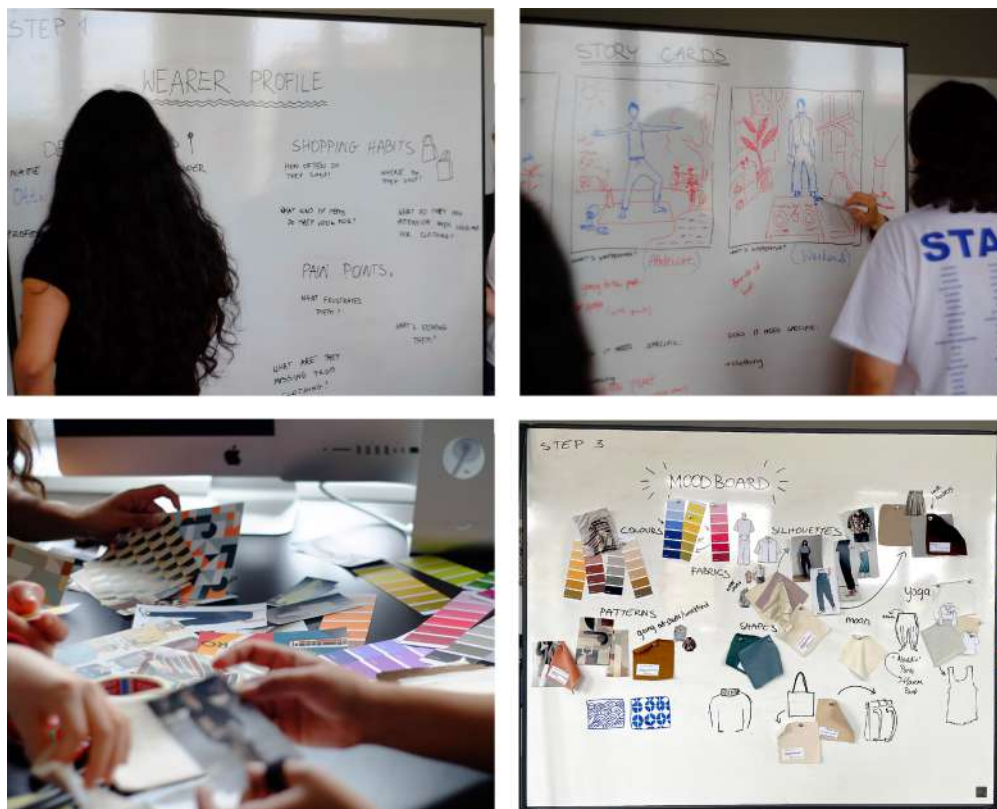


Fig. 03

FURTHER RESEARCH

However, this study is only one approach to the topic of co-design in fashion, and its findings have several limitations.

First, the framework has been developed and tested on a small scale. Exploring its long-term impact would require further development and industry collaboration with a diverse range of fashion companies. Second, due to the time-limitations of this study, the user-test stage was not included in the workshops. It would require further development and testing in order to fit it within the prototyping and manufacturing process, and development of user feedback forms. Workshop participants showed interest in the fashion design process, suggesting its educational value and potential to shape consumer perceptions and sustainable behaviours. Furthermore, future research could explore how participatory frameworks like this can evolve in alignment with transition strategies that emphasise long-term systemic transformation.

It would be beneficial to conduct a long-term study collaborating with brands willing to introduce the framework, develop and test products based on it, as well as the observing

customers-participants, their interactions with products and the impact on their behaviours. Engaging a more diverse group of stakeholders, for example technologists, managers, strategic planners or external partners could be tested in order to sensitise organisations to user-needs, encourage a broader exchange of perspectives and drive creation of new ideas.

Finally, we regard the framework as an initial state in theory developing process (Redström, 2017). We hope to inspire future researchers and design practitioners to adapt and expand this co-design fashion framework to match their needs. Nevertheless, the findings of this study suggest that the implementation of co-design approaches into the fashion design process is possible and has the potential to influence users' behaviour.

CAPTIONS

[Fig. 01] Participatory framework for fashion design.

[Fig. 02] Scheme for framework development.

[Fig. 03] Process and outcomes of workshop one.

[Tab. 01] Summary of Participatory Workshops Conducted.

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DIGITAL TOOLS

A NEW FASHION DESIGN PRACTICE AS ENABLER FOR A FASHION SYSTEM CHANGE

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Abstract

The term *fashion* has come to stand for particularly questionable profit-driven ecological and social imbalances. A closer look at its concept, however, shows that fashion itself is not the threat but rather contains solutions. To exemplify this, it is necessary to stress the difference between fashion and clothing. Nowadays, the fashion industry mainly promotes a supposed image of fashion. Nevertheless, a new perception of fashion in line with the 10R typology is beginning to emerge, as ultimately, society determines which clothing products become fashion. Clothing items are products realized by a design process. Today, contemporary fashion design moves away from disciplinary thinking. Designers make important material decisions, innovate processes, and have the potential to initiate thought processes in society. Fashion design practice should therefore be understood as an important knowledge culture with diverse mechanisms and principles. The cultural and social dimensions of design knowledge from design practices, as well as a designer's attitude, skills, and value systems, are of central importance to anticipate fashion for sustainable systems. The results of the *artistic-scientific* transdisciplinary research project *Fashion & Robotics* show how fashion design practices become not just fashion design solutions or technological advances, but *catalysts for systemic change in fashion*.

Keywords: *Fashion design practice, Knowledge culture, Circular systems, Redesign, Robotics*

INTRODUCTION

The term *fashion* has come to stand for particularly questionable profit-driven ecological and social imbalances. Complex global production networks and supply chains are highly fragmented, with thousands of players. The true cost is usually not included in the widely traveled textile product. The social conditions of production are far away from the UN sustainability goals. As a result of climate change and changes in ecosystems, the cultivation of textile raw materials is threatening our food chains, and yet global fiber production for textiles and fashion continues to increase (Textile Exchange, 2024). Design has contributed significantly to today's overproduction of goods by creating large quantities of very

short-lived products (Shedroff, 2009). It is essential to fundamentally rethink our actions in relation to fashion in order to find a new balance between society's basic needs for clothing and fashion, decent work, and the desire for relative prosperity in line with the boundaries of our planet. The greatest challenge today is to harmonize these seemingly contradictory requirements. *Fashion and the discipline of fashion design are significant and today overlooked actors in the search for answers and solutions.*

THE IMPORTANCE OF SYSTEMIC THINKING FOR PROBLEM CATEGORIZATION

In the past, researchers have dealt with the concept of fashion in order to better understand its dynamics. In doing so, Loschek (2009a) distinct in her systemic thinking between fashion and clothing and between a fashion system and an economic system. Although both systems are structurally interlinked, 'change is not the primary thing about fashion, because change is brought about by the economic concept of the seasonal renewal of clothing [...] without creating a fundamentally new image of fashion' (Loschek, 2009a, p. 30). 'Clothing [...] are products that are realized through a design process. Which products are accepted and become fashion is determined solely by society' (Loschek, 2009b, p. 161).

A multitude of negative impacts, currently attributed to fashion, are, strictly speaking, the result of linear business models of the textile and fashion industry, configured for fast pace and growth for short-lived mass-produced products, and are therefore much more related to the system economy. The discipline of fashion design today plays an embellishing role in the industry and is not perceived as an enabler of systemic change. Sustainability departments in fashion companies are increasingly moving from an advisory to a decision-making role (Ecosystex, 2024), however, positions in those departments are not filled by designers.

Looking at society, clothing-related sustainability discussions have now reached a wider audience. A flourishing second-hand fashion sector and a growing number of repair services are examples of how a new image of fashion is emerging in society that is no longer necessarily tied to novel fashion products.

FASHION DESIGN RESEARCH IN THE CONTEXT OF SUSTAINABILITY

PRACTICE-ORIENTED FASHION DESIGN RESEARCH

'It is estimated that the product design and development phase carries approximately 80% or even more of the environmental and social impacts of the product [...]' (Tischner & Charter, 2001, p. 120). The design phase includes material choices and influences how long products last, whether they can be repaired, or what happens to the

product at the end of life. In terms of clothing, this phase is currently the least researched. Despite a steady increase in academic influence on fashion (cultural studies, fashion studies, media theory, sociology, gender studies, etc.), contemporary debates are preponderated by discussions about the acceptance and social relevance of fashion, postcolonial facets, or technical and mercantile aspects of fashion. There is a lack of critical contributions that analyze fashion projects and related creative processes in terms of sustainability. A crucial part of the fashion design process, namely the act of creation, remains largely unexplored with regards to methods and new strategies that are required in circular or regenerative environmental systems. As Bigolin (2012) states, practice in fashion is mainly defined by its traditional production. New fashion design practices, however, are, as shown by Lidström (2023a) and Bigolin (2022), of fundamental importance for the progress of fashion design in terms of ecological and social balances. Fashion design must develop the knowledge necessary for systemic change, increase the quality of projects in this area, and contribute to deepening the general discourse on the subject. (Mareis 2011a) understands design as a historically contingent knowledge culture with diverse practices, mechanisms, and principles. The term knowledge culture refers to practices of knowledge creation through design and emphasizes the cultural dimension of this knowledge. It is crucial to adopt this perspective in fashion design to perceive this discipline as a changemaker with its own scope for action. It can achieve this by emancipating itself from traditional methods and outdated requirements of linear economic business models. *Fashion design must evolve from a role of 'prettifier' to a serious practice-based design discipline.*

PROJECT-GROUNDED RESEARCH FOR FASHION

Findeli (2022a) emphasizes in the summary of his long-time research that design is not about providing solutions to problems but is a process that moves a complex system from a situation 1 to a situation 2 that is considered *preferred*. In his *project-grounded* research (PGR), he highlights the importance of thinking in terms of projects to exploit the full potential of design. The basis of PGR is the scientific principle of *knowledge production* through action. In his so-called *Bremen model* (Fig. 01), a model of a general design project

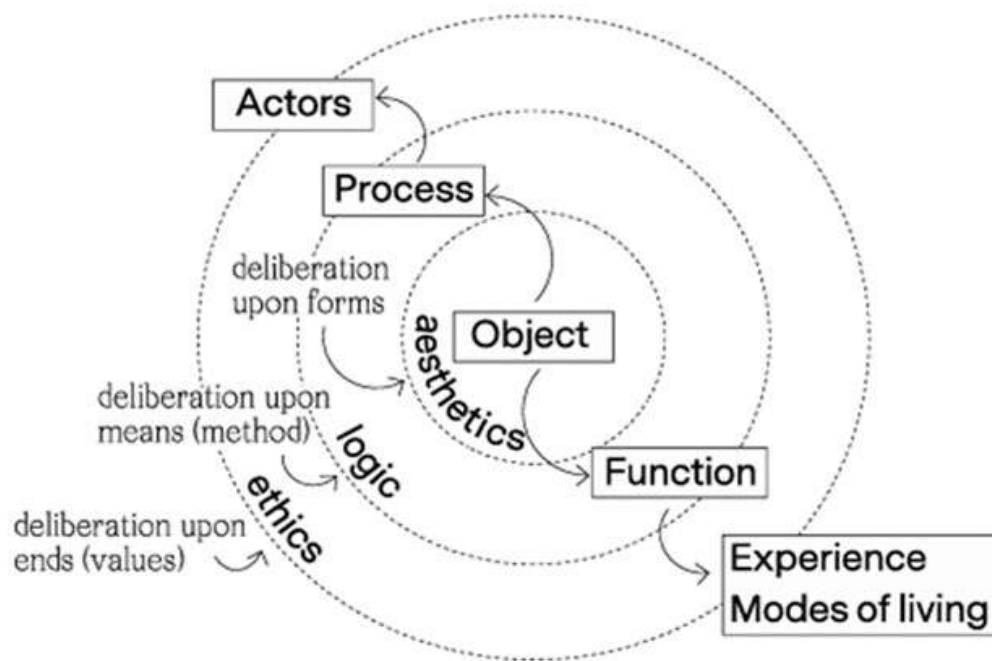


Fig. 01

theory, he points out the historical change from an object centered design (concerned with aesthetics) towards a design that involves all actors (concerned with ethics).

Later, Findeli (2022b) expands the boundaries of the Bremen model from a human-centered to a more complex design conception of the *habitability of the world*. 'Not the product, but the human being and ultimately the habitability of the world must be the goal of design' (Findeli, 2022c). He considers the designer's attitude as well as their skills and value systems to be important elements to design preferred configurations. *'Designers consciously or unconsciously draw on their most vivid cognitive, affective, and conative resources in their work [...]. Looking outwards, but also inwards, is crucial for good projects'* (Findeli 2022d). Fashion design and related research must now move away from a purely object-centered / aesthetic (or market-driven or technical or socio-cultural) character and instead adopt a more systemic and holistic design (research) approach, moving beyond the implementation of technical solutions to problems or behavior recommendations. Existing sustainable (fashion) design approaches range from cradle-to-cradle (McDonough, 2010) to

design for circularity (Ellen MacArthur, 2017a) to the sustainability framework of Williams (2019) to others, summarized by Adler et al. (2022a) and are systemic approaches that take the entire product value chain into account. *However, the focus of existing approaches is on the object/product level and thereby important influencing factors for preferred solutions are overlooked.*

INCLUSION OF HUMAN CREATIVITY FOR A TRULY INTER- AND TRANSDISCIPLINARY APPROACH

Preferred configurations cannot be found in disciplinary silos but require an inter- and transdisciplinary approach, including economic, natural science, humanities, and design perspectives. According to Mareis (2011b), design practice has its own original epistemology. Findeli (2015a) suggests design project thinking as fundamental to conveying ethical values as a circular economy (CE) not only needs a systemic approach. He suggests a corrected version of the 3P model (Profit/Planet/ People) or 3E model (Economy/ Environment/Equity) as all 3 poles possess their own logic: the force of economics (to produce more for a larger number), the force of ecology

(to respect the environment, to preserve nature, and therefore the living conditions of future generations), and the force of social equity (to fight poverty and distribute justly). ‘Only through the inclusion of human creativity and subjective inner aspects of the creator and human being can a real system change be achieved with the three poles: *comprehensive economics, social equity and human creativity*’ (Findeli, 2015b). According to Mareis (2011c), *design could be the discipline of synthesis*, as the discipline of the in-between, where knowledge and action are combined in a unique way. Contemporary fashion design has moved away from disciplinary thinking, and multiple factors, including political, social, economic, technical, ecological, or cultural aspects, are taken into account in design projects. *Fashion designers not only make key material decisions and innovate processes, but also have the ability to initiate important thought processes in society through projects.*

TOWARDS A NEW FASHION DESIGN PRACTICE: EXAMPLE DESIGN RESEARCH PROJECT FASHION & ROBOTICS (FAR)

In the transdisciplinary artistic-scientific research project FAR, novel fashion design practices and interconnected new processes were developed for possible use in new regenerative and circular fashion systems. Researchers from fashion design, creative robotics, and biochemistry worked together on various design case studies. Economics and humanities perspectives were included in one feedback round with an advisory board.

FAR FRAMEWORK (BREMEN MODEL: LEVEL ETHIC)

The ethical framework in which the design case studies were located could be no less than preserving planetary boundaries and associated required fashion system changes. To protect valuable finite resources, it will be crucial in the future to invent *regenerative and circular frameworks*, where goods are sourced locally and returned to the system again and again after one use cycle. As production phases have the greatest negative impact (Roos et al. 2016), the aim should be to keep products in good condition for as long as possible during the use and reuse phases (Ellen MacArthur, 2017b). Reike et al. (2018a) analyzed scientific publications for retention options (RO) in CE and combined the

most common views in their 10R typology: refuse (R0), reduce (R1), resell-reuse (R2), repair (R3), refurbish (R4), remanufacture (R5), repurpose (R6), recycle (R7), recover energy (R8), and remain (9). From a manufacturing perspective, long loops (R7-9) mean that components and products lose their original function and value. Medium loops (R4-R6) exist when parts are retained and less value is lost. In short loops (R0-R3), products remain close to their most valuable state and function, so that the greatest value is preserved. Few of the ROs are regularly applied in fashion today. Companies offer repair options, and clothes are collected or bought back from textile sorters to serve companies ‘pre-loved / pre-owned’ markets. However, *ROs are not considered as fields for design today, although design practices have great potential to impact all 10 ROs for fashion.*

With regards to human actors involved, labor-intensive production steps for the manufacturing of clothing are currently carried out with the cheapest labor force worldwide. The production of clothing has ceased to be a craft and has instead become a simple serial assembly line labor process, in which the seamstress is often exploited and the resulting garments are disposable products for the wearer. Any relationship and appreciation between human actors involved has been lost. In a circular fashion system, the ‘wearer’ is the raw material supplier at the same time and the system only works with trustful relations. In regenerative systems, non-hierarchical relationships and a valuable co-existence with nature are central. New local productions, not only reduce GHG emissions, but also allow to re-establish a connection to the product when locally sourced materials, for example secondary raw materials or new biomaterials, are applied on-site for either producing, remanufacturing, or repairing textiles. The idea of urban production, moving production back into urban areas, into the immediate proximity of both the user and the producer, creates a new sensibility for production processes. *Fashion design for local (re)manufacturing must include the conceptualization of new relationships between stakeholders so that products are valued, used, returned, and either transformed into new goods or disposed of correctly.* Through the definition of the ethical framework, it quickly became clear where design projects were needed to advance fashion practices in terms of sustainability. This approach enabled the focus of the case studies to be ultimately on fashion and

its current challenges, rather than on a proof of concept for a technology or a specific consumer target group.

FAR PROCESSES (BREMEN MODEL: LEVEL LOGIC)

In future regenerative and circular fashion frameworks, the need for novel methods, processes and skills arises from the inherent functioning of the new systems. Designers need on the one hand new knowledge to be able to make low-impact or renewable-oriented design decisions, what includes expertise about material streams (Adler et al., 2022b). On the other hand, Designers need extended know-how and skills about the correct handling of used clothes and novel materials, as they have not learned to think fashion for multiple use cycles, neither to work with volatile secondary raw materials (Lidström, 2023b) or grown biomaterials, nor to think fashion as redesign or for sharing services. Important new skills include on the one hand the revival of unlearned processes and crafts (mending, repair, bespoke tailoring techniques, weaving, embroidery, etc.) and on the other hand new technologies that have not yet played a role in fashion (robotics, digital techniques, AI, blockchain, 3D biomaterials, etc.). A design-based combination of traditional fashion techniques with new technologies has particularly great potential to reduce the impact of (re)manufacturing and to open up new tracks, as we can see within the practical examples in 4.2.1. and 4.2.2.

From an economic/technological but also societal point of view, it is crucial that the production of clothing becomes, to some extent, independent of simple manual lowest-wage labor. Local (and digital) production processes need to be invented with a high degree of individualization at a reasonable price so that the new (*digital*) *tailor* earns a living wage and clothing remains affordable for the wearer. In technical and economic-oriented research, automation processes are still being pushed for new garments, duplicating existing manual processes (Fengming et al., 2024). This will remain a difficult undertaking because of the complexity of garments. It is easier to automate individual small process steps on existing garments for redesign, repair, or remanufacturing. This approach has, however, not yet been pursued and is the field where the use cases of this research project started. During the process design, it was important to weigh up from case to case which automation made sense for the project to find an ideal skillful

division of labor between robots and humans to avoid the degree of automation led by a proof of concept from a technological point of view. Finally, various 3D processes and 3D materials for several ROs were developed.

NEW DIGITAL 3D PROCESSES FOR REPAIR (R3), REFURBISH (R4) AND REMANUFACTURE (R5)

Our bodies are complex three-dimensional forms. To be able to dress them with 2D textiles, elaborate pattern making and draping techniques were developed and refined over centuries. When designing with worn and/or damaged 3D garments in circular systems, it would be absurd from an environmental point of view to first dismantle 3D garments into 2D surfaces to be able to apply traditional 2D pattern-making and sewing processes. New 3D processes hence are needed to keep the products at their highest value. To this end, the ROs Refurbish and Remanufacture were first analyzed in more detail, and potential applications for use cases were investigated:

- *Refurbish (R4) is used when the overall structure remains intact while components are replaced or repaired, resulting in an overall improvement of the product. Remanufacture (R5) is when the entire structure is dismantled, inspected, cleaned, and, if necessary, replaced or repaired in an industrial process (Reike et al., 2018b).*

Lidström (2023c) dealt extensively with redesign as a method of remanufacturing and shows that developing something new out of an existing, discarded, or still loved item of clothing is an exciting new design task. Both ROs are still often not considered, taken seriously, or promoted today due to quality and labor (and cost) concerns. During the first months of the project, robotic processes for 3D garments have been extensively researched. The robotic arm acted as interfaces between an analogue and digital world, which enabled the designers of the research team to create their own 3D processes and transfer their expertise and material knowledge to the machine. For example, hand movements were tracked with a Vicon motion tracking system. In a digital workflow, this motion developed digital surfaces, geometries, and textures by capturing and analyzing hand movements in different body practices and full body tracking. These digital results were transferred to robotic motion to create, interact, or intervene with different surfaces and materials. Also, 3D printing technol-



Fig. 02

ogy was explored with a 6-axis industrial robot to manipulate fabrics. Experiments included the creation of 3D surfaces, printed trims applied during a remanufacturing process. At the end of this first research phase, it was possible to design and implement precise 3D manipulations (cutting, welding, printing, etc.) on 3D clothing on a mannequin and its digital replication, by hand and digitally. In a follow-up project, these 3D processes will be implemented in a local micro-factory. Next, the RO Repair was regarded more in detail.

- Repair (R3) is used to extend the lifetime of the product, making it as good as new, recreating its original function after minor defects or replacing broken parts. Repairing can be done by different actors and with or without change of ownership (Reike et al., 2018c).

Repair as a digital redesign service was identified within the project as a new field for fashion design where the design is developed globally and applied locally. The research team implemented a design-led framework for collaborative garment repair that combines visual programming with parametric design, collaborative robotics, and electrospinning. The team researched a process in which nanofibers made

from recycled polymers, obtained from garments that can no longer be recycled, were applied to repairable clothing made from the same polymer using high voltage. This automation considerably reduces repair costs compared to manual work. This application, in turn, leads from 3D repair to 3D redesign, in that the repair could be invisible or designed. This allows clothing to be worn for longer and creates new fields of service-based fashion design. A more detailed description of this use case is published in Gollob et al. (2025).

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NEW 3D MATERIAL FOR REDUCE (R1)

In fashion the RO Reduce (R1) is primarily understood as 'less material'. Zero waste 2D pattern making methods (Rissanen & McQuillan, 2016) today built on this. Also 'buy less' campaigns act in the same direction.

- *Reduce (R1) refers to using less material per unit of production, or to a dematerialization as an explicit step in product design (Reike et al., 2018d).*

Numerous individual production steps are necessary in clothing manufacturing to bring the 2D textile to the 3D body: pattern making, cutting, sewing, etc. Some of these steps could be eliminated if garments were developed directly three-dimensionally. With the use case 'Grow Whole Garments', a 3D process in which entire garments made of bacterial cellulose grow seamlessly in textile membranes, was developed (fig. 4). *Komagataei-bacter xylinus* is an aerobic acetic acid bacterium that uses oxygen to metabolize sugar into cellulose and can be seen as fabric-producing bacteria and future alternative to the cotton plant. Since clothing has to fulfill functions that are not evenly distributed throughout the body, experiments were made to observe and locally influenced the cellulose growth by a robot to grow different material properties in a fluid transition. More detailed information about this use case can be found in Eichinger et al. (2022). For now, the pieces are still small, flabby parts from basic science experiments. However, the laboratory grown bacteria-based shirts and trousers are the first visionary step on the way to a future application.



Fig. 03

A dematerialization in product manufacturing could also mean less energy. Within the MA design project braided textile (Fig. 03) the garment is created by a radial braiding machine, in reference to braid social relationships. The process needs 20 seconds in comparison to up to 3 hours in 3D knitting.

NEW ARTEFACTS (BREMEN MODEL: LEVEL AESTHETIC)

In fashion, aesthetics are influenced by applied production processes, such as sewing or knitting, and typical textile materials. The artifacts created with the newly developed 3D processes and 3D materials are characterized *by an inherent new aesthetic that ultimately expresses the attitude of a designer and conveys values*: Traces of use overlaid by a novel-looking material or prints, materials that wrap around body parts like a second skin or lines that circulate independently of a garment's construction.

The applications developed are ready to be also transferred into a service-based fashion design system, where redesign concepts are created globally but produced locally in line with sustainability requirements. According to Reike et al.

(2018e), Reduce (R1) also means the shared use of products or services. Future fashion design projects that conceptualize relationships and connections and create a *new type of immaterial, service-based fashion or a serial or collaborative use system* ultimately change the fashion image away from the economic concept of seasonal renewal of clothing. Further artistic experiments of the projects, realized during two residencies, even went a step further and focused on the interaction of robots, textiles, and space and ultimately explored the question of who is the actor in new more-than-human design processes, who is the helper and co-creator, and in doing so questioned what is actually a design object (Tepe et al., 2023).

CONCLUSION

Fashion design has contributed significantly to the overproduction and exploitation of resources and people. Fashion design, seen as a contemporary design discipline and emancipated from outdated economic concepts, can today contribute significantly to the functioning of circular or regenerative systems. Fashion designers must act in an informed manner and collaborate with inter- and transdis-



Fig. 04

ciplinary teams to develop solutions that strictly pursue the preservation of the habitable world. On the basis of the design research project Fashion & Robotics it was described how new preferred situations and systems can be pushed forward and finally established, which are not technical improvement or design artefacts, but catalysts for a system change. The practical examples show how opportunities for a new design practice are opened up and how new local processes can be developed, and finally how new attitudes are expressed with a new aesthetic.

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CAPTIONS

[Fig. 01] Findeli & Bousbaci, 2005, *Bremen model in the eclipse of the object*.

[Fig. 02] Project *Fashion & Robotics*. Collaborative 3D repair with an electrospinning process.

[Fig. 03] Katharina Halusa. Project *braided textiles*. The garment is created by a radial braiding machine, in reference to braid social relationships. The process needs 20 seconds in comparison to up to 3 hours in 3D knitting. Photo credits: Leon De Haas (left), Lea Sonderegger (right).

[Fig. 04] Project *Fashion & Robotics*. Seamlessly grown 3D pants.

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MEANING BEFORE MAKING

HOW DIGITAL TOOLS MIGHT ENABLE MATERIAL AND IMMATERIAL VALUE FOR SUSTAINABLE DESIGN

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Abstract

This paper explores the use of propositional design and digital tools for sustainable material and immaterial value creation in fashion design. Stuart Walker argues that within the current capitalist system, it is 'virtually impossible for the discipline of design to effectively and substantially address the interrelated issues of environmental responsibility, social obligation and personal meaning' (Walker, 2013). Propositional design objects are not design solutions but are concerned with 'challenging conventions, posing questions, and offering directions for reform.' Walker calls this 'non-commercial, academic, research-based designing' (Walker, 2013) propositional design. Alongside the increasing drive for more sustainable systems for fashion, digital tools have begun to change the way that fashion design is enacted. There has been a significant shift from the traditional physical craft skills of pattern cutting and sewing, to the use of software and digital spaces, used in tandem with the traditional fashion design studio environment. Software such as CLO3D allows for accurate patterns to be created digitally, emailed, and exported anywhere with an internet connection. Together with the changing context of the fashion industry and the growing desire to reduce waste, lower consumption, and redefine our relationship to clothes, these digital spaces provide new ways of thinking about and creating value.

Keywords: *Value, Sustainable design, Digital fashion, Propositional design, Technology*

INTRODUCTION

'Designers and manufacturers have no particularly profound knowledge of what the consumer values, and hence ever-changing trends, short product life spans and easy profit drive how clothes are currently designed.'(Niinimäki, 2010)

This practice-led research uses a propositional design approach and digital tools to explore sustainable value in fashion design. As Bourdieu articulated with his definition of cultural value, value is made up of multiple factors, some of which are tangible and some of which are 'understood'(Bourdieu, 1986). Clothing could be seen as having an outside (material) value and an inside (immaterial) value. Material value is that given by the context or society within which the

garment circulates. Immaterial value I define here as the personal memories, and individual narrative attached to a garment. This practice is contextualised by current developments and debates around the drivers of sustainable fashion (Dabas & Whang, 2022; Goldstein & Foulkes-Arellano, 2024), technology, and the digitization of fashion (Blum, 2021; Holden, 2022; Alexander & Rutter, 2022) (Yang & Lee, 2023; Sarmakari, 2023; Schramme & Verboven, 2024) product longevity (Haines-Gadd et al., 2018; Khamisani, 2021) data-integrated workflows(Hensel et al., 2022) and emotional sustainable capacity and sustainable responsibility(Martinez et al., 2024).

As designers of clothing, we are used to working with material values: the fibre, the fabric,

the form and the finish. What is less considered by the fashion designer, is the immaterial value of the things we design, their personal meaning. Chapman defined 'emotional durability' and framed landfill as a design failure, where designers failed to create a bond between the customer and the product (Chapman, 2005). However, many designers are limited by the business models they are working within. A 2020 paper about design practices in sustainable minded clothing companies acknowledged: 'The global fashion industry requires a massive systematic transformation' (Niinimäki & Karell, 2020). However, whilst the authors recognised the desire to make sustainable choices, many designers lacked knowledge about best practices. When asked what 'sustainability' meant, product longevity, material selection and social responsibility all scored highly, but lifecycle thinking, and alternative business models all scored quite low. The authors acknowledged the lack of time that designers have to properly reflect on their decisions, so that material selection can 'dictate the discussion of sustainable design practices in many respects' because 'material is the embodiment of a product and is probably the easiest and most controlled (certified) way to integrate sustainability'. Importantly it seemed that 'sustainable design practices...were limited to incremental product focused approaches. Hence, they did not challenge the wider industry practices and the current fashion system' (Niinimäki and Karell, 2020). Niinimäki previously investigated sustainable attachment to clothing for longevity and attachment (Niinimäki, 2010; Niinimäki & Armstrong, 2013) identifying 'connection to memories' as the most important quality in keeping clothes for longer, above quality, style or even beauty. I argue, in the light of environmental and ethical concerns, that these immaterial values could be as important as material values and consider if they could be designed. Could we design meaning before making? By valuing both the material and immaterial aspects of the design process equally as sites of value, how would this change the design process? Academics have long studied the semantics of dress, the social and historical meaning of fashion, and more recently sustainable materials and digital fashion, however the role of the design process in the generation of meaning has not garnered as much attention. This research explores whether it is possible to use digital tools to design the material and immaterial value of a

garment simultaneously. With digital technology's ability to dissolve boundaries between creative disciplines through shared software, and to collate, synthesise and organise large datasets, how could immaterial values be designed into a garment? I use a propositional design approach and digital tools to explore material and immaterial fields as distinct sites of value.

PROPOSITIONAL DESIGN

The practice was framed by Stuart Walker's propositional approach to product design research which he described as: '...a research methodology whose purpose is primarily exploratory and conceptual, the activity of designing should be regarded less as a *problem-solving activity* and more as a *question-asking activity*' (Walker, 2013). Walker argues that 'Perhaps the most important role for design today is to explore ways of re-uniting our material world with a world of meaning – with ethics, inner growth and spiritual wellbeing' (Walker, 2013). Like Critical Design and Speculative design, Propositional design removes commercial imperatives, allowing for broader question asking activities to occur. Propositional design objects are not design solutions but are '*questions in form*' concerned with 'challenging conventions, posing questions, and offering directions for reform.' Walker calls this 'non-commercial, academic, research-based designing' propositional design (Walker, 2013). As a design methodology, propositional design allows for a considered detangling of the 'wicked problem' (Churchman, 1967) of sustainability (Fig. 01).

As practice-based fundamental design research, propositional design involves three phases of theorizing, designing and reflecting. Propositional objects offer a different type of knowledge created *not through analysis but rather synthesis*, and 'provide a means of embodying issues of concern and reflecting on their implications' (Walker, 2013).

The risk with all outputs of design research is a focus on the aesthetic. The following practice represents an experimental formula for sustainable design, and importantly, not a product proposal. It does not represent a design solution; it is a conceptual fashion research experiment.

PRACTICE NARRATIVE

The first stage in propositional design research involves theorising: reading, writing and develop-

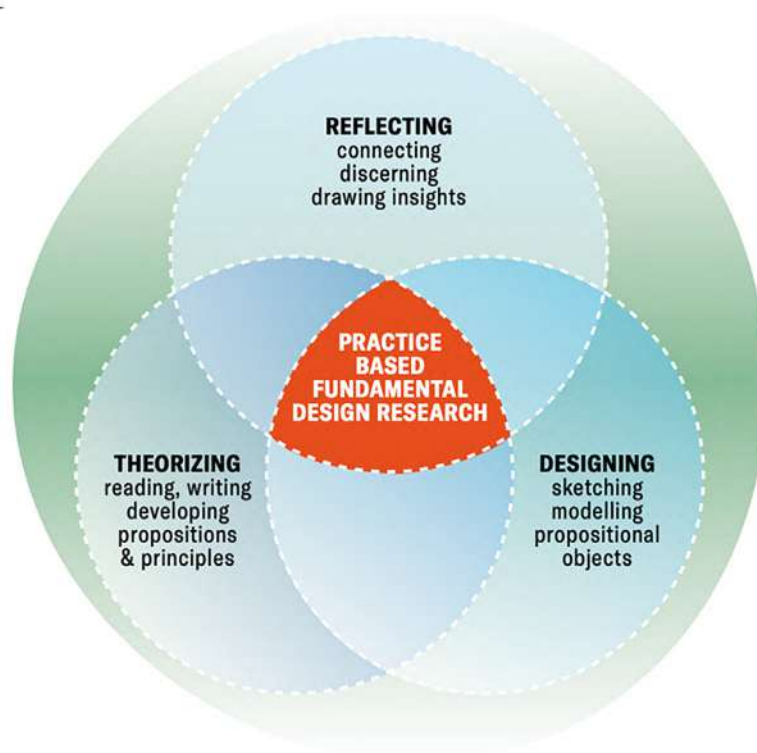


Fig. 01

ing propositions and principles. I began by investigating the relationship between people and objects, immaterial values and clothing to inform the design phase.

THEORISING

THINGS AS GATHERINGS AND 'ENTANGLED' VALUE

The archaeologist Ian Hodder described the relationship between people and objects as 'entangled'. Rather than focusing on objects as commodities, he used Heidegger's example of a jug to expand the meaning of an object to a 'thing' '...The jug takes what is poured into it, and then pours the liquid out. The water and wine come from a rock spring or from rain or from the grape growing in the earth. The pouring out can quench thirst for humans or be a libation to the gods... The jug, as thing, gathers together for a moment humans, gods, earth and sky.' (Hodder, 2012) This aspect of 'thingness' relates to sustainable design with its consideration of context (the environment), intergenerational design (people) and durability (long-term use). The notions of 'thingness' and 'entanglement' are helpful when position-

ing technology in relation to sustainability and value. If a designed artifact is a 'socio-material design thing' (Binder et al., 2011) digital technology – with its ability to gather, co-ordinate, facilitate collaboration, and re-distribute objects, surfaces, materials and data in time, space and any number of geographies – should allow not only materials and processes but also values to be designed in new ways.

CLOTHING AS MEMORY AND SOUVENIR

All objects retain or accrue immaterial or narrative value, and clothing is a potent example, as it is worn next to the body, and as such has the potential for greater intimacy with its owner. Embodied memory in inherited clothing was movingly described by Peter Stallybrass when he wore a jacket that had belonged to a deceased friend (Stallybrass, 1993). This sense of the past is perhaps most keenly felt in clothing, as it acts like a second skin, so close to the body that it takes on its form over time. 'Death activates clothing in peculiar ways, as if the garment takes over from the person...Yet it can only do so because, throughout our lifetimes, it accumulates the marks of lived experience. Our bodily imprint settles into the seams; the

DNA of our gestures moulds the garment into a ghostly negative of ourselves' (Evans, 2014). Both Stallybrass and Evans locate the intimacy, memory and narrative evoked by clothing in the evidence of use, but could this immaterial or narrative value be attached earlier, *prior to use*, adding further layers of meaning for a more 'emotionally durable' garment?

The sociologist Sherry Turkle wrote that 'everyday objects become part of our inner life' (Turkle, 2007). She described objects as bridges between our inner selves and our outer experiences, whilst Susan Stewart describes this connection as 'nostalgia' in relation to the souvenir. 'The souvenir speaks to a context of origin through a language of longing, for it is not an object arising out of need or use of value; it is an object arising out of the necessarily insatiable demands of nostalgia. The souvenir generates a narrative which reaches only "behind", spiralling in a continually inward movement rather than outward toward the future' (Stewart, 1992). Here, Stewart recognised nostalgia as a 'sort-of' need, and the souvenir as the narrative-generating object which satisfies it. As a form of social identifier, as a talisman, a memento, objects with a personal narrative attached to them are more likely to be kept and handed down to the next generation. If a souvenir authenticates the past, I propose that by designing using an individualised narrative, a souvenir might function not only as an aide-memoire but also *as a vehicle for connection to the self*.

NARRATIVES CREATE VALUE

As Stallybrass, Stewart and Turkle all acknowledge, the narratives we attach to objects create value. In 2009 Joshua Glenn and Rob Walker used eBay, the e-commerce website, to test their theory that stories create value for objects – even when the stories are not objectively 'true'. In their 'Significant Objects' experiment, they first bought a hundred insignificant objects at second-hand shops and flea-markets with an upper price limit of \$1.25 per object. They then commissioned 100 writers to write a completely fictional short story about each of the objects. The objects were listed on eBay with the short story as the item description and auctioned. The results were definitive. The stories added significant value to the objects, with some selling for over \$50 and even for over \$100 each. Walker and Glenn realised that by adding a story, in some cases the value of the object had increased by more

than 2,700% (Glenn & Walker, 2009). What this experiment demonstrated is that 'Stories are such a powerful driver of emotional value that their effect on any given object's subjective value can actually be measured objectively' (Glenn and Walker, 2012). If fictional stories add value to objects, then personal memories and connection to real events must create value, because they relate directly to individuals, families, friends, couples, social groups and communities. Just as technology enabled this experiment to take place, using a commonly used and well-known e-commerce site, technology here enables personalised data or memories to be *recorded, and harvested to actively create narrative value*.

DESIGNING

A CONCEPTUAL TRAVEL JACKET

To synthesise these ideas, I imagined a conceptual 'travel jacket' as a metaphor and hanger for the design thinking. This travel jacket would act as a physical diary, retracing travels and evoking memories, making the intangible tangible, by recording a highly personalised narrative. By weaving the narrative directly into the jacket's surface, the functionality of the garment would shift from the practical (pockets etc.) to the emotive, as a souvenir, aide-memoir and vessel for memory. The purpose of the practice being to explore how digital tools might combine with physical making, to allow meaning to be designed into a garment prior to manufacture or use.

The practice required concurrent digital and physical experimentation, with each area informing and influencing the other. The physical practice involved the weaving of cloth, and pattern cutting to create a garment form. This is what I defined as the *material value*. The digital experimentation was concerned with gathering and integrating travel data to influence the design of the garment, with an interactive system to engage the user. This is what I defined as *immaterial value*. Switching between the digital and the physical aspects of the research was not straightforward, but it was through this complex process or conversation that I progressed my thinking.

DESIGNING THE IMMATERIAL – GATHERING NARRATIVE VALUE

Following the theorising phase, my assertion was that the immaterial values of a 'travel jacket' might be designed using the metadata in a set of digital

photographs and linking them to a physical jacket as a propositional artefact.

To 'gather' immaterial value, I had initially collected and stored travel information on a prototype smartphone app, however, here the data was vulnerable. As more travel data was stored, the app began to drain the smartphone battery, as it was constantly 'on' and recording. All the data was lost when the operating system was upgraded by the user. At this stage, I made the decision to use digital photographs to provide the travel data. Smartphones are used daily, and digital photographs have replaced physical photo albums as memories that we carry with us. Using the metadata attached to digital photographs was practical, as no additional energy was needed, and the telephone battery would not be affected. To convert the metadata into information usable for the travel jacket, a website was created with a developer, to test the principle of uploading, storing and converting the photographs. Separating the tasks of 'gathering data' on the smartphone and 'using data' to create value on a website, was important in the digital development. The additional advantage of a website over an app, was the greater capacity for storytelling, as more elements could be integrated to establish a narrative. I planned to use the time and location metadata in the photographs, and connect their aesthetic, by extracting the colour at the same time as the geographical information. The website could be coded to 'see' each photograph as a grid, which would then be overlaid over each successive image, taking the colour from the same points on the grid each time. As the user moved through the photographs, the extracted colours could be applied to the surface pattern of the jacket.

THE PHYSICAL JACKET

A jacket was designed, a paper pattern made and toiled in calico to test the fit in the studio. Once correct, the paper pattern was digitised, enabling it to be exported to design and textile software. In the time since this practice was undertaken, (and post Covid 19 when studios were locked down and international travel prohibited), digital pattern cutting in software such as CLO3D is becoming industry standard practice. CLO3D allows garment patterns to be made and easily moved between digital software and the formation of 3D rendered digital garments.

TRANSFORMING DATA - FROM IMAGE TO STRIPE

Once digitised, the surface of the travel jacket was designed to accentuate its form and employ the travel dataset. Whilst working on the digital jacquard looms, I noticed how the 'Pointcarre' software iteratively reduced image complexity to simple colours and threads for weaving. I was drawn to the idea of taking something complex and difficult to capture (such as a landscape) and simplifying it to essential components or blocks. Influenced by the artist Sol Lewitt and his series of black and white isometric drawings (Lewitt, 1982), I developed a simple stripe design on the jacket surface, by repeatedly offsetting the pattern piece shapes, which could then be 'filled' with the colours from the photographs. This allowed the aesthetic of the jacket to be directly affected by the aesthetic of the images. I made a test of the offset stripes design using the colours from a photograph taken during a trip to the Swedish countryside, importing those colours into the stripes on the jacket. Using the colours from a set of images, memories of a place could be abstracted and linked to the jacket. A user would be involved in the making process by choosing what to photograph, which images they uploaded, and which version of the jacket they selected to make (Fig. 02).

JACKET SAMPLING

Several woven toiles were made on a digital jacquard loom. To check the stripe positions and scale before weaving, a printed toile was also made, to test the colour positioning. The jacket panels were printed onto sublimation paper, cut out, positioned on a test fabric and placed in the heat press, where the colour was transferred onto the fabric. A black and white version tested the line position, a full colour version tested the colour placement. This, together with the jacquard weave tests, provided the factory with a full colour prototype and all the information to set up the looms to weave the jacket panels. The lay plan of the pattern pieces was adapted to the width of the sample looms at the factory. A lay plan is the arrangement of pattern pieces which determine how much fabric is needed. Keeping the pieces as close together as possible reduces the amount of fabric required and the amount of wasted cloth. The wider the cloth, the less length required; the narrower the width, the more length required to fit in the pattern pieces. Once the lay plan was arranged to fit the loom width, the pieces could



Fig. 02

be woven, cut out and sewn together to create the finished jacket. The jacket was woven at Stephen Walters Ltd (Stephen Walters & Sons, 2024) based in Sudbury, UK. The company was founded in 1720, and specialises in Jacquard weaving, which embeds a surface pattern into the cloth through the weave structure.

WEBSITE PROTOTYPING

Prototyping the website involved creating pages to explain the connection between the map (Google Maps was used) and the jacket. A homepage was developed showing a spinning globe, which 'flattened' into a map on a subsequent page and rudimentary keys were positioned to allow the user to 'login/out', 'add images', 'show images' and 'start journey'.

Upon pressing the 'start journey' button, an animated line moved from one picture location to another, showing the locations of a year of photographs taken from my smartphone. Clicking on 'show images' opened a large grid showing hundreds of photographs taken in a year.

The final page showed a flat layout of the jacket pattern pieces with the colours on the

jacket changing as the user moved through the photographs using the arrows.

Advantages:

- The metadata and images were safely stored on a website and would not be lost.
- The story of the interactive jacket could be told more effectively.
- The smartphone battery was no longer drained by the app gathering the data.
- The coding for the colour extraction had been shown to work.

Challenges:

- The storytelling behind the jacket needed further development, as the connection between the photographs and the jacket remained visually unclear.
- The aesthetics of the site were not yet conducive to a fashion context.

FINAL WEBSITE DEVELOPMENT

In the final website design, a different structure was employed to create more cohesion in the narrative and an aesthetic more suited to luxury fashion. The pages and buttons were removed, and a dark background map was used as the backdrop to highlight the colours in the jacket. Google Maps remained the basis of the backdrop, but the labelling and details of the locations were removed and a slider representing a year from left to right (January to December) was added. As the slider moved, thumbnail pictures appeared over the locations in which they were taken. To better tell the story of the colour extraction onto the jacket, a 3D model of the jacket was produced.

THE 3D JACKET MODEL

A 3D jacket model was made using the software 'Marvelous Designer', which enabled the digital pattern to be digitally 'sewn together'. The software is used in CGI (computer generated imagery) and computer games to create realistic clothing (Marvellous Designer, 2024). The digital pattern was imported and converted into a 3D model of the jacket, complete with surface pattern. The 3D jacket was placed over the global map twice (one model showing the back and one model the front) and each model made to slowly rotate so that the front and back of the jacket were displayed simultaneously.

Transferring the photograph colours onto the 3D jacket was done by 'texture mapping'; a method of applying patterns or surfaces onto 3D models used in animation. This process is used

to transfer a 2D image onto a 3D form to make a computer-generated model more realistic. The developer wrote code, which harvested the colours from the photographs as before, and projected them onto the moving 3D models and the flat pattern layout simultaneously. This made more sense visually, when the 2D pattern was seen alongside the 3D jacket that the pieces combine to create.

The website acted as a proof of principle (POP) model demonstrating how the personalised data encoded in digital photographs could be used in an interactive experience. The jacket was transformed into a poetic and symbolic object, gathering traces of a journey and weaving them into a narrative-laden surface. The function of the jacket shifted from physical needs to psychological needs, evoking human connection, memory and emotion. The 'retrace jacket' connected to a time and place through an image and the memories associated with it (Fig. 03; Fig. 04).

REFLECTION

REDESIGNING RELATIONSHIPS

This practice argues for digitally restored connections between the designer, product and user, restoring relationships broken in mass production. Hugh Dubberly asserts that design is being re-framed or 'de-materialised' and describes a shift from transactions to relationships. People, smart devices, software applications and services gather together in product-service ecologies he suggests and that 'these gatherings need to be designed' (Dubberly, 2017) The retrace jacket is an example of a 'gathering', a conceptual product-service ecology, involving mobile technology, digital imagery, animation, interactive web design, digital jacquard weaving and garment construction, moving across disciplines to pull disparate elements into configuration around central research questions.

The research used a propositional design approach to determine if a physical and emotive journey could be designed into a garment, designing 'things' not commodities. It employed the surface of a garment as a container to store and evoke memories. The resulting propositional artefacts (website and jacket) suggest an interactive process to build narrative and meaning into clothing. Drawing on memories as a driver for design, the function of the jacket becomes symbolic, and entirely subjective. Using data,



Fig. 03

fabric was woven with colours linked to a time and place that already had value attributed to them. Photographs served as time capsules, activated and re-materialised in a garment. This surface can be worn, and further narratives added through use, creating a deeper, layered sense of connection and meaning. Stored images 'map' a year as a travel journal, recorder of time, and personalised data source. Taken together, the website and jacket imagine a design process which places meaning at its centre.

The propositional artefacts identified several questions for further research:

- Are immaterial values as important as material values for sustainable fashion design, and how might these be designed into garments?
- How could the fashion design process be reconfigured to generate greater meaning for users?
- Could the metadata housed in digital photographs become a personalised resource for use in fashion products as souvenirs of rarefied experiences?



Fig. 04

- Do interactive systems encourage product durability and brand loyalty in a fashion context?
- Could mobile devices act as data collecting tools, to personalise fashion?
- Could digital processes enable future fashion systems to discard 'stock' and be wholly made-to-order?

MEANING BEFORE MAKING

This research challenges the current paradigm, where meaning is given to objects artificially through advertising and then after manufacture, through use. Tilley's 'meaning through use' (Tilley, 2001) fuses with designed-in meaning, consolidating value long-term. As we move into a post-industrial society 'an immaterial culture is emerging' (Moles, 1995) and in this digital culture, data is as valuable as oil (The Economist, 2017). We protect our data with online security, passwords and firewalls, are warned about the dangers of data theft, and the prospect of corporations using our data against us. For designers, personalised data represents a vast untapped resource, to create sustainable connections between ourselves and our possessions. Using data to create *meaning*

before making, in the form of narrative and emotive value, could be key to product durability. Souvenirs and heirlooms evoke events, places and people of significance to us. The images, sounds and movies we gather on our mobile telephones have value to us as a diary, and a means of connection with others. Images previously housed in a photo album might be reframed as a personal, rarified resource which, when combined with sustainable production could redefine fashion. Making less and linking the physical and the digital spheres through designed interaction, is one route towards a sustainable source of value for fashion. Designing clothing that means something to us, is worth further investigation.

Propositional design, as an academic tool, could be adapted to fashion design as a means of creating space to open up future research avenues. The impact of this methodology would be to reimagine and visualise a transformed process encouraging product attachment, reducing waste, lowering emissions, advancing digital workflows, sustainable processes and new business models. By merging personalised data with digital tools and storytelling, this project demonstrates how a re-imagined system might discourage overcon-

sumption, overproduction and resource use by making meaning or immaterial value a driver of sustainable value in fashion.

CAPTIONS

[Fig. 01] Practice-based fundamental design research (Walker, 2013).

[Fig. 02] A stripe pattern was created to accentuate the pattern shapes, and the colours taken from a photograph were positioned into the stripes of the jacket.

[Fig. 03] The jacket in 3D, and being woven on the Jacquard looms at Stephen Walters & Sons.

[Fig. 04] A Propositional Artefact – The Retrace Travel Jacket.

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HYPERLOCAL KNITTING

BUILDING SUSTAINABLE NETWORKS WITH 3D SEAMLESS TECHNOLOGY

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Abstract

Traditional manufacturing models are increasingly unsustainable and vulnerable to environmental and geopolitical challenges. Industry 4.0 principles integrated with cutting-edge 3D knit technology form the basis for the proposed Future Factory Network (FFN). The FFN enables localised production on a global scale, where the physical location of designers and consumers becomes irrelevant; aligning with circular economy principles and offering extensive design options. Produced with near-zero waste, minimal post-processing, and highly customisable, 3D knit products offer an ideal solution for sustainable manufacturing. This research will develop and test a novel manufacturing model that leverages existing resources to adopt slow fashion principles within a scalable, efficient, and agile framework. The FFN model aims to enhance brand sustainability and circular economies through smart manufacturing systems and advanced 3D knit technology. Whilst this model addresses manufacturing processes, the behavioural shifts needed among consumers and stakeholders are intrinsic issues beyond the scope of this research.

Keywords: *3D knit, Industry 4.0, Industry 5.0, Sustainability, Circular economy*

INTRODUCTION

This paper reports on an ongoing doctoral research project in its second year, which explores the intersection of hyperlocal production, 3D knitting, and Artificial Intelligence (AI)-driven processes. The project investigates how the fashion industry can harness digital 3D seamless knit technology for hyperlocal manufacturing to develop sustainable knit products using advanced knitting technologies. This paper presents the research context, outlining the unique methodology that integrates AI to optimise design and material use and introduces the Future Factory Network—a conceptual model for sustainable, site-specific production.

Discussion of the preliminary findings offers insights into this innovative approach, its potential applications and its impact.

3D SEAMLESS KNITTING, INDUSTRY APPLICATIONS AND SUSTAINABILITY

Knitting is the creation of columns of intermeshed loops from a continuous yarn. Flatbed knit machines can produce various outputs, including 3D seamless knit products, shaped (or fully fashioned) panels, and cut-and-sew fabrics. 3D seamless knitting, the focus of this research, minimises or eliminates the need for typical garment construction post-processes by directly engineering near-complete clothes and various

products on the knitting machine (Choi, 2005). This technique has evolved from hand-knitted seamless socks in ancient Egypt to advanced technologies offered by manufacturers like Shima Seiki and Stoll, whose patented systems, WHOLEGARMENT® and Knit and Wear®, dominate the market (Pavko Čuden, 2022b; Spencer, 2001).

WHOLEGARMENT® technology streamlines garment production by eliminating the need for linking and reducing waste (Basu & Gupta, 2019; Giglio et al., 2022; Mahbub et al., 2014). Linking is joining individual knit garment pieces together, stitch for stitch, as needed for shaped and cut-and-sew knitting manufacturing methods. Throughout the researcher's experience, there has been an increasing shortage of linkers globally. Factory work is less appealing to younger people than it once was, so fewer of the next generation are learning the skill. WHOLEGARMENT® technology automates garment construction, reducing labour and material waste, thereby aligning with common sustainable production goals (Pavko Čuden, 2022b; Xie et al., 2021). The technology also supports circularity by avoiding mixed-fibre sewing threads needed to sew garments together, complicating recycling.

In conjunction with the knitting machines, Shima Seiki's TOTAL FASHION SYSTEM® offers efficient, sustainable, and flexible production systems that integrate design, virtual sampling, and production management. The TOTAL FASHION SYSTEM®, which enables Just-in-Time manufacturing, which is simply making goods as needed to reduce waste (Swanson & Lankford, 1998), and mass customisation (Sustainability at SHIMA SEIKI, n.d.) for efficient, sustainable, and flexible production (Davis, 1987; Swanson & Lankford, 1998). The technology can align with Davis's (1987) definition of mass customisation by meeting the customer's individual needs anywhere and anytime, with value (Davis, 1987). WHOLEGARMENT® is the selected technology in this research to test a hyperlocal, digitised Future Factory Network (FFN), addressing labour shortages and potentially democratising manufacturing.

In today's industry application, the Shima Seiki TOTAL FASHION SYSTEM® currently operates within a single manufacturer. The Future Factory Network (FFN) proposes expanding the system into a decentralised network of "Design Hubs" and local manufacturing sites. This approach

could reduce freight costs, lead times, environmental impact, and geopolitical risks by enabling responsive production closer to consumers—making import tariffs and potential geopolitical crises like the COVID-19 pandemic less impactful to supply chains.

Sustainability improvements in the manufacturing industry are essential, and seamless 3D knitting provides significant advantages over traditional manufacturing methods. It reduces waste, eliminates labour-intensive post-processing, has a lower carbon footprint, and, in applications outside of apparel, can produce flat-packed, lightweight products (Cerulo et al., 2022; Pavko Čuden, 2022a). The textile industry contributes 8% of global greenhouse gas emissions and generates significant waste, with 33% of the 100 billion garments produced annually ending up in landfills within a year (Khan et al., 2023; Quantis, 2018).

Whilst 3D seamless knitting has vast potential to reduce waste, designing requires highly skilled specialised programming to maximise the technology's technical capabilities (Peterson & Ekwall, 2007). The development of AI to assist with programming could significantly enhance communication of design and enable knit programming capabilities, allowing users with minimal experience to create effective and appealing knit programs for production with shorter lead times and fewer resources dedicated to sampling (Scheidt et al., 2020), this will be explored further later in the paper. The proposed FFN has the potential to address the need for specialised skills and reinforce its commitment to sustainable and efficient production, balancing the advantages of WHOLEGARMENT® technology integrated with technological innovation and ethical manufacturing practices.

Integrating Industry 4.0 technologies, explored later in the paper, can improve collaboration throughout the FFN supply chain, making it possible to scale slow fashion principles. Slow fashion is an alternative to fast fashion, aiming to slow resource extraction while meeting essential needs and representing a "future vision" for the fashion industry (Aakko & Koskennurmi-Sivonen, 2013; Cataldi, 2013). Cataldi (2013) proposes deconstructing the 'fast fashion' sector into more specialised fashion industries, such as slow fashion, which has many business models, including recycling, resale, reuse, and repair of garments. Although slow fashion businesses still operate for

profit (Pucker, 2022), they are more socially and environmentally conscious and strive to have a positive impact.

For slow fashion to be a sustainable, scalable fashion model, collaboration is critical, and interconnectedness strengthens the actors through the guidance of similar principles (Cataldi, 2013). An interlinked local system of designers, consumers, and supply chain workers can create connections throughout the fashion life cycle, offering a philosophy similar to slow fashion except at scale (McRobbie, n.d.). Sustainable systems, like the proposed FFN, care for internal and external systems, from work culture to external society's well-being – necessitating the shift from the technological advances of Industry 4.0 to Industry 5.0, driving innovation in knitting, delivering benefits for the environment, industry, work culture and society (Maiti et al., 2022; Pavko Čuden, 2022b; *Sustainability at SHIMA SEIKI*, n.d.).

INDUSTRY 4.0, 5.0 AND 3D SEAMLESS KNIT

The transition from Industry 4.0 to Industry 5.0 represents a critical opportunity for the knitting industry to align advanced automation with sustainability and human-centric principles. The FFN proposes reconfiguring existing Industry 4.0 technologies into a globally adaptable, sustainable manufacturing model that could transform the knit manufacturing industry.

Industry 4.0's integration of cyber-physical systems (CPSS), Internet of Things (IoT), and AI has revolutionised manufacturing by enabling smart, interconnected production environments (Ahuett-Garza & Kurfess, 2018; Pavko Čuden, 2022b) (Ahuett-Garza & Kurfess, 2018; Pavko Čuden, 2022). IoT refers to internet-connected objects with built-in intelligence capable of communicating, exchanging data, making decisions, triggering actions, and delivering services. It emerged from IT processing power, cloud computing, and data analysis advances. In the textile industry, IoT is primarily linked to Radio-Frequency Identification (RFID) for tracking and tracing (Zizic et al., 2022). Industry 5.0 builds on this foundation by emphasising worker well-being, resilience, and sustainability, fostering a more balanced manufacturing ecosystem (European Commission. Directorate General for Research and Innovation., 2020; Ivanov, 2023; Maddikunta et al., 2022).

The integration of automation within Industry 5.0 does not seek to replace human labour and creativity, but rather to enhance the human experience by removing repetitive and labour-intensive tasks. One example is to enable designers to focus on innovation, especially with 3D knit seamless products, which can be advanced in technical complexity. The advanced technology can leave designers at the mercy of the programmer's willingness to experiment (Taylor & Townsend, 2014), and AI can potentially help overcome these limitations. For instance, AI-driven tools can assist in automating the creation of technical specifications, such as tech packs for complete garment knitwear. This optimisation allows designers to conceptualise and iterate creative ideas more freely while ensuring that these ideas are technically feasible and aligned with production requirements. AI models trained with diverse design scenarios and costing frameworks can offer real-time suggestions, improving the efficiency of design-to-production processes (Grosso & Boselli, 2022). Such integration fosters a symbiotic relationship between human creativity and machine efficiency, where AI supports designers by streamlining complex technical details, ultimately enhancing their capacity to meet market demands without compromising the artistic and ethical dimensions of fashion design. This human-technology collaboration aligns with the core values of Industry 5.0, reinforcing creativity rather than constraining it (Adel, 2022; Kazancoglu et al., 2023).

By integrating AI and machine learning, the FFN seeks to support decentralised decision-making, enabling hyperlocal production that adapts to market demands and geopolitical challenges (Li et al., 2021; Zizic et al., 2022). The FFN aspires to leverage these advancements to scale slow fashion principles, offering on-demand, localised manufacturing.

Technologies like Shima Seiki's WHOLEGARMENT® and a range of "smart technology" such as "Smart Bobbins", which are elaborated on later in the paper, streamline production, reducing lead times and the necessary resources while enhancing flexibility and circularity (Pavko Čuden, 2022b; Simonis et al., 2016). Smart Factories, exemplified by the Shima Seiki Factory Boutique, demonstrate the potential for customised, sustainable production using existing technologies (Peterson et al., 2011). Complemented

by advanced software for design visualisation and automated production used within smart factories, environmental impact and efficiency are reduced.

The FFN's reliance on automation could enhance efficiency and create new job opportunities in high-labour-cost regions by reviving local industries. Labour shortages have severely impacted the U.S. manufacturing sector. In 2020, there were over 600,000 stable manufacturing jobs on the job market. As noted earlier, Australia is experiencing the retirement of older workers before their skills have been passed on, causing great worry to stakeholders (Stevick, 2023).

By combining human ingenuity with robotic systems, Industry 5.0 ensures innovation supports societal well-being and environmental sustainability, aligning the textile industry with modern economic and ecological goals (Adel, 2022; Kazancoglu et al., 2023).

ARTIFICIAL INTELLIGENCE, KNIT PROGRAMMING AND 3D SEAMLESS KNIT

Since its inception in 1955 by Stanford Professor John McCarthy, AI has evolved from creating intelligent machines to a broader discipline focused on developing machine intelligence. Contemporary definitions describe AI as intelligence generated through mathematical modelling, enabling machines to process signals, make decisions, and reduce human error (Hassani et al., 2020; Manning, 2020; Wang et al., 2024). AI classification is based on its capacity to emulate human thought and emotion, encompassing categories such as AI-enabled machines and technology-focused approaches (Hassani et al., 2020; Joshi, 2019). This research will primarily use generative AI, though integrating additional AI technologies could further enhance its outcomes if there were increased resources.

Hassani et al. (2020) classify IoT applications into internal and external platforms, with machine learning (ML), a subset of AI, playing a critical role in enhancing IoT's capabilities. IoT refers to internet-connected objects with built-in intelligence capable of communicating, exchanging data, making decisions, triggering actions, and delivering services. It emerged from IT processing power, cloud computing, and data analysis advances. In the textile industry, IoT is primarily linked to Radio-Frequency Identification (RFID) for tracking and tracing, such as the referenced

earlier, RFID "smart bobbins" enable operators to respond immediately to yarn changes without relying on manual checks or sensor triggers, saving up to 20% in reset time while reducing skill level variability and boosting international competitiveness (Zizic et al., 2022). IoT technology, in conjunction with ML, enables AI to function intelligently by learning from its environment; for example, it can be particularly valuable in predicting the properties of knitted fabrics. Artificial Neural Networks (ANNs), a common ML tool, effectively model the complex relationships between yarn, machine type, and knit structure, forecasting fabric attributes like handle, drape, and comfort (El Naqa et al., 2015; Singha et al., 2022). ANNs rely on input, hidden, and output layers to filter complex data, and their efficiency can be further improved using fuzzy logic (FL) to manage variable parameters (Alibi et al., 2013; Yildirim et al., 2018). There is incredible potential in using AI to predict machinery failures and faulty products, reducing waste and extending the life of equipment whilst enhancing the workers and designers through human and technology collaboration (Banjanović-Mehmedović & Mehmedović, 2022). Incorporating other advanced AI techniques, such as long short-term memory (LSTM) models, offers significant potential for automating knit programming. LSTMs can process sequential data and generate knitting codes based on design specifications, reducing the need for highly specialised programming skills (Scheidt et al., 2020) and bridging the gap between designers and programmers. Workflow and increased efficiency are possible by reducing sampling lead times and minimising waste from unapproved samples. However, designers still require a foundational understanding of 3D knitting technology to fully exploit its capabilities and streamline the design-development process (Smith & Moore, 2020).

Current training for industrial knitting machines, such as those offered by Shima Seiki, remains segmented between design and programming. Using AI to integrate these disciplines could foster technical designers capable of navigating both creative and technical aspects of knitwear production (Taylor & Townsend, 2014). Tools like design compilers, which translate high-level design elements into machine-ready instructions, hold promise for democratising knit programming and

accelerating innovation in the industry (McCann et al., 2016).

Innovative AI-driven intelligent development and manufacturing systems can enhance sustainable design, development and manufacturing strategies by adopting mass customisation concepts (Grosso & Boselli, 2022) as seen in slow fashion. AI's ability to optimise and design production processes that can cater for customised and personalised products at a mass scale greatly benefits consumers, society and the environment. This research proposes a model that enables slow fashion principles to be competitive with fast fashion without compromising ethics or sustainability goals through the uptake of advanced AI technologies combined with the capabilities of 3D knitting machines. Reducing the design and development bottleneck and leveraging AI tools to make better design and technical decisions streamline the process. All whilst upholding high ethical and sustainability standards and rapidly responding to consumer demands.

3D SEAMLESS KNITTING, HYPERLOCAL, SLOW AND FAST FASHION

As consumers become increasingly aware of their impact on the environment and consumption, slow fashion becomes an increasingly important movement. Slow fashion emphasises sustainability, quality, and respect for natural resources and labour. This philosophy aligns with Shima Seiki's WHOLEGARMENT® technology, which supports zero waste, traceability, and durable garments (Aakko & Koskennurmi-Sivonen, 2013; Maffei & Villari, 2011). By enabling community-focused production and shortening supply chains, WHOLEGARMENT® technology creates local "hi-tech craft workshops" (Langvik, 2022), bridging the gap between traditional slow fashion values and the demand for faster, more efficient production.

The Future Factory Network (FFN) takes this further, leveraging 3D seamless knitting technology within an alternative manufacturing framework. The precision and flexibility that 3D seamless knitting offers are required for on-demand production, reducing waste and eliminating labour-intensive processes like linking. By decentralising production through a network of manufacturing hubs, the FFN promotes Just-In-Time manufacturing and mass customisation, striking a balance between the responsiveness of

fast fashion and the ethical, sustainable principles of slow fashion (Cerulo et al., 2022; Pavko Čuden, 2022b). In the FFN theoretical framework, raw materials, like yarn, are stored and only used once an order is placed, ensuring no unsold product stock, while in this case, keeping the yarn available for new styles. This hyperlocal approach allows quick responses to market demands.

Hyperlocal manufacturing plays a pivotal role by producing goods closer to the consumer, the FFN reduces freight costs and environmental impact, reinforcing slow fashion's emphasis on local economies and minimal waste (Nawaz & Nayak, 2015; Ozdamar Ertekin & Atik, 2015). Concurrently, the FFN is highly likely to be able to respond and adapt rapidly to market demands, which aligns with the agility of fast fashion. The FFN can then be an offering for a sustainable alternative manufacturing model without sacrificing efficiency.

The integration of Industry 5.0 principles further enhances this relationship. Smart Factories like the Shima Seiki Factory Boutique demonstrate how automation and advanced technologies can scale slow fashion principles. The integration maintains the speed and flexibility of fast fashion whilst operating sustainable and ethical supply chains, fostering resilience and adaptability in shifting market demands (Adel, 2022; Kazancoglu et al., 2023).

METHODOLOGY

This research takes a practice-based approach, leveraging AI and smart technology. It aims to automate tasks where possible and improve the efficiency of the design and development process by utilising a range of low-cost or free AI tools. The developed knit products will demonstrate the flexibility and capability of 3D seamless knit technology, specifically the Shima Seiki WHOLEGARMENT SWG-XR machine owned by UTS.

The process begins with the selection of appropriate technologies, identifying and selecting AI tools that are either low-cost or free, and focusing on those that can automate repetitive tasks and increase efficiency. Leveraging the Shima Seiki WHOLEGARMENT SWG-XR machine and suite of Shima Seiki products, seamless knit products will be created and refined through virtual simulations to ensure they meet the desired specifications before being produced.

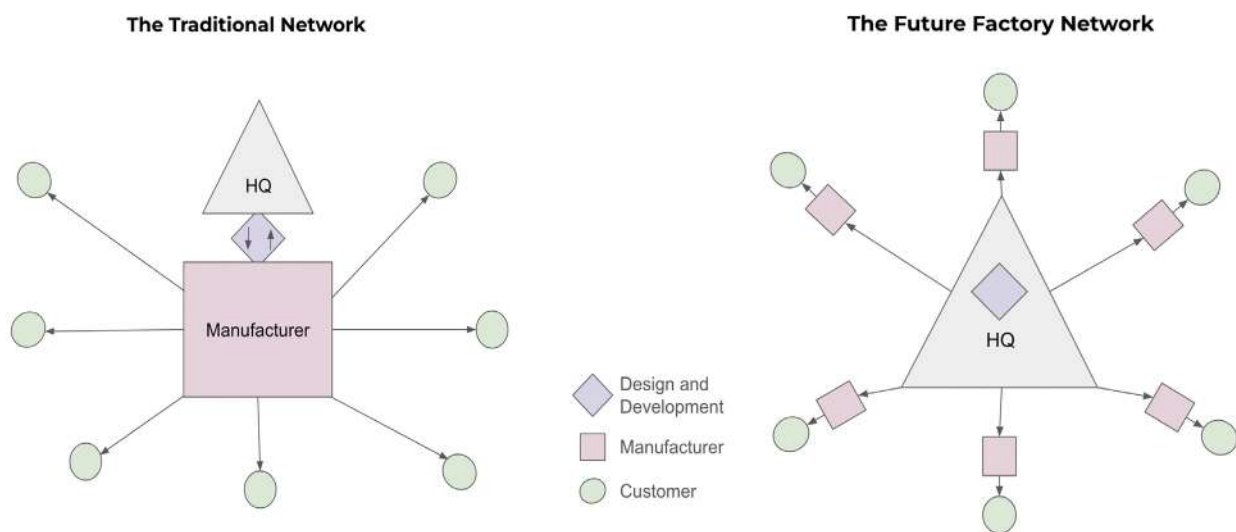


Fig. 01

The Future Factory Network (FFN) simulation aims to explore the feasibility and efficiency of a networked production environment involving Knovus and UTS, utilising their combined advanced programming skills and knit product development expertise. The FFN simulation consists of setting up a mock network connecting Knovus and UTS and integrating knit development expertise from both locations. Testing of the FFN model will include experiments to investigate the communication and coordination between the two locations. The researcher will test the production capabilities of the FFN with overseas networks, considering lead times, costs and environmental footprint.

Evaluating the technology and system requirements needed to support the FFN will be critical to the simulation. The evaluation will involve assessing the hardware, software, and communication tools necessary to establish and maintain an efficient FFN and determining the environmental impacts and the overall model through simulation with an overseas partner. The researcher will develop a rubric for evaluating the success of the experiments identifying optimal parameters for designing a system that capitalis-

es on AI within the FFN. After the research has concluded, the researcher will exhibit the results from the experiments as a series of artefacts and samples.

This methodology tests the parameters and possibilities of a Future Factory Network by leveraging AI and advanced manufacturing technologies. The simulation between Knovus and UTS will provide insights into the technological and system requirements for efficient and innovative knit product development. The experiments conducted within the FFN will help identify the optimal parameters for designing a flexible and customisable production system that can operate in hyperlocal settings. Documentation of observations on environmental impact and lead times will be made, although thorough research on these aspects is beyond the scope of this study.

DISCUSSION AND CONCLUSIONS

This research demonstrates the potential of integrating advanced knitting technologies, such as Shima Seiki's WHOLEGARMENT® and TOTAL FASHION SYSTEM®, within a hyperlocal manufacturing model to address critical challenges in

the fashion and textile industries. The proposed FFN aligns with previously discussed sustainability goals, leveraging Industry 4.0 and 5.0 principles to reduce waste, improve efficiency, and localise production. By decentralising manufacturing through a network of design hubs and local production sites, the FFN presents a sustainable alternative to traditional supply chains, often fraught with environmental and geopolitical vulnerabilities.

As highlighted earlier, the textile industry significantly contributes to global carbon emissions and waste. The FFN's emphasis on Just-In-Time manufacturing and mass customisation provides a pathway for reducing these impacts, supporting circularity, and minimising overproduction. Technologies such as WHOLEGARMENT® allow the creation of knitted products without linking, thereby addressing labour shortages and reducing material waste. The findings could underscore the benefits of shifting towards a decentralised, hyperlocal model that enhances sustainability and revitalises local economies by bringing production closer to consumers.

A key area of research in this study is the role of AI in democratising knitwear production. A critical component is that AI-driven tools, such as generative design and machine learning algorithms, can streamline the programming of complex knit products, bridging the gap between designers and programmers. In the researcher's experience as both a programmer and a designer, the right combination of shared skills offers tremendous potential; there are many ways to program the same product with varying production efficiencies, and AI offers great prospects to find optimal outcomes. The integration could improve communication and reduce the time and cost associated with sampling, allowing for more efficient design iterations. These tools align with the FFN's model by enabling non-experts to use advanced knitting technology, expanding access to sustainable manufacturing practices.

Despite these advancements, several challenges remain. While the FFN will present a robust framework for sustainable production, its scalability and integration into existing global supply chains require further exploration. Balancing local production with global demand and the complexities of managing decentralised networks will offer additional research opportunities. Additionally, while AI has shown promise in

enhancing knit programming, its full potential has yet to be realised. Future studies could investigate the development of more sophisticated AI models capable of automating the entire design-to-production workflow, further reducing the reliance on specialised skills.

The research also points to gaps in applying Industry 5.0 principles within the textile industry. While Industry 4.0 has focused on automation and efficiency, Industry 5.0 introduces a more human-centric approach, emphasising sustainability and worker well-being. Integrating these principles within the FFN offers a unique opportunity to create a balanced manufacturing ecosystem that prioritises technological innovation, sustainability and ethical practices. Future research could explore how this balance can be maintained as the FFN model is scaled, ensuring that the benefits of automation do not come at the expense of human labour and creativity.

Finally, this study highlights the potential of hyperlocal production to revolutionise the fashion industry by offering a sustainable alternative to manufacturing models. By focusing on localised, on-demand manufacturing, the FFN could reduce the environmental impact and enhance supply chain resilience. However, further research is needed to fully understand the implications of this model, particularly in terms of its economic viability and ability to meet diverse consumer needs. This ongoing research will continue to refine the FFN model, contributing valuable insights into developing a more sustainable and adaptable textile industry.

In conclusion, this research demonstrates the transformative potential of combining 3D seamless knitting, AI, and hyperlocal production within a decentralised manufacturing framework. Further exploration into the remaining gaps is needed to realise the Future Factory Network's potential. By doing so, this work aims to contribute to a more sustainable, efficient, and ethical future for the global fashion and textile industries.

CAPTIONS

[Fig. 01] Traditional supply chain model vs. proposed Future Factory Network Model, Author: Chircop (2024), "Diagram of Future Factory Network next to current supply chain network model"

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ETHICS AND AESTHETICS

THE NOTION OF PROSPERITY IN THE AESTHETICS OF FASHION

A RELIGIOUS GENEALOGY

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Abstract

The notion of prosperity has its own religious genealogy: in *The Protestant Ethic and the Spirit of Capitalism*, Max Weber famously linked the notion of prosperity with the Protestant Reformation. As crucial as Weber's theory is for different approaches to luxury, this paper focuses, instead, on a different understanding of prosperity in fashion, thus paving the way for a new religious genealogy of the notion. This genealogy imagines an approach to fashion that sees prosperity as happiness. Indeed, from a religious and ethical perspective, prosperity is, first and foremost, the search for happiness in this life. Several monotheistic traditions overlap the notion of prosperity with that of divine grace or blessing, meaning that true prosperity can only be achieved through the exercise of virtues. Thus, only virtues can create a new meaning and new aesthetics of prosperity in fashion. By offering a more theoretical reflection on the notion of prosperity in fashion, this paper intends to determine whether different forms of aesthetics might offer a clue for the understanding of prosperity and wealth in order to herald true prosperity in fashion.

Keywords: *Theory of Fashion, Theology, Aesthetics of brands, Sociology of Religion*

INTRODUCTION

This contribution sets forth from Weber's reflection according to which, from an anthropological and sociological perspective, capitalism would have a religious origin that indeed makes it possible to speak of a theological archaeology of its spirit. This starting point allows us to undertake further research on the possible derivations of this spirit when it comes to aesthetics – that is, the manifestation of such spirit – as it develops in the Protestant and Catholic spheres of influence. Weber hinges his idea of the spirit of capitalism on a speech delivered by Benjamin Franklin in which the latter posited the conditions that make work, time, and production all merge into the accumulation of capital, where capital can be understood in many

different ways. According to Weber's reading of capitalism:

The concept spirit of capitalism is here used in this specific sense, it is the spirit of modern capitalism. For that we are here dealing only with Western European and American capitalism is obvious from the way in which the problem was stated. Capitalism existed in China, India, Babylon, in the classic world, and in the Middle Ages. But in all these cases, as we shall see, this particular ethos was lacking. (Weber, 2000, p. 18)

Weber points out that capitalism not only concerns human greed but is also an ethos in its own right, a manner of behaving and living life: capitalism

has its own spirit because it entails a certain ethics. The notion of the spirit of capitalism and its ethos, which is derived from a religious form of asceticism and puritanism, as Weber argues in the second part of his book, can also be useful when discussing fashion, which is one of its epiphenomena. Thus, the aesthetics of fashion too could similarly find its origins in religion. This would imply the existence of an aesthetics of fashion that in its shapes, colours, trends, etc. is the reflection of a spirit which is more Protestant than Catholic or vice versa. Thus, aesthetics is to fashion as the spirit is to capitalism and the history of fashion offers some excellent examples of this: Gabrielle Chanel's aesthetics is moulded also by her attendance at a school run by Catholic nuns, whilst Hermès's expression is altogether more Protestant; Yves Saint Laurent has his cultural roots in Catholicism, whilst Vivienne Westwood represents British culture at large, including its religion. The line of demarcation between these differing yet all clearly religiously inspired aesthetics is sobriety or, to put it better, aesthetic minimalism, which means that we have to find the epistemological nexus at the origin of the religious genealogy of fashion expressions as inspired by Protestantism, Catholicism, or Anglicanism, to remain within the geo-cultural horizon of the West and the Christian tradition.

THE RELIGIOUS GENEALOGY OF PROSPERITY IN FASHION

In 1905, the same year when the German philosopher Georg Simmel published his *Philosophie der Mode* (1911) in German (translated into English in a shorter format in 1910), Max Weber left his mark on the history of religious sociology with the publication of one of his most renowned works, *The Protestant Ethic and the Spirit of Capitalism* (2000). Weber's essay has often been misunderstood and hastily summarised in such a way as to attribute to Protestantism the only origin of the spirit of capitalistic accumulation. Its underlying proposition, instead, is that the one form of ethics capable of originating a real spirit of capitalism is Christian Pietism. So, the source of capitalism should not be found in Catholicism or Protestantism per se, but rather in that religious ethos of asceticism and puritanism more easily found in Protestant denominations but also present in Catholicism, though differently expressed. Proof of this is the fact that the spirit of capitalistic accumulation is active also in the Catholic sphere. Weber

clarifies what he means by 'spirit of capitalism' in the first chapter of his work: though the entire history of humanity bears witness to a frantic, obsessive search for the accumulation of gold and, consequently, of riches, the spirit of capitalism somehow manages to add to or deeply modify this virtually natural propensity.

In 1913, and thus around the same time as Weber's reflection, Werner Sombart, another German sociologist who worked with Weber, offered his own contribution to the relationship between luxury and capitalism (1967). A few years earlier, another economist, Thorstein Veblen, had focused especially on the ostentatious consumption of the so-called 'leisure class' (1899).

Yet it is certainly Weber who is at the forefront of the reflection on prosperity and lays the foundations for a religious archaeology of the notions of economic prosperity and aesthetic ostentation. Indeed, ostentation and prosperity intersect one another without necessarily overlapping fully. When talking about German entrepreneurs, Weber says that, unlike what Veblen had observed for the United States, ostentation is not necessary:

The ideal type of the capitalistic entrepreneur, as it has been represented even in Germany by occasional outstanding examples, has no relation to such more or less refined climbers. He avoids ostentation and unnecessary expenditure, as well as conscious enjoyment of his power, and is embarrassed by the outward signs of the social recognition which he receives. (Weber, 2000, p. 33)

Weber does not see ostentation, which finds its roots in the ancient military language used to boast the power of a state or a people, as an absolute criterion for the identification of the leisure class, that is, the capitalistic middle class. Here, we can glimpse at the Protestant imagery of aesthetic minimalism manifesting itself as the absence of ostentation. So, just like the Protestant temple is devoid of any signs, icons, or forms of Christian art, Protestant aesthetics too, including when it comes to fashion, might have a minimalist character of its own.

In other passages, Weber makes this connection explicit when he references Calvinist asceticism and takes clothing as an example:

The conceptions of idle talk, of superfluities, and of vain ostentation, all designations of an irrational attitude without objective purpose, thus not ascetic, and especially not serving the glory of God, but of man, were always at hand to serve in deciding in favour of sober utility as against any artistic tendencies. This was especially true in the case of decoration of the person, for instance clothing. (Weber, 2000, p. 113-114)

Ostentation in clothing is a tendency to be rebuffed in the name of an authentically religious spirit, at least within the Puritanism that Weber takes as his starting point. Note 70 makes this relationship explicit by bringing the example of seventeenth-century Quackers, who underwent a ten-year-long crisis when they arrived in the United States from Amsterdam because of the fashionable hats worn by the pastor's wife. What in other epochs and contexts is defined as modest fashion or modesty in clothing comes to outline the internal politics of the community and even the religious aesthetics of fashion. Indeed, if a religious ethos or spirituality can have an impact on the economic system, as Weber argues, then the opposite too must be considered: the spirit underlying an economic system – capitalism, in this case – can influence also its aesthetic expressions and, therefore, its fashionable clothing and fashion itself. Almost by synecdoche, in fact, what is fashionable becomes fashion. Fashion can be examined and studied as a system in its own right (Barile, 2011), that is, as an idea of fashion. This is not the same operation carried out by Roland Barthes (1983), who studied fashion as a system only to expose its 'vanity,' that is, its being a pure system of signs, a language created by language itself. Whilst Roland Barthes's approach continues to remain crucial, here instead we are concerning ourselves with fashion as a system, as a whole, as a philosophy of fashion or as a sociological phenomenon that should be understood in its own right within the social analysis of mass phenomena. When looking at it from this perspective, the system of fashion can be criticised, especially when fashion shows itself as a phenomenon with the potential to drive change (Ambrosio, 2024) only to then turn out to be utterly unable to implement any virtuous transformation (Masci, 2024).

So, can this system lead to real prosperity without being prosperous only in and of itself? Indeed, if fashion is considered only as an

economic system, how else should prosperity be understood if not financially? But fashion has its own aesthetic influence on the societies in which it thrives and so what trends can it introduce on the market?

Some examples from the aesthetics of leading brands can help us understand how a notion of fashion focused on prosperity could finally bring together ethical roots and aesthetic differences. For instance, Vivienne Westwood's symbolism is grounded in the British tradition – as exemplified by the royal cross-topped orb – but the brand has actively renounced using shiny materials: textiles are now chosen rigorously so as to avoid any finish that might prove to be especially polluting. Hermès, on the other hand, has developed a characteristic pietistic minimalism that is typical of Protestant aesthetics and could lead to the introduction of the idea of sobriety on catwalks or, conversely, could also become a further expression of magnificence for haute couture. Finally, Chanel stands out for its long tradition of bicolour styles, especially black and white, that finds its origin in the time Gabrielle Chanel spent in the Catholic school of Aubazine, in France. Whether rightly or wrongly, the brand cultivates to this day the narrative that Chanel's aesthetics is deeply connected to this spiritual – or rather religious – inspiration. All of this is to say that brands can offer powerful interpretations of prosperity and, in many ways, they already do. A real change, though – a conversion, as it were – would be for fashion to become acutely aware of the power it wields when spreading an aesthetics pivoting on prosperity.

Having demonstrated that the notion of prosperity has also a religious genealogy, it is now legitimate to investigate whether the aesthetics of fashion might have a religious manifestation of its own when it comes to prosperity and if such prosperity could be described as a fashion in itself. Indeed, Weber's idea of a relationship between the spirit of capitalism and Protestant ethics also underlies the so-called 'prosperity theology,' a current of Pentecostal Christianity often criticised and eyed with suspicion by other Christian denominations, including the Catholic Church (Spadaro & Figueroa, 2017).

THE ETHICS OF APPEARANCES

So, can fashion contribute to prosperity? And what kind of prosperity would that be? How does prosperity interact with fashionable clothing and fashion itself? Indeed, it is from the starting point of Weber's reflection that we can investigate prosperity, aesthetics of fashion, and religious references. Prosperity is a vast field of investigation that underlies several economic, financial, cultural, and even religious reflections. Vignoli, Roversi, Jatwani, and Tiriduzzi (2021) have attempted to interrogate this notion by stating the need to consider it in all its complexity, yet they take into account neither its religious nor its aesthetic aspects. On the other hand, Moore and Mintchev (2023) clarify that the definition of prosperity entails philosophical reflexivity, if only because each has their own notion of it, depending on culture, locale, and several other variables (2023, p. 28).

The assumption that we are attempting to demonstrate and from which we want to develop a new idea of aesthetic prosperity in fashion comes from the possibility of an interface between prosperity itself and its representation in fashion. The aesthetics of fashion should take prosperity into account: this can be verified phenomenologically since fashion reflects the spirit of the brand and, therefore, of the designers. Consequently, aesthetics, too, plays an active role in putting forward an idea of prosperity. The epistemological nexus that allows us to think about the aesthetics of prosperity and, consequently, about a new meaning for prosperity in fashion is all in the fact that fashionable clothing and indeed fashion itself are the aesthetic epiphenomena of the current economic and financial systems. Fashion – which has always shown a predilection for luxury, both with genuine brands and knock-offs imitating luxury merchandise – mostly looks at prosperity as the luxury of quantity and quality and systematically ignores other kinds of prosperity, including that of sobriety. Indeed, sobriety is considered to be the direct opposite of luxury, of the magnificence emanating from fashion.

In order to prove that the aesthetics of fashion can communicate a new sense of prosperity, that is, sobriety, the causal relationship of this assumption must be made even more explicit. From a philosophical perspective, this relationship is founded on the fact that connects the surface – that is, the appearances – to the essence – that

is, the nature – of a phenomenon. The aesthetics of fashion and luxury, these worldly phenomena (phenomenology) of being in the world (existentialism), are the epiphenomena of modern philosophy and economy and, as such, communicate their essence. That is, appearances are not and cannot be anything but the epiphenomena of a world view and of an economy. This is so true that, even when big brands of fashion try to offer a collection conveying a sense of cultural, social, and political resistance, or a desire for sobriety and minimalism, the means through which this is expressed always understand prosperity as luxury, that is, as everything that is not essential.

From an economic point of view, though Sombart interpreted luxury as the cause for the establishment of capitalism itself, the most credited opinion sees fashion and luxury as the consequences of the new economic system, that is, capitalism. In either case, fashion is strongly connected with the development of the economic system, whether as its cause or as its effect, even though fashion studies have relativised and deconstructed the link between the origin of fashion and the establishment of Western modernity. Whether following one interpretation or the other, fashion nevertheless carries within itself the spirit of capitalism and its ethos, and concerns economic prosperity since its very origins and to the present day.

Now, an aesthetics of fashion wishing to overcome the link between a capitalistic economy and economic prosperity understood exclusively as growth must be able to embody the sense of change that only a revolution is capable of producing. Here, revolution must be understood as a *re-revolution*, a new cycle: that is, fashion must be able, or should be able, to revolutionise its aesthetics not only in its more superficial appearances but so as to express a truth on an ongoing change in the economic system and its sincerity.

Producing without any worry for the protection of the environment, on the one hand, and for social justice, on the other, and offering clothing that only on the surface, in the appearances, expresses something else, that is, a new sense of prosperity, is an endeavour destined to fail. Fashion needs what, in my contribution *Per una morale contemporanea* (Ambrosio, 2024), I call a 'true conversion', and not just a restyling. At times, this conversion might seem to take the form of the myriad 'green-washing' marketing campaigns launched by one brand or another. One such

example could be LVMH's campaign from 2018 to reduce the carbon footprint of their shops and boutiques by changing their practices relating to internal lighting. Though the brand's intention is worthy, this is a 'conversion' that is likely to have very little concrete impact since it does not deal in any way with the practical environmental impacts of the fashion industry on a worldwide scale. However, 'conversions' can be partial and superficial but can also reach much deeper, as is the case for newly established ethical brands that use innovative materials respectful of people and the environment. In 2021, Kering, another giant of luxury, launched a powerful campaign to announce that it would stop using animal furs altogether, thus starting a new trend combining ethics and aesthetics in haute couture and the luxury industry. This latter example can be considered a true 'conversion' and is likely to also have a significant impact on consumers and their acceptance of new trends. Fashion indeed expresses a strong drive within the system of the contemporary. Agamben (2018) finds in fashion the most accomplished example of the device of 'contemporaneity', indeed because it best represents the idea of a perpetual search for instantness within the flow of time, thus creating with every novelty an effect of outdatedness. This chase after novelty, which creates the conditions for a never-ending consumption, fixes the idea of the fleeting, thus making fashion the sister of death, as Giacomo Leopardi had already called it in his dialogue from 1829 included in *Small Moral Works*. The fact that fashion always offers a sense of prosperity is confirmed by the current report *The State of Fashion* by McKinsey & Company. Despite a more or less swinging trend in 2023, the report does not hesitate to say that: 'As a whole, the fashion industry is predicted to achieve year-on-year retail sales growth of between 2 percent and 4 percent in 2024' (2023, p. 10). Despite the big brands of fashion and luxury inviting the industry to return to sobriety during the pandemic, the system of fashion communicates, in practice, a will to grow economically, and quantitatively and qualitatively, with a wish for a creative renewal of forms as well as materials. Now, the prosperity of fashion and its aesthetics are embodied, to use a term with a strong Christian theological connotation, in the myth of growth (Latouche, 2010), which entails the influence of limitless progress (Latouche, 2004). The aesthetics of fashionable clothing and haute couture specifically conveys values of

prosperity founded on the parameters of luxury, that is, as defined by Sombart, of quantitative or qualitative excess:

Quantitative luxury is synonymous with prodigality; such as the keeping of a hundred servants when one would do, or the simultaneous striking of three matches to light one cigar, etc. Qualitative luxury is the use of goods of superior quality. These two types can be, and in most cases are, combined. (Sombart, 1967, p. 59).

However, if prosperity is understood instead as a notion that is also ethical and even religious, that is, as a sense of divine blessing and, more importantly, as a responsibility, then aesthetics too can contribute to its reformation, that is, to the conversion of the system.

CONCLUSION: A PATH TOWARDS "PROSPERITY FASHION"

If the previous argument is cogent enough, it is impossible to think that fashion with all of its actors, from the designers to the marketing teams and through all the chains of production and post-production, cannot be founded on an ethics that is at the same time of entrepreneurship, social justice, stewardship of the environment, and finally transparency towards the consumer: only an ethical intervention can save fashion from the financial bubble it entered after the Second World War and over the decades following the economic boom, that is, from the Eighties.

If on the one hand it is impossible to imagine a moralisation of fashion along the lines of ethical operations from bygone times, yet it is not impossible to envisage attributing to fashion a real ethical mission. Since fashion defines itself, in its own founding principles, as the bringer of novelty and the interpreter of the spirit of the time (Vinken, 2005), then the spirit of the current time is ready to reconsider the meaning of prosperity.

Neo-liberal capitalistic economies are founded on the idea of never-ending growth, but a new meaning can rise from prosperity if this is understood as happiness. Such operation entails that the meaning of prosperity must go back to the terms offered by philosophical and religious ethics. The fear of a return to moralism is connected to an understanding of the latter that derives from areas now independent of any sense of moral or religious law. But other areas can take inspiration from true

elements of ethical and religious traditions that, at any rate, have already been at work in the development of that very same spirit that prevailed in capitalism.

True prosperity means happiness, and this should not be understood as a purely irenic consideration but as an exercise of the virtues elaborated by theologians and philosophers from antiquity to the modern day. True prosperity, a notion that must be understood as a sense of happiness, is possible only if human virtues are exercised. These virtues, which can also take on a religious meaning, are deeply rooted in human ethics. The prosperity that fashion can offer is that of a happiness founded on the exercise of several virtues: not only the accumulation of capital and the yearly growth of earnings and profits, coupled with head-spinning dividends, but also human ethics in all the scopes of justice, whether social, climatic, or aesthetic.

The seventeenth-century financial bubble around the trade of the most refined and most ephemeral flower on earth – that is, the tulip (Dash, 2010) – is a very thought-provoking example that can be quite relevant also for fashion, which is built on clothing that is always changing and thus is ephemeral. More recently, other, more essential sectors of the economy have demonstrated that the financial bubble does not ignore any industry. Thus, in order to counter financial crises, fashion and luxury – which, as already mentioned, are already starting to show slight signs of suffering – must be ethical, that is, they must exercise virtues in all their capacities in order to become a path to true prosperity, that is, to happiness.

Fashion can and must offer happiness as a possibility for exercising human and social virtues. The word virtue in itself is linked to the notion of *habitus*, in its Latin and Scholastic meaning, that is, the ability to repeat a good action in order to generate virtue. So, it is not by chance that *habitus* refers both to a good habit and the clothing that one wears. And just like a habit, which is an item of clothing donned forever, virtue too is part of human behaviours.

From a contemporary and sociological perspective, Pierre Bourdieu has recently brought such a classic field of ethics back into focus, interpreting the notion of *habitus* both as a social practice and as cultural capital, or rather as an embodiment of that cultural capital (Bourdieu, 2016). By bringing together embodied cultural

capital – the *habitus* – and the other dimension of the *habitus* itself, that is, social behaviours, Bourdieu's reflection allows us to introduce the idea of a 'prosperity fashion' capable of spreading new trends and hermeneutics when it comes to prosperity itself. Thus, the *habitus* as discussed by Bourdieu turns into an extremely important tool that connects political power, social behaviours, and cultural capital. In this context, cultural capital is understood as the aesthetics of fashion – that is, the power of style – with brands both large and small playing an important role in the diffusion of an idea or trend such as that of prosperity.

Though this reflection might perhaps sound a bit utopian, it is not so when one takes into account all the financial crises of many sectors that used to be considered to be necessarily far removed from ethics since they are shrouded in the shadow of human greed. Fashion must either be able to exercise the entire outfit of human and social virtues for the protection of workers, artists, and resources, or it is destined for an apocalypse with no return. In this sense, fashion as a system can be compared to a religion, that is, a system of beliefs as well as ethical references capable of transforming the individual and the society (Ambrosio, 2022).

Thus, the aesthetics of fashion must be able to convey this inner transformation of all the sectors of creation, from production to marketing, lest the ultimate judgement is that of a missed opportunity for true prosperity. It is not enough to legislate to make enterprises virtuous: there is a need for ethical responsibility – an almost tautological notion – that might allow all those who operate or have an interest in fashion to work towards the genuine creation of the conditions for happiness.

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THE MUTUAL CONTRIBUTION OF VISUAL EPISTEMOLOGY,

VISUAL LITERACY AND ECO FASHION DESIGN TO THE BUILDING OF PROSPERITY FASHION

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Abstract

Artistic practice and creative industries, including fashion and the fashion world, are of great importance for spreading and raising ecological awareness. But for this to happen, fashion and the fashion industry, which is considered one of the biggest polluters, must adopt a prosperous vision of the world and our future towards sustainability and environmentally friendly practices. In this paper, we propose that fashion design, as an exceptionally visual medium, could use the means of visual fashion literacy and visual epistemology in the name of building environmental awareness. We will demonstrate this in three steps, dictated by three provocative questions: What is it that we avoid seeing? What is the new vision of prosperity? How to see the invisible?

Keywords: *Eco fashion design, Visual epistemology, Visual literacy*

INTRODUCTION

The textile and clothing industry is a major polluter, and a voracious consumer of water. Given this perspective, it seems almost paradoxical to imagine the fashion industry as a bearer of sustainability and environmental awareness. However, this is precisely the aspiration of new approaches in fashion and design, such as eco-fashion design. The concept of eco-fashion design is broadly understood here as those fashion design practices that are committed to sustainability and the cultivation of ecological awareness. Related to this is also a specific understanding of the fashion prosperity. Prosperity here does not simply mean economic growth. We see growth as a growing awareness: of the environment in which we live, of limited

natural resources, and the need to research environmentally friendly fashion technology, which will also dictate the further course of fashion industrialization. Building prosperity fashion requires the gradual establishing and the gradual development of a prosperous environmental mindset. To grow means paradoxically to accept the principles of *degrowth theory*.

In the spirit of this vision, the paper proposes that fashion, as a distinctly visual medium, has the potential to promote ecological literacy through the principles of fashion visual literacy and visual epistemology. In the following, we will connect the fields of visual logic and literacy, ecological issues, and fashion design through three provocative questions. What is it that

we avoid seeing? What is the new vision of prosperity? How to see the invisible?

The first question: “What is it that we avoid seeing?” seeks to shed light on the fact that, faced with climate change and ecological crises, we often instinctively and emotionally shield ourselves from understanding the full extent of the dangers in which we live. The second question, “What is the new vision of prosperity?”, introduces principles of sustainability that the fashion industry should adopt, which originate from the theory of degrowth. The third question, “How can we see the invisible?” builds on previous two questions and suggests that fashion design, with a particular focus on a unique visual language, can cultivate its consumers into environmentally conscious users. This means that fashion design has potential to actually participate in social transformation that leads to sustainable and environmentally responsible behaviour.

INVISIBLE VIOLENCE

What is it that we avoid seeing?

Although we possess scientific evidence and information about climate change, global warming, pollution, and increasing global CO₂ emissions, we seem to remain in a state of structural blindness. Global warming has been a reality for two centuries, yet as Andreas Malm elucidates in his comprehensive study, *Fossil Capital* (2016), it has largely remained invisible. The question, therefore, is: how much of this reality is visible today?

With the latter question, we are not claiming that we do not have enough scientific knowledge and evidence. On the contrary, science is resoundingly clear about the ecological crisis, and its warnings are both loud and justified by scientific methodologies. The question is, however, whether scientific evidence alone is enough to alter individual behaviour and prompt concrete social changes. It appears that our social and individual efforts towards ecological sustainability are still insufficient. We still need constant reminders that climate change is *really* real. Does this mean that we are not aware enough despite all the scientific evidence? It seems that we are fundamentally unable to grasp the magnitude of the danger. Therefore, we must ask ourselves what form of denial or structural blindness we are living in, both as a society and as individuals? How quickly do we respond to ecological threats?

Partly, answering these questions necessi-

tates confronting the specific nature of climate change and the way we psychologically perceive danger. Fossil fuel usage is not only the primary cause of current climate change; it is also a form of violence – violence inflicted on beings yet to be born (Malm, 2016). This is not immediate violence but a gradual one, which is difficult to imagine. It is literally *invisible violence*. To grasp the nature of this invisible violence and the extent of the consequences it produces, we must fundamentally change and decolonize our logical and perceptual frameworks. Which, again, is very difficult, because our perceptual apparatus is guided by different rules.

As Clive Hamilton posits, humans have evolved to respond instinctively to immediate threats. We react to immediate danger with emotions like fear, terror, and anxiety. However, in the case of global warming, there is no immediate emotional response, as its consequences are indirect and still insufficiently visible. Fear cannot guide us in assessing risk (Hamilton, 2010). Emotions simply cannot alert us to the risk and the actual environmental danger we face, only reason can guide us here. This means that we can understand the scientific explanations of climate change very well, but that understanding alone does not necessarily and decisively lead to a change in our collective and individual attitude towards the environment. Until we feel strongly enough the danger we live in, until we see the direct consequences of climate change, we may still be insufficiently determined to change our behaviours. But, as scientists also point out, the problem with ecological issues is that the consequences appear in full force when it is too late to do anything.

So, is there anything we can do? Can we somehow engage our emotional apparatus, and our very system of perception? Can we shock it so that it finally sees the invisible?

We can develop practices and actions that can influence our perceptual and emotional systems. Artistic practice and creative industries, including fashion, play a crucial role in this idea. According to Miles (2016), art can raise awareness of climate change and interrupt our perception patterns. The same holds true for fashion. Paradoxically, while the fashion industry is one of the biggest polluters, it also has the potential to raise environmental awareness. However, for this to occur, fashion itself must adopt a new prosperous vision of the world and our future.

A NEW ECO-VISION OF FASHION

What vision of prosperity should we build?

In order to live better, we now have to produce and consume differently, to do better and more with less, by eliminating sources of waste to begin with (for example, unnecessary packaging, poor heat insulation, the predominance of road transport) and by increasing product durability. (Gorz, 1994, p.106)

In recent years, there has been a growing call for fashion design not only to embrace the basic principles of sustainability and eco-friendly practices, but also to act as a tool to promote social change towards thinking and acting in the name of sustainability. In academic and industrial circles, a growing number of insights and proposals highlight the urgent need to embed ecological and ethical practices into the fabric of the fashion, textile and clothing industries. At its core, sustainable fashion is about minimizing harm while maximizing positive impact. This includes tackling pressing challenges such as carbon emissions, pollution, waste, biodiversity loss, overproduction and exploitative labour practices. But it is also about innovation – pioneering technologies that conserve resources, strengthen local communities, foster environmental stewardship, and inspire consumers to become discerning advocates of sustainable and eco-friendly fashion products.

Advocates for transitioning from a growth to a degrowth paradigm echo this direction. According to Serge Latouche, professor of economics and one of the most renowned partisans of the degrowth theory, achieving this transition requires a comprehensive re-evaluation, reconceptualization, restructuring, redistribution, relocation, reduction, reuse, and recycling (Latouche, 2009). Notably, all eight of Latouche's imperatives can be applied within the realm of sustainable fashion design. Kate Fletcher (2008, 2012) excellently highlights the principles of sustainability in fashion, which we will briefly summarize here.

Latouche's call to replace humanity's "predator" mindset with that of a "gardener" urges us to reconsider our relationship with nature (Latouche, 2009, p.35). By redefining wealth, scarcity, and abundance, he challenges us to shift from dominating ecosystems to coexisting harmoniously with them – rejecting technological and Promethean fantasies of creating an artificial

world (Ibid.). Similarly, Kate Fletcher underscores the critical role of sustainability in reshaping fashion:

The goal is to show that there is a wealth of different ways in which we can go about building long-lasting environmental and social quality through the design, production and use of fashion and textiles that go beyond traditional ideas or expectations. After all, the challenge of sustainability – that is, of integrating human well-being and natural integrity – is such that we can't go on as before. Business as usual or, more to the point, fashion as usual, is not an option. So what should we do instead? (Fletcher, 2008, p. xii)

Re-evaluating and reconceptualizing fashion design with a focus on sustainability demands a fundamental shift in perspective. Sustainability necessitates a systematic approach that embraces diverse and pluralistic perspectives. For instance, material and fibre processing should be considered holistically, encompassing the entire lifecycle. Sustainable fashion design challenges the prevailing monolithic practices, particularly the contemporary dominance of non-renewable and non-biodegradable cotton and polyester. Fletcher advocates for material diversity, which, while not excluding cotton and polyester, emphasizes the processing and promotion of a wide array of alternative fibres. These include cellulosic fibres such as organic or low-chemical cotton, flax, hemp, lyocell, organically grown wool, and biodegradable synthetics derived from plants. These alternatives significantly contribute to sustainable and environmentally friendly practices.

The redistribution of relations (which, according to Latouche, is especially necessary when it comes to the geopolitical and economic relationship between the North and the South) means a turn in the understanding that it is not so much about giving more as taking less. This also requires moving production to the local level. Local needs simply have to be met locally, and most products need to be produced in local factories, financed locally (Latouche, 2009, p. 37). The same applies to sustainable fashion. The concept of minority fibres juxtaposed against the dominance of cotton and polyester promotes the development of local agriculture and the use of regional fibres, thereby enhancing diversity and reducing resource consumption. Redistributing the fashion industry

entails prioritizing local services and crafts, with a special emphasis on preserving the natural and cultural heritage of specific regions.

Latouche's principles of reduce, reuse, and recycle are epitomized by the imperative to shift from viewing the economy as a linear system that produces and discards, to embracing a cyclical economy that repurposes materials as resources for new goods. Fletcher encapsulates this idea, stating, "everything is recycled and all waste from one component of the system becomes 'food' for another. Here what appears to be waste is actually exchange" (Fletcher, 2008, p.108). Reuse entails not purchasing new items, but selecting products crafted through environmentally friendly practices, and recycle involves creating new garments from existing items (Fletcher, 2008, p. 95).

These steps can steer the fashion industry towards sustainable production practices and new prosperity. Next, we shall explore how fashion design can convey the message of sustainability to its users. One powerful avenue is through its inherent visual and aesthetic language. By utilizing this language, fashion can disseminate the message of sustainability and ecology, thereby indirectly and directly influencing the environmental awareness of its audience and fostering ecologically responsible individuals. It is certainly a slow process of visual learning, which can nevertheless transform the user from a passive, unskilled and unaware consumer into an active and responsible citizen of the world we live in, where, given the state of climate danger, we can no longer afford ignorance or denial about ecological and environmental problems.

VISUAL LITERACY AND VISUAL EPISTEMOLOGY IN ECO-FASHION DESIGN

How to see the invisible?

In this segment, we delve into the possibility of comprehending fashion through the lenses of visual literacy and visual epistemology, which could significantly impact the cultivation of ecologically aware users and the broader participation of fashion in driving social changes towards sustainability.

Visual literacy and visual epistemology are interdisciplinary methodologies that explore the visual realm. The visual encompasses visual knowledge, visual language, visual communication, and diverse forms of visual representations. These methodologies rest on the premise that our world

is predominantly visual, often communicating through visual means. Stemming from new visual studies (Bildwissenschaft), emerging in the 1990s as an "iconic turn", visual epistemology asserts that visual thinking isn't merely a translation of linguistic form into a visual one, but it possesses its own principles of construction (Klinke, 2014). Thus, it becomes possible to read and interpret visual images, fostering a specialized form of literacy (Elkins, 2007). Literacy and knowledge are not confined to textual forms and words; they can be visual as well.

Visual literacy and visual epistemology aim to understand how people perceive objects, what can be learned from this perception, how to develop visual language and communication, how to transmit visual information, and how to create concepts and knowledge that are not necessarily discursive. The benefits of visual literacy are now the subject of numerous studies that often explore the impact that the use of visual tools has on the development of other forms of literacy. A good example is research focused on the development of health literacy (HL) with the help of visual materials, as images enable a better patient understanding of medications and treatments. As shown by Allan Paivio's Dual Coding Theory, images have a greater impact than verbal language (so called the picture superiority effect), as they are encoded by the inherent processes of the sensory and verbal systems (Paivio, 2013).

However, there is a slight distinction between visual literacy and visual epistemology. Visual literacy refers to the ability to interpret, understand, and create meaning from visual elements such as images, symbols, diagrams, and other visual representations. It's about "reading" visuals the way we read text, enabling us to communicate and make sense of the world through visual means. For example, being visually literate might involve understanding a complex chart, interpreting body language, or effectively using visuals in a presentation. It's also tied to improving skills in related areas, such as learning visual cues for specific disciplines, like medicine, or ecology.

Visual epistemology is more focused on how visual tools and methods contribute to knowledge creation and understanding. It looks at the role of visuals in shaping our behaviours, thoughts, and perceptions of reality. For instance, how a well-designed infographic can influence public opinion or how visual media might shape

cultural norms. Visual epistemology demonstrates that visuals aren't just tools for communication, but also powerful forces that impact how we learn and think. We will demonstrate this with a very simple example.

Consider the Hollywood film *The Devil Wears Prada* (2006). The editor-in-chief of *Runway* magazine (played by Meryl Streep) illustrates fashion's evolution using a blue sweater worn by her employee (played by Anne Hathaway). Despite the employee's disinterest in fashion, the editor demonstrates that every fashion choice is influenced by others' decisions. As the editor famously remarks, "it's really comical that you think you made your own fashion choices when you're basically wearing a sweater that was chosen for you."

The movie scene reveals the ideological state of the modern fashion world, in which our subject-autonomy and choice are not necessarily supported by fashion. Quite opposite. The fashion industry often invisibly dictates our aesthetic choices. Beyond revealing the ideology of contemporary fashion reality, the scene also underscores the importance of visual literacy. The visual knowledge makes visible what is usually invisible, such as the entire system of ideological fashion power. The editor-in-chief's fashion-trained eye enables her to recognize that blue is not just blue, but cerulean, connecting it to past fashion styles that had developed a few years earlier and launched a certain blue colour, which then filled stores for mass consumers and influenced mass consumer choices. This example highlights how those proficient in visual reading possess an advantage. Reading colours correctly involves decoding the entire fashion process of creation, decision-making, production, and consumption processes.

The film scene thus illustrates two key roles that visual literacy can play. Visual literacy can expose the invisible ideological power structures that influence the decisions of fashion users. At the same time, visual literacy also illustrates the discrepancy in visual epistemology between the employee and the editor-in-chief. The employee's visual knowledge is almost entirely lacking, while the entire dominant position of the editor is built, among other things, on the possession of fashion visual knowledge.

Considering the powerful significance that visual fashion literacy and knowledge could have,

we are now interested in how this could be applied to environmental issues. Visual literacy and visual epistemology play a vital role in understanding ecological systems, as these are often represented through images like maps, charts, diagrams, and photographs. For instance, visual literacy can help someone interpret a satellite image showing deforestation or understand a graph depicting the decline of biodiversity. It enables individuals to critically analyse these visuals, draw conclusions, and take informed actions toward ecological conservation. Visual epistemology adds another layer by examining how these ecological visuals shape our understanding of the environment. For example, the widespread use of stunning nature photography in campaigns for climate action can influence people's perceptions and attitudes toward environmental issues. Similarly, the design of visual models, such as an ecosystem flowchart, can guide how we conceptualize interactions within nature. These visual tools don't just communicate ecological knowledge – they actively shape it, influencing how we view our relationship with the planet.

"How to see the invisible" is therefore not just a metaphorical or provocative question, but also a crucial question of how to see invisible ecological violence. We certainly cannot expect every user to have professional visual and fashion knowledge, even less in the case of eco-fashion design. Although the greenwashing cases demonstrate the utmost urgency of developing ecological fashion literacy, this is still a gradual and slow process. So, are there other ways in which fashion can influence the formation, or better, reformation of our perceptions in the direction of sustainability?

In fact, there are nice examples of the use of fashion as an intense visual medium that can influence our perceptions and direct attention to unnoticed issues such as global warming and pollution. Lauren Bowker for example has created an ink called PdCl₂ that absorbs pollution, as the Chromic Dye can react in the presence of carbon emissions. It is a reversible process of changing the colour from yellow to black in dirty conditions; the colour can be returned if the conditions change (e.g., the air is fresh). The artist has made fashion pieces PHNX made of feathers (as a symbol of the birth of something new) impregnated with PdCl₂ ink, which changes colour in relation to environmental conditions. The whole idea shows how it is possible to use material, modern technology and fashion

products in the name of creating an innovative visual language that warns its users about concrete-ly state of pollution. Similarly, the brand Xiamen Hoda which manufactures umbrellas. Among the latest innovations are the production of umbrellas that change design due to increasing temperature. At 32 degrees Celsius, a black umbrella design becomes colourful, serving also as a medical warning to protect children from UV rays.

Both examples demonstrate how visual changes can impact users emotionally and perceptually, making the invisible – such as pollution or high temperatures – visible. The PHNX project, in particular, evokes an emotional response as colours change to black, signalling pollution. These fashion products inform us about high temperature or air pollution, but they also produce a strong visual shock. With a change in colour, something that is aesthetic, beautiful, that we wear on ourselves or with ourselves, that makes us feel safe (fashion can do that), suddenly starts behaving differently. And we suddenly become aware of external situation. Climate change becomes visible. The invisible becomes visible. It is perfect visual fashion storytelling that can produce powerful emotional experience that can also affect our perceptual apparatus even more effectively than text and words.

CONCLUSION

Developing visual literacy competencies provides a powerful tool for visual storytelling, producing emotional experiences that can influence our perceptual apparatus more effectively than words alone. The potential of visual communication is boundless, and we propose that fashion design should harness these opportunities to elevate environmental awareness. It seems to us that this is an interesting direction of fashion research, which combines science, technology, ecological problems, aesthetics, visual language and visual knowledge. It seems that right now, we really need this kind of visual and then also emotional shocks in the name of developing a prosperous vision of the world and our future.

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NEGATIVE AESTHETICS AND THE DE-BEAUTIFICATION OF FASHION

THE TAXONOMY OF DISGUSTING FASHION

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Abstract

This paper explores the emergence of “disgusting fashion” as a deliberate aesthetic strategy within contemporary design, positioning it within the frameworks of Negative Aesthetics, abjection, and art-horror. Drawing on philosophical theories from Georges Bataille, Julia Kristeva, Carolyn Korsmeyer, and Noel Carroll, the paper examines how fashion engages with disgust not simply as a reaction, but as a generative force that challenges normative ideals of beauty, identity, and the body. Using Carroll and Contesi’s taxonomy of disgust in art, the study proposes a tripartite framework for analyzing garments based on whether their subjects and/or materials (vehicles) evoke disgust. Through case studies of designers such as Alexander McQueen, Lady Gaga, Alessandro Michele, and Michaela Stark, the paper demonstrates how fashion utilizes grotesque materials, symbolic violence, and bodily excess to provoke visceral responses and engage in sociopolitical critique. It argues that the incorporation of disgust functions as a transformative tool—destabilizing traditional boundaries between the self and the other, the inside and the outside, and the beautiful and the abject. Ultimately, disgusting fashion reveals how negative emotions can generate powerful aesthetic experiences, offering new ways to understand fashion not as adornment, but as a philosophical and cultural force.

Keywords: *Taxonomy, Disgust, Art, Fashion, Negative Aesthetics*

INTRODUCTION

Noel Carroll and Filippo Contesi in their chapter “A Taxonomy of Disgust in Art” categorize disgust in art, explaining how the aesthetics of disgust were developed from the depiction of mythological monsters such as Polyphemus, Medusa and Minotaur to contemporary monstrous creatures from cinema and literature. The philosophers use references from popular culture’s disgusting moments of the horror genre while they parallelize it with the concept of “freak show” and the “craving of biological anomalies”. Although it was initially rejected from the aesthetic spectrum of art, especially due to Kant’s argument on the identical emotions evoked by the real and the represented object, the alluring effect of disgust is

recognized as a secondary experience – an idiosyncratic pleasure, a mixture of cognitive satisfaction and painful curiosity (Korsmeyer, 2011). This paradoxical pleasure aligns closely with what Carroll describes as *art-horror*—an aesthetic category in which negative emotions like fear and disgust are intentionally evoked by fictional or stylized representations, yet consumed with interest and even enjoyment. In *The Philosophy of Horror* (1990), Carroll argues that audiences can appreciate horror art because it engages cognitive processes: we are fascinated by the monstrous and the disgusting, not despite the revulsion they produce, but because they provoke reflection and complex emotional responses. This framework can be extended to fashion: just as the horror genre

uses fictional monsters to elicit structured emotional reactions, avant-garde designers use grotesque or abject elements to disrupt, disturb, and yet captivate. Carroll and Contesi define two variables for the categorization of disgust in art: the artworks that depict or refer to something disgusting and the artworks that are made of disgusting materials. Based on these variables, they present three categories of disgust in art: a) artworks that both their vehicles and their subjects are disgusting, b) artworks that their vehicles are disgusting but their subject is not and c) artworks that their subjects are disgusting but their vehicles are not.

Using this philosophical framework, the aim of this paper is to taxonomize the emotion of disgust in contemporary fashion. Disgusting fashion changed the way we perceive aesthetics, contributing to our perception of inclusivity and challenging the old-fashioned norms of what is considered as conventionally beautiful. This process of de-beautification of fashion is part of Everyday Aesthetics and Negative Aesthetics. Drawing the examples from contemporary fashion collections and the current beauty trends, disgusting fashion can be categorized as follows: a) clothing whose subject is disgusting and whose vehicles are disgusting, b) clothing whose subject is not disgusting and whose vehicles are and c) clothing whose subject is disgusting and whose vehicles are not. Disgusting fashion is related to the use of disgusting materials; meat or textures that reminds us of it, animal byproducts such as skins, living or dead organisms are only some of the examples of how fashion becomes a source of disgust. Clothes that have slimy or sticky texture, or they are made of unconventional materials (meat, worms) can be extremely repulsive, despite their design or their aesthetic value. The contact of the skin with these materials that remind us of decomposition turns the body itself into a disgusting object. Therefore, the grotesque body is usually the disgusting body, which becomes a means of communication of ideas, a philosophical ground where the designer is able to express and challenge oneself.

In the contemporary history of fashion, there are some provocative examples of how disgust can be incorporated in clothing. In 1996, Alexander McQueen presented his Spring Summer collection inspired by the vampire movie "Hunger." Among the outfits, there was a corset molded in the shape of a clear buster, filled with dirt and (alive) worms. In 2001, he presented his collection "Voss."

McQueen, being very theatrical in his practice and his approach of fashion, finished the show with a riveting performance by fetish writer Michelle Olley, being naked in a glass box filled with moths touching her bare skin. On a similar note, one of the most iconic moments in the latest fashion history was the "Meat dress" that Lady Gaga wore in the 2010 MTV Music Awards, made by raw meat pieces and designed by the artist Frank Fernandez. In 2018, Alessandro Michele, the previous creative director of Gucci presented his Fall-Winter collection in Milan (GQ Magazine, 2018). The models walked the runway keeping in their hands their own decapitated domes. Last, there are several contemporary examples such as the brand LeMÁine, specialized in "imitation flesh" textile, which exclusively creates horrific, graphic clothes that resemble bloody skin, while the artist Michaela Stark designs underwear and corsetry that are made to modify and restrain the body in such way, that create uncomfortable and repulsive figures.

Based on the previous examples, the emotion of disgust is a phenomenon strongly related to the aesthetics of avant garde fashion. Similar to art, fashion was considered to serve the ideals of beauty and harmony; when it comes to negative emotions, such as horror or disgust, the question remains the same "is this fashion?" Provocative designers seem to use elicitors of disgust, in order to communicate their thoughts and beliefs or to make a statement about sociopolitical matters. In addition, contemporary fashion uses negative emotions to trigger intense responses, since the audience seems to become more and more indifferent to beauty. While fashion during 2000-2010 used to be all about perfection and presenting the best version of oneself, with the popularization of plastic surgeries, the last 10 years more and more designers present creations that remind us of a "freak show." Carroll and Roversi (2019) argue that the thrill or craving of witnessing freaky images satisfy the curiosity of the audience and, as result, it is pleasurable. Therefore, the disgusting representations in fashion have an aesthetically pleasing aspect, that mainly has to do with the "painful" cognitive pleasure and the evoking of intense emotions.

The introduction of disgust in the broader realm of aesthetics and art is also discussed by Carolyn Korsmeyer. Korsmeyer (2011) analyzes the paradoxical attraction of disgust, stating that it is usually accompanied by an "unsettling

eroticism.” In this framework, disgust is explored also as a cultural phenomenon, introducing the term aesthetic disgust. Korsmeyer defines aesthetic disgust as “a response that, no matter how unpleasant, can rivet attention to the point where one actually may be said to savor the feeling.” Savoring disgusting images or objects is one of the reasons that it is important to taxonomize disgust in art and fashion, in order to understand how this negative emotion can be turned into a pleasurable experience. Previous studies on the emotion of disgust proved that it spreads like an infection from the disgusting object to the disgusted subject (Kolnai, 1929). Kolnai also explored the triggers of disgust, by examining their traits and defining them as “materially disgusting”, and listed decay, waste, bodily fluids, and dirt, and extending to repulsive animals, particularly insects when they swarm in excessive numbers; food in specific states; human bodies that are overly close; excessive reproduction; illness; and physical deformities. Kolnai’s theory has been used as a corner stone for the research of other scholars, such as Winfried Menninghaus (2003), who highlights the intertwined relationship between disgust and aesthetics, arguing that this emotion can serve as a vehicle for understanding cultural values, ethical boundaries, and the limits of beauty or taste. One of Menninghaus’ key points is that disgust, while often seen as a “base” or “primitive” emotion, has an important role in shaping aesthetic experiences. He argues that disgust helps define boundaries between what is considered “acceptable” or “beautiful” and what is perceived as “contaminated” or “repulsive.” In this sense, the emotion of disgust can influence our perception of art, literature, and culture, where it often evokes strong reactions or prompts reflection on issues like morality, health, and social norms. As Georges Bataille (1985) argues, disgust marks a moment of transgression where societal order collapses and the sacred emerges. Through bodily decay, filth, and eroticism, he links the repulsive to a kind of sublime power. His idea of formlessness, central to Surrealist aesthetics, connects abjection to the visual and material realm. Artists like Duchamp, Manzoni, and Warhol used bodily secretions to challenge norms—an approach echoed in fashion by designers like McQueen and Michaela Stark. Their work, like that of Cindy Sherman or Andres Serrano, draws on this avant-garde tradition where disgust becomes a tool

to question beauty, identity, and the boundaries of the body.

CLOTHING WHOSE SUBJECT IS DISGUSTING AND WHOSE VEHICLES ARE DISGUSTING

In 1996, fashion designer Alexander McQueen (1969-2010) started establishing himself as one of the most prominent and at the same time radical designers of his generation. Inspired by the erotic horror vampire film *Hunger*, McQueen presented his Spring Summer 1996 collection at London’s Natural History Museum. Themes of sexuality, violence and death had always been the inspiration and the main motives behind McQueen’s macabre creations. As Caroline Evans (2003) discusses, McQueen’s fashion exemplifies what she terms the aesthetics of “deathliness,” where spectacle, trauma, and decay operate as central visual strategies. His work aligns with a wider movement in late 20th-century fashion that engages with the uncanny, the morbid, and the grotesque as ways of disturbing conventional beauty. Nevertheless, this collection put forward one of his most controversial creations in the history of contemporary fashion. Among the sharply tailored garments and the oversexualized outfits, the designer presented a translucent plastic bodice filled with alive worms, touching the bare breasts of the model. This piece rapidly became the object of hard criticism, because of its disgusting nature and its provocative messages.

The bodice, which is now part of the Metropolitan Museum of Art collection, encased the worms between the plastic and the skin, creating a revolting image. This creation belongs to the category of clothing that both its subject and its vehicle is disgusting, since the designer used one of the main sources of disgust to communicate a deep, disgusting truth about life. The material that the corset is made of can be considered disgusting since it includes alive worms crawling on the model’s skin. According to Kolnai (1929), lower animals such as insects tend to arouse disgust due to their appearance, behavior and association with filth or decay. Worms belong to the first categories of the elicitors of disgust because of their association with decay, rotting as well as their associations with death and excessive fertility. For McQueen the symbolism of worms on the naked flesh was a means to communicate his own ideas on death, putrescence and decomposition. The contradic-

tion between the filthiness of the worms and the pale skin intensifies the emotion of disgust; what once seemed pure, now it was infected by decay, and we are the spectators of this process. The contrast between what is visually attractive and the emotional reaction they provoke highlights the tension between the narrow definitions of beauty and the emotions associated with it (Korsmeyer, 2011). The bodice was intended to evoke a sense of alien-like, organic forms, emphasizing McQueen's fascination with the body, the grotesque, and the natural world. It also plays with ideas of sexuality, fragility, and strength, with the body both concealed and exposed at the same time. The role of repulsion is major in the aesthetic admiration of the piece. McQueen deliberately incorporated disturbing elements into his work to challenge the viewer's conceptions of beauty and femininity.

Carroll and Contesi emphasize on the dichotomy between *confrontation* and *representation*, a distinction formerly introduced by Derek Matravers (2014), explaining that in art the materials are not always made of disgusting substance, but their references are strong enough to provoke disgust. In particular, representation refers to fictionally disgusting cases, whose object (fictional or not) is distant enough, so the audience is not directly affected by disgust but the representation of it. On the other hand, confrontation places the audience in a disarming position; the materials are not only disgusting but also real (non-fictional). McQueen's worm bodice is at first glance a case of confrontation. The designer did not only use real worms touching the model's torso, but at the same time he created a transparent piece of clothing, wanting the audience to be fully aware of this disgusting creation's bizarre materials. Nevertheless, the audience could not actually touch or feel the worms. What is important to highlight here is the role of the transparent corset, which "locked" the worms between the plastic and the body, and at the same time it kept them in a safe distance from the audience. Considering that Contesi states that "disgust is best understood ideationally, rather than sensorily," it seems that even the idea of the worm's touch is enough to elicit disgust. Nevertheless, this is not the same as someone having the worms on oneself, exactly like the model had. A fair answer to the question of the representation/confrontation dichotomy could be that McQueen's worm bodice is a case of disgusting representation for the audience, but it would be considered a case of confronta-

tion for the model, who wore it. In both cases, McQueen successfully challenged the traditional fashion sensibilities, by combining art, nature and the human body and creating an emblematic and unsettling piece.

CLOTHING WHOSE SUBJECT IS NOT DISGUSTING AND WHOSE VEHICLES ARE

In 2018, Alessandro Michele, the former creative director of Gucci, presented his Fall-Winter collection in Milan. The models walked the runway carrying with them duplicates of their own decapitated domes. The inspiration behind the collection was said to be cyborgs and post-human aesthetics. Matters of identity were central to this collection, with Michele highlighting that "a figure that can overcome the dualism and dichotomy of identity." The hyper realistic props created an eerie atmosphere, eliciting disgust to the shocked audience. They were made from silicone and featured incredibly detailed, almost unsettling features, including realistic hair, eyes, and skin textures. They were intended to create an almost alien or unnatural sense of disconnection between the model's body and their face. Alessandro Michele explained that the head replicas were an exploration of identity, transformation, and the loss of self, reflecting his interest in selfhood and the idea of masking or altering one's appearance. The use of prosthetic heads mirrored themes of humanity vs. artificiality and explored the idea of the mask as a way to both conceal and reveal.

Alessandro Michele's bodiless heads were a very controversial moment of contemporary fashion history. Blending art, surrealism and fashion, the director created a very unsettling environment, where disgust plays the most important role in the communication of his vision. The means that he chose were grotesque, balancing between horror and fascination. Carroll and Contesi underline that "the rhetoric of disgust is mobilized to figuratively characterize the content of the artwork." In Gucci's case, the use of repulsive imagery as a comment on matters of identity and body image is interpreted as Michele's critique on the commodification of identity in fashion suggesting that the "head" — which often symbolizes the mind or spirit — can be treated as a decorative object, further blurring the lines between authenticity and artifice (Bourdieu, 1984). The disgust evoked by the disruption of the normal

expectations of the body aimed to confront the dehumanization of the human form. At the same time, a disembodied head can be interpreted as a transgressive object that breaks social and biological norms, eliciting disgust because it is a reminder of mortality and the fragility of the human body (Korsmeyer, 2011). In this sense, disgust can be seen as a reaction to the violation of the integrity of the human body, which is often idealized and normalized in fashion.

Despite the fact that the Gucci case is taxonomized as a case of non-disgusting subject/disgusting vehicle, it is interesting to think about the negative implications of the heads' symbolism and how their meaning is potentially disgusting too. The use of a severed head as an accessory reflects a deeper critique of commodification in fashion. At the same time, disgust is one of the most powerful ways to challenge cultural assumptions about beauty, taste, and the body. The disembodied head challenges the idea that the human form should be whole and integrated, which evokes a sense of discomfort and revulsion. This emotional response can provoke critical thought about societal norms and the nature of fashion itself. Therefore, the visceral reaction could not only be directed to the image of the heads, but also to the dehumanization and objectification of the individual, when human dignity and identity are violated and the body is reduced to an object for consumption.

The same question applies to the following example, which phenomenally belongs to the same category. Undoubtedly, one of the most disturbing moments of fashion has been Lady Gaga's meat dress appearance in the MTV Awards in 2010. The singer appeared to the nomination event dressed in real pieces of meat from head to toes; her headpiece, her dress and purse as well as her shoes were all made of raw beef, veal and pork. The outfit was designed by artist Frank Fernandez and was constructed in a corset-like frame and intended to look like a high-fashion gown. The choice of the material had as an ultimate aim to shock the audience and to make a strong political statement. According to fashion theorist Francesca Granata "it is the ultimate abjection," since what shocked people the most was the combination of raw meat on bare skin. She also argues that "it troubles the inside versus outside of the body, literally having flesh on the outside of the body. It reminds people of their own mortality. I don't think

any of her other looks were so explicitly disturbing." Carroll and Roversi also mention that the pictures that remind us of the disgusting nature of death function as memento mori. The higher purpose of the outfit was to communicate a message about the US military's policy "Don't ask, don't tell," which prevented service people from disclosing their sexual identity (source: BBC), and the disgusting creation played an important role for the symbolic representation of the freedom of expression.

The disgust evoked by losing the boundary between the inside and the outside is also mentioned by Julia Kristeva (1982) in her work *Powers of Horror: An Essay on Abjection*. Kristeva's theory of *abjection* focuses on the ways in which certain things are expelled from the body (e.g., bodily fluids, excrement, corpses) and how these things evoke feelings of disgust and horror. For Kristeva, the experience of disgust is tied to the breakdown of boundaries between the self and the other, the inside and the outside, and it plays a crucial role in the formation of identity and social order. In the meat dress' case, the meat and, by association, its decomposition signifies also the objectification and the need to claim our rights "For me this evening it's [saying], 'If we don't stand up for what we believe in, if we don't fight for our rights, pretty soon we're going to have as much rights as the meat on our bones'" (source: BBC). The lost boundary between inside and outside, which evokes disgust, is similar to the lost boundary between what we are and what we are obliged to show, in cases such as the military service. The symbolism of the meat dress can also be read through Bataille's lens of sacrificial expenditure, where the rawness of flesh—devoid of function and displayed publicly—becomes a site of erotic horror. Bataille identifies the corpse, the wound, and the abject as liminal states—neither life nor death, self nor other. Gaga's meat dress operates as a Bataille—an object par excellence: it externalizes the internal, eroticizes decay, and stages a public offering of the body as a sacrifice that resists commodification while also exploiting it. It's not merely political—it is ritualistic. The meat dress is disgusting because they needed to show their intense remonstrance against the irrational policies of the army. But, the policy itself, which required from the soldiers not to talk about their sexual preferences, could be also considered as morally disgusting since they removed their right to express themselves freely. Carroll and Contesi explain that "this conjunction

of content that is not literally, physically disgusting with a vehicle that is literally, physically disgusting provides a very serviceable strategy for socially critical art.” This resonates with Martha Nussbaum’s (2004) argument that disgust is often misused in legal and political discourse to marginalize certain identities. She critiques the role of disgust in lawmaking, especially when it is used to justify the suppression of individual rights, suggesting that such uses of disgust reflect fear rather than reason.

CLOTHING WHOSE SUBJECT IS DISGUSTING AND WHOSE VEHICLES ARE NOT

In 1996, Alexander McQueen presented his collection *Highland Rape*, one of the most iconic, controversial, and talked-about collections in the history of fashion. The collection was titled “*Highland Rape*,” a provocative reference to Scotland’s historical and cultural trauma (Bolton, 2011). The title, which was deliberately shocking, was intended to evoke the violent history of the British treatment of Scotland, particularly focusing on the 18th-century English invasion and the aftermath of the Highland Clearances, a period of intense violence and displacement. *Highland Rape* directly referenced the trauma and violent oppression suffered by the Scottish Highlands during and after the English occupation. McQueen used this as a metaphor for the broader themes of victimhood, violence, and the expression of power and vulnerability in fashion. In *Eroticism* (1986), Bataille asserts that eroticism is intimately connected with violence, taboo, and the breakdown of boundaries—particularly the boundary between subject and object. The *Highland Rape* collection, while not erotic in a conventional sense, draws from this idea of transgressive exposure—where violence is aestheticized not to titillate but to shock, to rupture social norms, and to evoke reflection. The beautiful dresses become sites of moral and bodily degradation, aligning with Bataille’s notion that true beauty often lies adjacent to horror. The collection sparked a massive controversy due to its raw and violent imagery. The press and public were polarized, with some praising McQueen for his boldness and others accusing him of glorifying abuse. The combination of the collection’s name and the designs that featured women in distressed states, including the appearance of rips in their clothing and makeup that resembled bloodstains,

was viewed as either art or exploitation, depending on perspective.

McQueen presented his models semi-naked walking on a catwalk strewn with heather and bracken, the clothes seemed destroyed. According to Andrew Bolton (2011), “the torn and far-from-finem lace”, bought for a very low price, the damaged tartans and the uncensored exposure of the female body made the collection so scandalous. The dresses seemed decayed, ripped, functioning as a connotation of the sexual abuse. In this case, disgust is evoked by the meaning of the dress and not the material of it. The deconstructed lace is symbolic to the loathsome act of rape. In the case of Gaga’s meat dress, the viscerally disgusting imagery signifies the violence of a non-physically disgusting practice, while in the case of *Highland Rape* collection, the act is both physically and morally disgusting, but it is represented in an almost aesthetically pleasing way. There are two crucial matters occurred in this example: first, the fact that rape – even in a symbolic content – is represented by aesthetically pleasing means and secondly, the fact that wording – in this case the title of the collection - is so powerful that can define the whole collection as (morally) disgusting. In the first case, the use of an avant garde fashion collection to represent the act of rape (in literal or metaphorical level) could be interpreted as a subtle critique to the romantization or the idealization of morally disgusting acts. In addition, the aesthetic discomfort created by the tension between the vehicle (which may be aesthetically pleasing or emotionally comforting) and the morally disgusting content is central to the experience. In the second case, the power of the word “rape” bores into the collection, charging the collection with a deeply disturbing and disgusting meaning, which also affects the appreciation of the designer’s aesthetics and craftsmanship.

In conclusion, the incorporation of disgust into contemporary fashion challenges traditional perceptions of beauty and aesthetics by exploring negative emotions as a means of conveying complex sociopolitical and philosophical messages. As this paper has demonstrated, disgust in fashion operates in various forms, whether through the choice of materials, such as raw meat or bodily fluids, or through symbolic representations of violence and decay. Drawing on the taxonomic framework proposed by Noel Carroll and Filippo Contesi, we have seen that disgust can manifest in fashion both

literally, through the use of repulsive materials, and figuratively, through the representation of morally or culturally disturbing themes. Designers like Alexander McQueen and Alessandro Michele use these unsettling elements to provoke thought and engage audiences in a dialogue about identity, power, and societal norms.

At the heart of this phenomenon is the paradox of aesthetic disgust, as described by theorists such as Carolyn Korsmeyer and Julia Kristeva. Disgust, while inherently unpleasant, is often accompanied by a cognitive pleasure derived from its ability to push boundaries, defy conventional standards of beauty, and challenge our discomfort with the body and its functions. This interplay between revulsion and fascination allows fashion to transcend its role as mere adornment, transforming it into a medium for deeper cultural critique.

In many ways, contemporary fashion's embrace of disgust reflects a broader shift in cultural values, where the idealization of beauty is being replaced by a more inclusive and complex exploration of human experience. As fashion continues to evolve, the tension between the grotesque and the beautiful remains a powerful tool for designers to question, subvert, and ultimately redefine the limits of aesthetics in our time. Whether through McQueen's decayed lace or Lady Gaga's meat dress, the use of disgust in fashion invites us to reconsider the boundaries of art, morality, and taste, ultimately offering a new way to understand the transformative potential of fashion as both a reflective and provocative art form.

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CULTIVATING A RELATIONAL FASHION SYSTEM FOR PROSPERITY

EMBRACING DECOLONIAL EMBODIMENT AND MORE-THAN-HUMAN CARE THROUGH THE PRACTICE OF DEEP-WEARING

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Abstract

Wearers are locked in endless cycles of acquisition, disenchantment and disposal. Time spent with our garments is fleeting. We are encouraged to *have* clothes, to *buy* clothes, but not to *care for them*, to *be in an embodied relationship with* our clothes. We need to implement practices of care and relationality in more-than-human worlds or face ecological and societal collapse. Care is an intersectional relational practice that encompasses the entire spectrum of sustainability of our world - social, cultural, spiritual, and economic.^[1] In response to over a decade of ongoing research-through-design project engaging in a “conversation across worlds,” as articulated by de la Cadena and Blaser (2018) fostering dialogue and interaction between diverse epistemologies, ontologies, and cultural perspectives the authors enacted a short temporal deep-wearing project that centres decolonial body-garment relations. This paper contributes to defining the concept of prosperity fashion by cultivating alternative value systems and modes of exchange for holistic, metaphysical oneness with our clothing in our everyday lives. This aligns with a process of decoloniality, embracing diversity in ways of knowing and being, through mind-body-spirit that towards the aim of multispecies flourishing, goals that are far outside of the capitalist, growth-oriented lens. Drawing from Indigenous Knowledge; Chinese, Celtic and Māori; making visible and assigning value to what was erased by Modernism, the Cartesian divide and the colonial order. It applies Taoist theory and methodology that accepts that, everything, including ourselves ^[3] and our clothing is energy.

Keywords: *Relational Fashion, Decolonial Embodiment, More-than-Human Care, Indigenous and Taoist Knowledge, Pluriversal Materialism*

INTRODUCTION

SUSTAINABILITY IS A CRISIS OF WORLDVIEW AND THE STORIES WE CHOOSE TO TELL OURSELVES

It's becoming abundantly clear from the lack of success of the sustainability initiatives employed by the fashion industry (BoF, 2020, p. 15) that it is either suffering from a cognitive dissonance between its beliefs, and its actions, or more accurately, that it does not want to *really* change. It is no surprise that the prescriptive, solution-focused approaches by the industry have failed as they come from the same logic, values and narratives of the broken system. As Jennifer Craik describes, the fashion industry upholds a worldview that is a “late-capitalist, neo-liberal, post-Fordist

mindset from the Global North” (Craik, 2020, p. 923). A colonial, human-centred perspective that deepens divisions between people Global North and Global South and nature, fostering arrogance and a sense of superiority while disregarding the voices and concerns of garment producers and consumers in the Global South. This worldview lies at the heart of many of the crises of this time (2018, Escobar, 2014, Klein et al). It is a wholly anthropocentric approach to sustainability that only permits transactional solutions and relationships i.e. “sustainable fashion.” Sustainability is framed as a purchasable object - a garment. Overproduction and overconsumption are not questioned as industry growth is more important than the needs of the non-human world. The complexity and

reality of sustainability as a verb and a process, based on cultivating relationships is diminished. Audre Lorde said, “The master’s tools will never dismantle the master’s house. They may allow us temporarily to beat him at his own game, but they will never enable us to bring about genuine change” (1984, p. 110). If indeed the fashion industry wants to do no harm, it needs to expand its narrative framework and delink what it has silenced and erased, to be open to other ways of knowing, from a relational, pluriversal perspective. The latest UN climate report (2024) underscores the critical need for the fashion industry to embrace new value-creation models and incorporate broader social and ecological factors into their success criteria. We need to advocate for more relational, inclusive approaches to knowledge and existence (Fig. 01).

THE COLONIALITY OF OUR RELATIONSHIPS

The contemporary fashion system is emblematic of the ideas and values of modernity. (Jameson, 1991, Simmel, G. 1957). As Walter Mignolo and Rolando Vazquez (2013) say, when we peel back the narrative of modernity, we reveal the logic of “coloniality” and its ongoing, hidden processes of extraction, separation, exploitation, and pollution that sustain this story. Coloniality and colonialism are distinct concepts (Maldonado-Torres, 2007). While colonialism denotes direct political and economic domination, coloniality signifies the long-standing patterns of power that emerged from colonisation. As Maldonado-Torres (2007, pg. 243) posits ‘coloniality survives colonialism’ - as the invisible yet pervasive set of practices, & beliefs, that shape contemporary societies, coloniality is always with us. As wearers of clothing, we are aware; to varying degrees; of the colonial legacies embedded in the production of clothing and cloth as the modern/colonial project dominated the economy, politics, power and knowledge. (Barber, 2021, Barenblat, A., & Mayer, A. 2019, et al). We are perhaps less aware of how coloniality sought to control our senses and the way we perceive ourselves, others, or the world around us (Mignolo and Vazquez 2013). It is difficult to comprehend how this affects everything, how we interpret, understand, or view a situation, object, or ourselves. In the context of this paper, we will specifically refer to how it affects our contemporary relationship with clothing and our embodied practices of wear. As modern individuals in the 21st century, coloniality has shaped/and is continuing to shape us, as

we “breathe coloniality all the time and every day” (Maldonado-Torres, 2007, p. 243). Mignolo and Vázquez claim that our collective colonial wounds remain present and open, manifesting “in the everyday experience of most people on the planet” (2013). Māori scholar Linda Tuhiwai Smith (1999, p. 24) suggests that our relationships, including those with clothing, are shaped by colonial notions of relationality. Coloniality has imposed specific values and frameworks for relating to clothing - in terms of how we understand power (hierarchical, human/industry-centered), time (linear progress), space (geographical exploitation), subjectivity (racial and gendered identities), and knowledge (Western/Eurocentric expertise) (Fig. 02).

WORDS HAVE POWER - THE DECOLONIALITY OF EVERYDAY CONVERSATIONS, LANGUAGE, AND NARRATIVES

A significant part of our clothing experience is culturally created through everyday conversations, language, and narratives. Language is not ‘objective’ or ‘neutral’ but it is encoded and loaded with belief systems and knowledge of the dominant culture, or as Tuhiwai Smith (1999, pg42) “imperial eyes”. Language not only shapes how we perceive the world, but it can also limit our perception. Research indicates that how we see colour can vary depending on our gender, ethnicity, geographical location, and what language we speak. (Brogaard, 2020). As Robin Wall Kimmerer states, ‘Science is a language of distance, which reduces [the world] to its working parts—it is a language of objects’ The language and narratives of sustainability often perpetuate reductionism and separation, that is rooted in Western knowledge systems. (Escobar, 2011). In contrast, language from outside of this worldview fosters a sense of kinship, reciprocity, and balance with nature and each other by framing humans as part of a larger ecosystem (Magan, M. 2022). This begs us to ask: is our language limiting our perception? Whitty’s own indigenous language (Irish - *Gaeilge*) has thirty-two words for “field,” which reflects a deep attentiveness to subtle environmental distinctions and an inseparable connection between the Irish landscape and its language (Magan, 2020).) This linguistic richness offered our ancestors a magical, poetic and nuanced way of seeing their environment. In Māori, the term *whakapapa* refers to genealogy but extends beyond human ancestry to include all living and non-living entities, acknowledging kinship with nature.

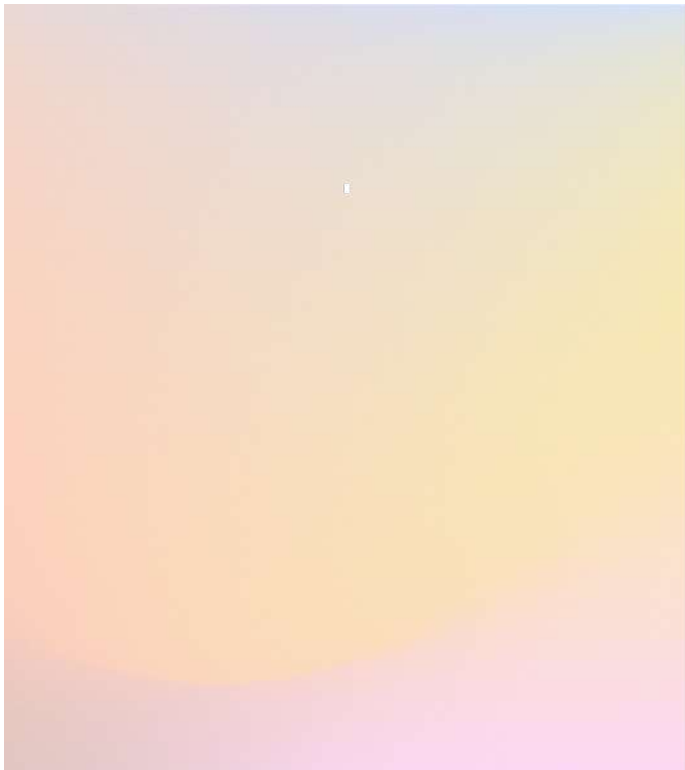


Fig. 01

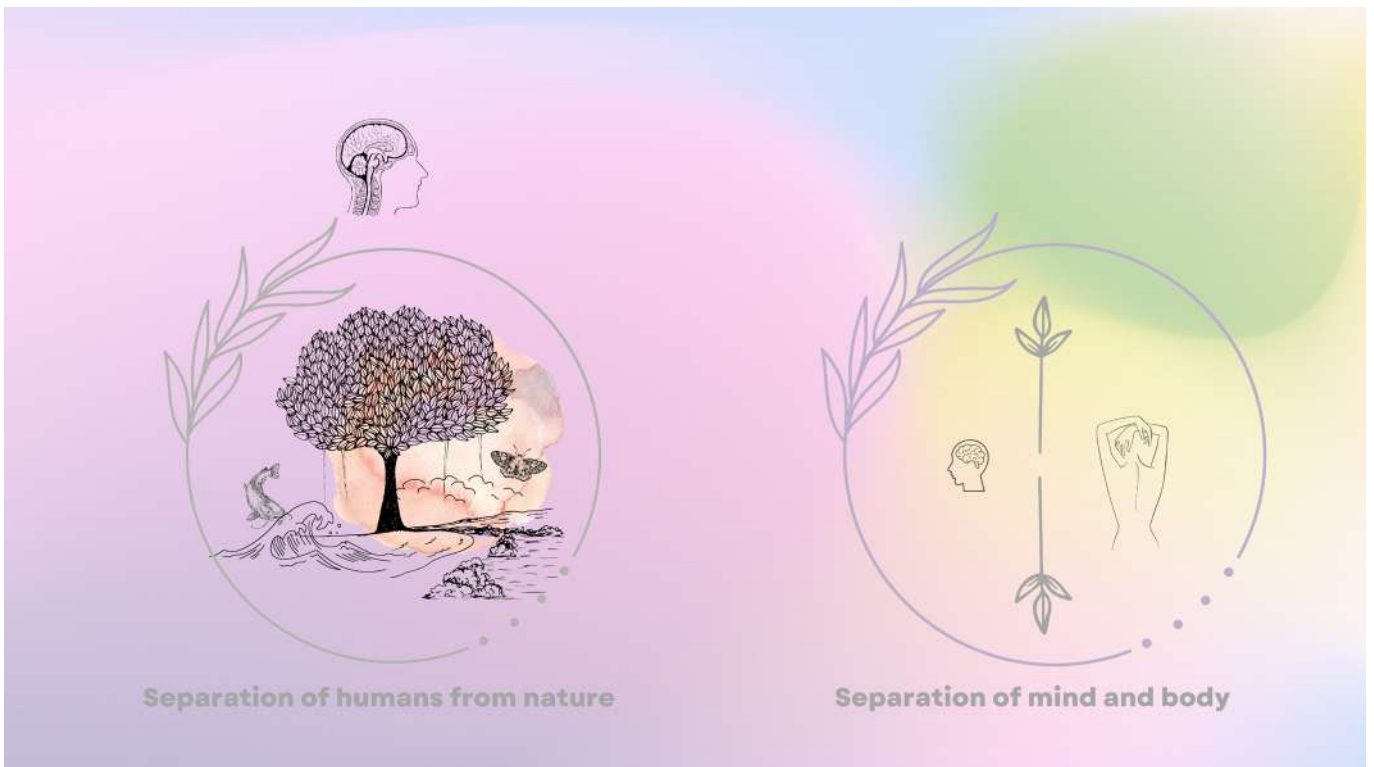


Fig. 02

Relearning languages suppressed by colonialism is a decolonial act that goes beyond linguistic skills, transforming ontological perspectives, relational orientations, and worldviews.

LISTEN TO OUR BODIES - DECOLONIAL BODY-GARMENT RELATIONS

Our bodies are central to our lived experience, our health, our well-being, and our sense of connection. They form the basis of our immediate reality—as an interface between our internal world of organs and thoughts, to the external world of skin and nature. Our bodies are deeply interconnected systems, composed of ourselves as host organisms and the vast microbial communities inhabiting us inside and out. When we accept that fashion as a soil-to-soil system (Burgess, R 2019) it reveals the integral role of soil not only in clothing production but also in who we are. The boundaries between our inner selves and the external environment are fluid, underscoring their fundamental unity. In many Indigenous worldviews, soil and land are seen as “kin,” offering a relational framework to care for and nurture the Earth as we would a family member. (Pihamā, L., & Smith, L. T. 2021). This reciprocal relationship extends to our bodies and our clothing - our chosen second skin. We exist on the Earth in our clothed bodies, which in turn shapes our interaction with the world (Merleau-Ponty, 2012, Elizabeth Grosz, 1994) Embodiment - our lived experience of having and being a body is central to human perception and being-in-the-world. From the Māori worldview, *mauri*—the life force—exists in relationship with all things (Durie, 2001, p.21). This perspective recognizes that the well-being of humans and non-humans is deeply interconnected. Sickness is not merely physical; it is also spiritual (*taha wairua*) emotional/mental (*taha hinengaro*), physical (*taha tinana*), family/social (*taha whānau*) (Durie, 1997). The Indigenous belief system of China, Taoism is based around the understanding that everything in the universe is interconnected and interdependent. (Kirkland, 2004). The flow of energy (referred to as *qi* or *chi*, 氣) binds all things together, whether they are human beings, nature, or the cosmos, as they are always in relationship in this paper, we collectively reflect on the exchange of fashion knowledge and experiences within the context of unequal power relations shaped by the modern/colonial order. Drawing from our respective positionalities, knowledge, and experiences, we examine what it means to engage

across differences, as individuals based in the Global North and the Global South. We acknowledge the power imbalances inherent in this collaborative writing process, rooted in disparities of race, age, life experiences, institutional education, and social status. Additionally, we recognise our diverse positionalities and the distinct perspectives from which we each speak. With one another. The Eight Energy Body Theory is a framework describing different layers of existence and consciousness that integrate the physical, emotional, and spiritual aspects of a person. These associations can be understood as influencing the emotional aspects of our being, often referred to in a broader spiritual or energetic context. Whitty’s Ancient Irish ancestors believed that nature was sacred and that all material phenomena (objects, landscapes etc.) had agency—they were alive with spirit, meaning, and power (Freeman, P. 2021). It is interesting to note that the design discipline that is the most intimately connected to the body, it has been systematically silenced and marginalized as an unthinking object. Our clothing relationship is shaped by colonial notions of relationships and interactions. —dividing humans from nature, self from others, and body from spirit (Descartes, 1996). Garments are often created as exercises in aesthetic refinement, frequently neglecting their relationality to the soil, and to our emotional/mental, physical, family/social bodies. As a result, our clothes fail to support us, leaving us physically, psychologically, and spiritually unwell. (Cline, E. L 2012, Wicker, A. 2023). This system is self-serving and is failing human-nature - we are producing more clothing than ever before, but we are wearing garments less frequently. Between 2000 and 2025, the number of times a garment worn before being throwaway decreased by 36%, while garment production doubled between 2000 and 2015 (Textile Exchange, 2024, p. 13).

It compels us to ask why has it been silenced? Is a disembodied relationship easier to exploit through our insecurities, feelings of inadequacy, & anxieties? What might our bodies say if they were allowed to feel? Would they also sense when clothes were not made in *mauri* or *chi*, and were made in pain? If our clothing relationships were decolonial, grounded in *mauri*, and *chi* (氣) they would foster vitality and well-being across humans and non-humans? (Fig. 03)



Fig. 03

POSITIONALITY

In this paper, we reflect collectively on what it means to exchange fashion knowledge and experiences in a setting of unequal power relations due to the modern/colonial order. We reflect from our respective positionalities, knowledge and experiences on what it means when we meet in difference, as people based in the Global North and the Global South. We want to acknowledge the power inequalities in this collective writing process due to the modern/colonial order and our differences in race, age, life experiences, institutional education and social status. We also want to acknowledge our different positionalities and where we are each speaking from. Oli Dong, a young Chinese woman who was born and works in China but who was educated in the UK, is from the post-90s generation (90后). Oli grew up under the one-child policy during a time of rapid modernization, digital connectivity, and urbanization in China. Her generation, markedly different from those before it, reflects the cultural tension between tradition and modernity. Yan Yuan is a Chinese woman, born and educated in urban China (Beijing and Xi'an) as part of the Post-60s Generation (60

后) (Liù Líng Hòu), she grew up during the tail end of the Cultural Revolution. Yan was educated in fashion design, and traditional Chinese rituals and practices that embody Confucianism, Taoism & Buddhism (the three main philosophies of China), such as the tea ceremony, playing the guqin (古琴) an ancient Chinese stringed musical instrument. Yan is a mother, daughter, wife and an Associate professor in Fashion Design. Her generation serves as a bridge between China's revolutionary past and its rapid modernization, embodying a mix of traditional values and a growing awareness of global influences. Jennifer Whitty, a white woman, as Muintir na hÉireann, a person descended from the native people of Ireland, now living as tauiwi (Māori term to refer to newcomers to Aotearoa, New Zealand). As a colonized, third-culture individual Whitty's experience of living in-between cultures—navigating a state of non-belonging between insider and outsider perspectives—has shaped her ability to build bridges across worlds. Learning about Indigenous Chinese culture has deeply resonated with her, feeling substantial and profoundly aligned with values she has long held but had not fully articulated. It has also illuminated, as Magan

(2022, p. 289) describes, the “deep psychological block” created by the trauma of colonization—a separation from traditional reverence for the land and the loss of her Indigenous language. Over her 10 years of visiting China, Whitty has learned and unlearned much about the country, often challenging her Eurocentric and colonial view of China as a monolithic culture. While China has increasingly adopted a consumption-driven culture, there is also a renaissance of Indigenous ethno-ontological wisdom and a metaphysical philosophy which is where our work finds its place.

LEARNING FROM THE PLURIVERSE – WE NEED TO COME TOGETHER

The colonial worldview has divided from one another, “othering” people who exist outside Western frames of reference - The Global North and Global South. In response, we advocate for the inclusion of diverse ontologies—such as Indigenous cosmologies—in addressing environmental issues. These perspectives offer valuable insights into sustainability and relational approaches that are essential for creating a more inclusive and equitable future. This work is part of a growing wave of decolonial confidence. Our external perceptions of each other’s cultures have highlighted how deeply our worldviews are shaped by our cultural contexts and the necessity of unlearning entrenched assumptions. It is only by coming together in the difference that we realise we are more similar than dominant narratives might suggest. Engaging with decolonial practices has been both humbling and destabilizing. It enabled us to confront the reality that much of what we thought to be “real” or “true” was shaped by a dominant worldview that marginalized alternative perspectives. This paper is part of an ongoing research-through-design project that has evolved over a decade of collaboration across mainland China and Aotearoa, New Zealand. During this time, we have opened ourselves to each other’s worldviews, reflecting on our positionalities and engaging in what de la Cadena and Blaser (2018) describe as “conversation across worlds”—a process fostering dialogue and interaction between diverse epistemologies, ontologies, and cultural perspectives. This collaborative approach embraces the coexistence of multiple ways of being and knowing, challenging the dominance of a singular worldview and rejecting the “one-world reality” (Law, 2015). Cross-cultural dialogue is essential for addressing global challenges. By coming together, we

aim to overcome differences, build relationships, and foster connections among ourselves and others (Mignolo & Walsh, 2018, p. 2). We are all designers, wearers and educators - clothing is a site of meaning, and rich potential for practices of care and new relations to emerge on the soil in our bodies.

DEVELOPING RITUALS AND PRACTICES FOR DEEP DECOLONIAL WEARING

This decolonial wearing temporal intervention began as a thought experiment: could attuning to the clothing on our bodies deepen connections with the human and non-human worlds? Could it shift our values and foster a relational understanding of clothing? As designers and wearers, instead of striving for detached perspectives, we can begin to cultivate—through small, tangible actions in our immediate environments—an engagement with our “situated knowledges,” (Haraway, 1988, pg575–99.) our existing clothing, and practices of care, fostering what Haraway refers to as “ways of seeing” (Haraway, 1988, pg. 583). It advocates for the quietly radical act of resisting the neoliberal capitalist rhythms of productivity and consumption by simply dedicating time to being present with our clothed bodies.

METHODOLOGY

This deep-wearing intervention draws upon a holistic, decolonial framework aimed at encouraging fashion wearers to adopt decolonial mindsets and embodied practices intervention integrates multiple frameworks, and philosophies namely:

- **Phenomenological & Embodied Practice:** Inspired by the focus on lived experiences Merleau-Ponty (2012) and Grosz (1994), the intervention challenges Cartesian dualisms between mind/body and nature/culture. It incorporates Taoist-inspired practices, including the Eight Energy Body Theory (Frantzis, 2019), which fosters integration of physical, emotional, mental, and spiritual connections. Corresponding with Clark’s concept of shifting worldview and introduce new values to fashion through “everyday values. sensory studies, micro phenomenology” (2019, 323) Building on Whitty’s work (2024, 2023) on care being deeply connected to touch, and our embodied, sensory knowledge of being in our clothed bodies. Decolonial approaches: Decolonial AestheSis: (Mignolo & Vázquez,

2013), which integrates thought, action, and sensory experience into a seamless process of knowing and being. This approach recognizes the embodied experience as a legitimate form of knowledge, by challenging colonial separations between mind and body. Drawing on the work of Pihama and Smith (2021), Magan, (2022), Kimmerer, R. W. (2013) this intervention is an act of reclaiming Indigenous ways of being, creating a space where fashion practices thrive outside the confines of modernity, aligning with Jansen's (2020) idea of redefining fashion as a "multitude of possibilities" that move beyond monocultural Eurocentric frameworks. It builds on it by changing the micropatterns of social life, on the ground, with each other to decolonize ourselves. The project also incorporates non-linear Indigenous temporality. Part of this practice decolonial practice draws from mindful awareness practice that primarily stems from Eastern spiritual and meditative practices as a counterpoint to habitual and unconscious practices of wearing. It encourages us to "unthink" ingrained assumptions and unlearn biases rooted in Western knowledge systems, fostering a more reflective and intentional relationship with clothing. Building on Whitty's (2024) work on care, as a relational, collaborative process.

- More-than-human perspective, as proposed by Craik and Peirson-Smith (2020) an approach that shifts from anthropocentric sustainability models towards relational care within broader ecosystems Maria Puig de la Bellacasa (2017). Whitty's previous work (2023) on being in common with our clothes as an embedded relational practice to cross the conceptual divide between human and nonhuman:
- New materialism - Karen Barad's (2007) concept of agential realism and Rosi Braidotti's (2013) relational ontology further inform this approach, emphasizing the interconnectedness of all phenomena. The project also draws on Indigenous animist beliefs (Chinese, Māori, and Celtic), which view objects, landscapes, and natural phenomena as imbued with spirit and agency (Freeman, P. 2021), (Durie, M. 1997), The ArtEZ Fashion Professorship promotes a new way of engaging with fashion's matter and materialities through 'New Ecologies of Matter,' viewing fashion's materialities, including sensuous living bodies, as part of a continuum

of living matter.

- Expanding the framework for clothing - a decolonial alternative logic to the binary framework of Western fashion, a "third way" curator Claire Wilcox (2020, p. 131) 'Fashion as an expression of artistry'—or as art itself. This approach aligns with Bari's (2020) view of dressing as a philosophical and existential act, emphasizing clothing as mnemonic objects rather than mere utility or style.
- This research builds on the decolonial embodiment work of Yuan and Whitty (2021) 'Taoist mind, body clothing service, the meditation workshop delivered at Responsible Fashion Series in Antwerp (2021), and the workshop 'Fashion utopias: An exploration of the possible based on Whanaungatanga (relationship building), Whakapapa (genealogy), and Kaitiakitanga (guardianship) with clothes' (Whitty 2023).

METHODS

This intervention employs a qualitative methodology to explore the lived experiences of fashion wearers in the context of sustainability, using embodied, autoethnographic, phenomenological and experimental methods. The authors engaged as participants in a 5-day practice involving mindfulness with their everyday clothing to explore embodied connections to their own clothing. The data collection methods took the form of a collaborative mural board, discussions, and artifacts:

- Mural board: A collaborative mural board was set up with prompts and questions to be reflected on and responded to over the course of the day - morning, afternoon, and evening, with reflection over the whole day. The participants were encouraged to document their daily experiences and reflections on digital post it notes on the board, the board could be accessed on the participants' phones to allow for accessibility and immediacy. All responses could be seen by all participants at any time to encourage collaborative learning/sharing.
- Artifacts: Participants created outputs (e.g., photos, garments, drawings) during the exercise that can be analyzed.
- Discussions: Pre- and post-reflective discussions to gather insights, and to understand changes in perspectives.

To capture the essence of everyday life, the intervention took place over five regular

working days, during which participants engaged in the practice of “deep wearing” with their everyday clothing. This period coincided with an exceptionally busy time for Yuan and Dong, which influenced their level of engagement. However, this added authenticity, providing an accurate reflection of what a typical day entails. The intervention utilized a digital mural board, with each participant assigned a dedicated section featuring 8 prompts (Appendix 1) in both English and Chinese.

The prompts were developed from Taoist principles, and Māori knowledge, designed to align the garment-body-mind-spirit connection with the natural rhythms and patterns of life. The prompts covered a range of themes, including body awareness, environmental awareness and principles explicitly rooted in Taoist philosophy designed to encourage participants to cultivate a deeper relationship with themselves and their environment.

The relational principles included:

1. Chi/Qi (氣) – Vital Energy Practices, to cultivate and harmonize the flow of energy (Chi) within the body. Practice/Prompt: Body-garment Awareness: to circulate energy and calm the mind.
2. Wu Wei (Effortless Action) - to act in harmony with the Tao by aligning with the natural flow of life rather than resisting it. Practice/prompt: mindful wearing - focus on how the body moves through the garment. Observation of Nature: Spend time outdoors observing how garments interact with nature.
3. Relational Harmony (He 和) and mauri—the life force—exist in relationship with all things to cultivate harmonious relationships with oneself, others, and the environment. Practice/prompt: Clothed Body Awareness: Participants were asked to pay attention to how garments interact with their body—how they feel, move, and support or constrain your flow of energy. Interpersonal Presence: Practice deep listening and non-verbal awareness in interactions, aligning with the mauri and Tao's flow in relationships. They were asked to tune into their body—what messages is it sending you through the sensations of wearing this garment?
4. Meditation and Stillness - to Achieve inner peace and clarity by quieting the mind and tuning into the present moment. Practice/prompt: participants were asked to check in and focus their attention on different parts of their

clothed body, noticing sensations.

5. Connection to Nature: to reconnect with the natural world to restore balance and alignment with the Tao through clothing. Practice/prompt: Participants were asked to consider the lifecycle of their garment, from its origins (soil) to its eventual return to the earth (soil-to-soil). They were asked to Observe how the sun interacted with their garments.
6. Taoist Rituals - to honour the interconnectedness of all life and bring intentionality to daily actions. Practices: Morning Intentions: Participants were asked to begin each day by expressing gratitude and setting mindful intentions aligned with the Tao through the garment.

(Fig. 04)

FINDINGS

EMBEDDEDNESS OF COLONIAL MODERNITY

From the outset, the influence of colonial modernity on participants' values and mindsets was evident. On the first day of the project, Yuan and Oli's immediate focus was on their lack of new clothing, reflecting a strong association of fashion with newness. Asking participants to consider clothing beyond this frame of reference was challenging, as it felt unfamiliar and foreign to their habitual ways of thinking about fashion.

LACK OF LANGUAGE

The participants struggled to articulate their feelings towards their clothing, finding both English and Chinese insufficient, and lacking to fully capture their deep wearing experience. The language of clothing relationships is binary or transactional- it either reinforces functional or aesthetic relationships or goes to the domain of human relationships. In response, Whitty experimented with alternative modes of expression, using images, inventing new terms, or even incorporating sounds to better convey emotions and connections.

SHIFT FROM OBJECT TO SUBJECT

Interestingly, of the three participants two of them described their clothes as subjects rather than objects. Yan likened her clothes to “a friend to help me.” Whitty, over the course of the exercise, developed a deep connection with her clothing. Each morning, she began by expressing gratitude, speaking to her garments and saying, “I’m so

3.2 Findings

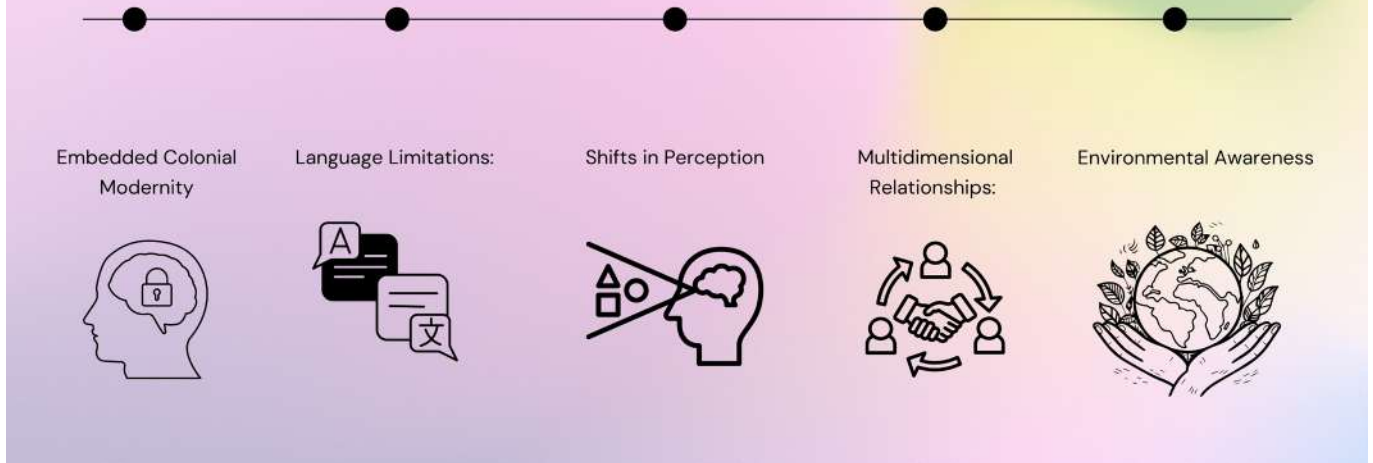


Fig. 04

grateful for all of your help.” She found this practice grounding and centering, and by the fifth day, it had become second nature. Her relationship with her clothes extended to her bed sheets, and her wardrobe no longer felt like a collection of random objects but rather a gathering of friends filled with memories. For Whitty, this process of mindful wearing enhanced her attunement to her surroundings and herself. Whitty stopped seeing clothes as specific items - ‘dresses, trousers etc.’ but started to second skin. The line between the fabric and how it responds to corporeality by turning into a skin.

MULTIDIMENSIONAL WEARING

Dong frequently spoke about the interconnectedness of mind, body, and clothing. For her, clothes provided a link between “protection and mood,” offering a sense of safety— “always bring the safe.” The relationship between emotional/mental well-being (taha hinengaro) and physical well-being (taha tinana) was evident in her reflections. On days when this harmony was achieved, she noted the ability to maintain the harmonious flow of Chi/Qi (气) through her clothed body, remarking, “Today—it can flow :).” For Whitty, she entered a space where the body and garment existed in a

dynamic, dialectical relationship—a continuum where dressing became a practice that nurtured creativity, and dialogue across cloth, space and body. The art of dressing and being dressed was - the goal. She noticed that over the 5 days, she paid less attention to the external appearance of her clothes and paid more attention to the interface of cloth to body in a sensory way free from pressures of aesthetic appearance as the measure of clothing success.

FINDING NEW TEMPORALITIES

Whitty and Yan expressed a desire to show more care and build deeper relationships with their clothing but felt hindered by a lack of time, language, and practical capability. To address this, Whitty experimented with slowing down her interactions with garments, taking more time to dress and undress, and engaging in mindful practices such as folding clothes with care. These small, intentional actions transformed mundane tasks into opportunities for building relationships, fostering care, and finding enjoyment in everyday rituals.

THE BODY AS A LIVING PROCESS

For Yuan and Whitty, this process highlighted the profound relationship between physical sensations—such as wearing—emotional awareness, and cognitive processes, reinforcing the body's vital role in shaping the mind. For Whitty breathing and dressing became interwoven in a continuous cycle: the living body depends on the rhythm of breath—inhalation and exhalation—mirroring the cyclical nature of our daily rituals. Breathing is an act of deep relationality with nature—a constant exchange that unites us with the atmosphere and reminds us of our interconnectedness. Clothing, in turn, is intrinsically tied to this act of breathing, arguably more so than any other form of design. She tuned into listening to her body's wisdom and then expressed or clarified that feeling through the mural board. Whitty's focus on the breathing, clothed body brought attention to this invisible yet essential exchange, cultivating a dynamic relationship with clothing.

MIND-BODY-CLOTHING RELATIONSHIPS

Mind-body-clothing relationship; and chose to wear the same outfit for an entire month, describing it as providing a sense of security and calm—the yin to the yang of her busy life. Initially, her sense of this practice lacked a clear narrative, but through focused attention during this project, she began to recognise its deeper significance. Her reflections uncovered insights into her sartorial practices that she can continue to explore and use as a grounding tool. She described the experience as “like the clothes of a monk—without thinking too much, just repeating the same colour and structure, so there's no need to concentrate my mind entirely on clothes.

CONNECTION WITH THE ENVIRONMENT

The intervention revealed that most of the authors, apart from Whitty, were unfamiliar with considering a garment's full lifespan, particularly its end-of-life. This aspect was often overlooked. For example, when asked about it, Dong admitted, “No idea actually—I can't imagine how this coat will end its life.” Yan referred to burning clothes as a common practice, highlighting cultural differences in sustainability perspectives. While incineration may be more prevalent in some cultures, it is less accepted in the West due to its severe environmental consequences, such as the release of carbon dioxide and other greenhouse gases that contribute to global warming. This finding

points to a significant gap in knowledge among fashion design professionals. Although they are typically knowledgeable about certain stages of a garment's lifecycle, there is often limited awareness or consideration of its entire lifecycle, particularly its conclusion. Addressing this gap requires a more holistic approach to sustainable fashion, one that incorporates all stages of a garment's existence, from creation to disposal, into design and practice.

CHALLENGES AND IMPLICATIONS

Deep wearing begins with a re-engagement with our embodied memories and bodily experiences that are historically ignored and erased. Despite our geographical differences, it is evident that we are all living and working within an anthropocentric system. This system often obscures latent, decolonial ways of being and thinking embedded in our bodies, minds, and histories. It prioritizes the human perspective in our relationship with clothing, perpetuating cycles that are difficult to disrupt and challenge. Breaking free from these Western-centric ideologies and belief systems requires a holistic approach that reconsiders our connection to fashion and the broader world. We have been conditioned to view “fashion practice” narrowly, as something that exists solely at the point of purchase and within the framework of consumption. Moving away from this thinking, doing and being takes time. As Jennifer Craik observes, “Sustainability solutions for the fashion system cannot be implemented by all players, at all times, or in the same way, but must highlight local specificity alongside universal implications” (Craik & Peirson-Smith, p. 942), we cannot expect the same uptake, or understanding from all.

The strength of this approach lies in the difficulties it presents, — unlike universal, monocultural strategies, decolonial methods cannot be measured or “implemented” in a standardized way. They do not rely on external validation but instead originate from within, rooted deeply in our intrinsic understanding and felt sense—what resonates in our gut. As Robin Kimmerer (2013) observes, some questions extend beyond the reach of science, requiring us to embrace deeper and broader ways of understanding the interconnectedness of humans and nonhumans. As decolonial scholar Linda Tuhiwai Smith observes, work by Indigenous peoples is often deemed “legitimate” or “real” only if it aligns with Western frameworks and holds value for the dominant non-Indige-

nous culture. Similarly, the practices explored in this project may not resonate with or appeal to the dominant fashion system, as they challenge conventional understandings of what fashion is and can be.

Recording feelings and experiential sensations is inherently challenging. The written word often fails to capture true meaning, particularly across languages, as language itself is an imperfect tool. The act of naming—rooted in Western taxonomies—implies that something does not exist until it is labelled (Hamilton Pearson, 1992, p. 33). At any moment, billions of data points are available to us, yet we can process and record only a fraction of them. This creates a narrow perspective, like glimpsing through a keyhole, where we assemble interpretations and overlay them with our own narratives. Deep wearing, as an embodied practice, becomes a form of art—an unknowable, flowing undercurrent that resists full capture. The constraints of paper and language cannot encompass its vastness, leaving much of its essence beyond the reach of documentation.

CONCLUSION

Wearing isn't neutral, it's a relationship - between humans and non-humans. According to Robin Kimmerer, dressing is a "phenomenon that is simultaneously material and spiritual" (2013, p. 46), emphasizing the dual nature of clothing as both a tangible and deeply meaningful practice. Wearing, like many physical activities, can often be done on autopilot, but it can also be approached with intention. While sleep wear-wearing reflects a passive, unconscious relationship with clothing, deep-wearing offers a revelatory experience where new meanings and connections come into focus. It fosters awareness and acceptance of the present moment, shifting attention away from the constant desire for more or new, and rooting us in the here and now.

In this context, deep wearing is not simply an external act, a transformative gesture for the wearer, or a statement of intent. Instead, it is a profoundly relational practice—an integration of mind, body, and spirit that goes beyond function or aesthetics. It becomes a process of weaving connection, uncovering something abundant and meaningful beyond the garment's immediate purpose.

Every small action matters. Each individual approaches sustainability from a unique entry

point, shaped by different motivations and ideals for change. A diversity of approaches, from the smallest gestures to systemic changes, is essential—each plays a vital role. Slowing down to attune to natural rhythms and temporalities is both transformative and impactful, reshaping how we exist in the world and how we view cared-for garments and deep relationships with clothing.

This small but potentially powerful practice invites us to rethink our connections and embrace more meaningful ways of being with the materials we wear. Sometimes, the smallest seed can grow into the largest tree; even the most mundane insight can open doors to new dimensions. Even if this seed is just a fleeting perception, it is enough to spark transformation. When the mind quiets and sensitivity and receptivity are attuned, a new clarity emerges. In this state of openness, when we pose a question to the universe, we become truly ready to receive an answer.

CAPTIONS

[Fig. 01] Whitty, 2025, *More Than Green: Weaving Culture and Spirit into the Fabric of Sustainability*.

[Fig. 02] Whitty, 2025, *Threads of Power: Coloniality in Fashion and the Separation of Nature, Body, and Mind*.

[Fig. 03] Whitty, 2025, *Clothing as Second Skin: A Tangible Interface with Nature and Self*.

[Fig. 04] Whitty, 2025, *Unravelling Threads: Coloniality, Language, Perception, and Relational Awareness in Fashion*.

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APPENDIX 1

DEEP WEARING PROMPTS

Morning:

1. Begin your day by giving thanks to your clothes. Reflect on their presence and purpose in your life.
2. Consider the lifecycle of your garment, from its origins (soil) to its eventual return to the earth (soil-to-soil).

Afternoon:

3. Engage in activities that connect you with your clothing. Observe how the sun interacts with your garments—does it warm, lighten, or illuminate them in new ways?
4. Reflect on how your body feels in the garment. Is it supportive, restrictive, or liberating?

Evening:

5. Tune into your body—what messages is it sending you through the sensations of wearing this garment?
6. Practice Relational Harmony (He 和): Can you align your clothed body with the natural rhythms and patterns of the Tao, finding balance and flow in your movements and surroundings?
7. Explore Chi/Qi (气) – Vital Energy: Reflect on whether your clothing supports the harmonious flow of energy through your body, fostering a sense of balance and vitality

Reflection:

8. How did you maintain the harmonious flow of Chi through your clothed body?

EDUCATION

RECOMPOSE

AN INVITATION TO EXPLORE THE PEDAGOGICAL ENVIRONMENT AS A REGENERATIVE FRONT-LINE

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Abstract

Fashion education programmes continue to proliferate in parallel with a dramatically changing climate and heavily degraded ecologies. The dominant linear fashion imaginary is incompatible with Earth's cyclical systems. Fashion education programmes therefore should work critically to engage with these crises, introducing a new repository of socio-ecological thinking and practices. Ecological economist E.F Schumacher reminds us that in contexts like these, if we are to have yet more education, then it is going to have to be an education of a very different kind. This paper challenges fibre-centric discourses, as well as uncritical reflections on continued economic growth in the sector, to which, mainstream circular fashion initiatives align. Authors developed the workshop series Recompose for the MA Fashion programme at the Royal College of Art, where the cohort engaged with bioregionalism, regenerative design, and reflective practices through situated environmental learning. The study presents student reflections on this process and further develops these through interviews with fashion designer Lee Roach and practitioners in regenerative fibre and food systems. The paper cautions against practices that are fibre-lucid at the expense of becoming system-blind and invites the fashion education community to adopt regenerative pedagogies tailored to their local contexts, fostering diverse practices that challenge globalised fashion systems and support bioregional fibre production.

Keywords: *Regenerative fashion, Fashion pedagogies, Hemp, Localised production systems, Cultural industrial narratives*

VALUES IN FASHION PEDAGOGY IN THE CONTEXT OF A DESTRUCTIVE FASHION PARADIGM

THE CRISIS AT FASHION'S CORE: ENVIRONMENTAL AND SOCIAL IMPERATIVES AND THE INCOHERENCE OF GROWTH MINDSETS IN CIRCULAR SYSTEMS

What is the responsibility inherent in working with students who are undertaking design studies in Fashion? The fashion industry's rapid acceleration has positioned the industry at a critical juncture, where its environmental and social impacts are becoming untenable (Fletcher, 2019). Despite an acute awareness of these challenges the industry

is currently not on track to meet several critical international climate, social and biodiversity goals like the 2030 Sustainable Development Goals (SDGs), the 2015 Paris Agreement and the 2030 Kunming-Montreal Global Biodiversity Framework (GBF) (Vijayarasa & Liu, 2022). Within the context on an industry seemingly incapable of taking the necessary action to transition, away from carbon dependency, exploitation of human capital and the degradation of environmental resources, we argue it is critical for fashion educators to reapproach the educational context, to imagine alternative modes of teaching that account for and engage with this complexity.

In response to these systemic challenges, circular economy models—which consider repair, reuse, recycling, and renting—have been championed across the fashion sector (James, 2021; British Fashion Council, 2021) and these ideas are well established in fashion curricula (Seixas et al., 2021; Sehnem et al., 2023). However, the focus on fibres and materials as sustainability panaceas in these practices we argue overlooks deeper systemic issues. Fibre in fashion is part of a larger, deeply flawed system. While circular approaches such as recycling are crucial (Ellen MacArthur Foundation, 2022), they often fall short in addressing the complexities of fashion's globalised production system. Mainstream circular economy thinking aligns circularity with economic growth. However, this commitment to growth has been problematised where, efforts to decouple economic expansion from environmental and social damage are elusive and fundamentally at odds with a finite planetary ecology (Hickel & Kallis, 2020; Daly, 1996; Kallis, 2009; Daly, 2019). For example, in fashion, contemporary recycling methods frequently result in higher emissions, and less than 1% of garments made from mixed fibres are recycled into new clothing (Levänen et al., 2021; Pucker, 2022; Textile Exchange, 2021).

The inadequacies of global centric and growth minded circular economy models become apparent when we consider planetary system limits. Circular approaches, while important, do not fully question the larger system of production or the economic acceleration that sustains it. Here, we can evoke Walter Benjamin's critique of power structures, where superficial changes fail to challenge the deeper systemic forces at play. In the case of fashion, merely swapping synthetic fibres for natural ones leaves intact the broader dynamics of overproduction and consumption that perpetuate environmental harm (Benjamin, 1935). Changing the fibre alone does not challenge the underlying mechanisms that maintain the status quo.

Recent efforts to incorporate more holistic approaches, such as doughnut economic principles (Raworth, 2017), reflect a move toward rethinking the industry's future. Cities like Amsterdam have begun integrating these principles into regional circular fashion strategies, aiming to significantly reduce material use and fostering more localised production initiatives (United Nations Economic Commission for Europe, 2024; Doughnut Economics Action Lab, 2020). However, even these

efforts are hindered by the deeper systemic barriers posed by economic growth paradigms. This paper problematises the notion that fibre, as a sustainability solution, can resolve the deeper issues at play. While the transition to natural or regenerative fibres is crucial, it cannot succeed without rethinking the entire system—how we produce, consume, and ultimately, how we imagine the role of fashion in a world in crisis. Given the inconsistencies, contradictions and impossibilities of an incumbent fashion system that fails to regulate itself and with a complete awareness of its destructive impacts: How could fashion be shaped differently? Critical to this is how we then engage with design education in fashion.

MOVING FASHION BEYOND FLIMSY VALUES IN HIGHER EDUCATION

Universities increasingly shape curricula based on projections of uncritical future industrial and economic demands, influenced by a growing reliance on management consultants who prioritise short-term institutional growth (Wieczorek, 2024). Szadkowski (2023) and Shore (2024) critique this trend, noting how the focus on efficiency reduces education to a simplistic input-output model, leaving little room for critical, reflective learning. This marketisation turns education into a consumer product, despite the evident urgency for transformative approaches needed to the face of social and environmental crises.

There is a prevalent idea that fashion education programmes should prepare students for anticipated industrial needs and technological developments (Nguyen & Hahn, 2025), this thinking maintains a modernist idea of linear technological and cultural progress (Ginsberg, 2022) which has derived in a technological lens in circular fashion discourses. The dominant approach to fashion circularity placed technological solutions at the centre, this is aligned with ideas that innovation cycles and new technology solutions will obviate prior methods, tools and processes through 'creative destruction' (Polanyi, 2021). This reliance on technosolutionist and ecomodernist narrative places idealistic faith that 'green' technologies can meaningfully mitigate climate change (Hickel, J., & Kallis, G., 2020).

Irrespective of the mode of production, fashion under a growth oriented economic system will continue to degrade ecologies due to overproduction (Hickel & Kallis, 2020). We argue that as educators we must challenge hegemonies that

present technology as solution and growth as inevitable, to equip students instead with the creative capacities to respond to dynamic and complex change, and to build a fortitude that can counter the temptation towards apathy in the face of escalating crisis (Servant-Miklos, 2024). Fashion education should instead prepare students with critical awareness of contemporary fashion systems and a foresight to recognise that the present model is time limited either by design or environmental collapse.

Current fashion design employment landscape is already precarious, and designers in this space are often so time poor that the capacity to create an original design proposition, reimagine systems and think differently is neutralised by the repetitive and growing collection cycles that expand annually. Fashion students rather than aiming to find a job in current detrimental fashion systems should envision how fashion discipline can equip them to rethink those systems, de-instrumentalising themselves in service of the sector discovering how else to apply their professional capabilities to make significant change.

Tonkinwise (2014) observes that market-driven education often results in an overly liberal approach to ethics and values in design, exposing students to a range of concepts without meaningful engagement. He calls for discipline-specific, ethically grounded pedagogy, warning that without this depth, design education risks irrelevance, overshadowed by capitalist and technocentric agendas. In response, educators have begun integrating curriculum models focused on regenerative values—such as communal regeneration, co-design, and systemic resilience—as countermeasures to environmental and social degradation (Irwin et al., 2015; Cobrero et al., 2023). These initiatives embed systems thinking and ecological awareness, aligning with longstanding sustainability efforts in design pedagogy (Jones et al., 2023).

Fashion education, dominated by urban contexts, frequently separates students from the socio-material contexts being discussed, which Tonkinwise (2014) argues results in learning without depth. This is something that educators have direct influence over, as, in the context of creative education Orr and Shreeve (2018) explore, there are many approaches to the student/educator dynamic, some being more instructive, others less so, but that in the traditional model, the educator

often implicitly embeds values without explicit dialogue or discussion with the students. Regenerative thinking in fashion education requires challenging traditional hierarchies, to consider how knowledge and understanding are co-created through group dynamics, creating the space for fostering self-actualisation and the development of a collective agency rooted in empathy and care (Shotter, 2012., Mountz et al., 2015).

These are values that Meike Cardozo implemented and reflected on through an educational approach that facilitates students in co-creating their educational journeys, emphasising critical reflection, shared responsibility, and the dissolution of traditional hierarchies (Cardozo, 2023). Here, educators become ‘constructive disruptors’ supporting collective discovery over imparting fixed knowledge, yet Cardozo notes the challenge of implementing such approaches within conventional, and ever less flexible academic structures as discussed previously. This transformation depends on reshaping the educator’s role from knowledge provider to a facilitator of student-led learning, encouraging students to reimagine fashion as a socially and ecologically responsible field.

Rissanen (2017) makes the case for a reimagined fashion curriculum that treats design as a catalyst for systemic change. His concept of ‘design for micro-utopias’ envisions an educational manifesto grounded in metadesign, redirec-tive design, and transition design, encouraging students to envision futures beyond conventional industry constraints. Examples of this shift include Lettmann, Hillyard, and White’s (2023) framework at Birmingham City University, which incorporates circular systems thinking and encourages student engagement with local communities. Similarly, Polimoda’s *Textiles from Farm to Fabric to Fashion* course deepens students’ connection to material origins, although it still adheres to traditional production paradigms focused on extraction, processing, and manufacturing (Polimoda, 2024).

REGENERATIVE FASHION ECOSYSTEM: VALUES WITHIN THE PEDAGOGICAL APPROACH AND LEARNING ENVIRONMENT

While the principles of sustainability and circularity are well-discussed in fashion education contexts, a significant gap remains between theoretical concepts and real-world integration of situated fibre systems into fashion design education (Seixas et al.,

2021; Sehnem et al., 2023). Urban-centric fashion education exacerbates the disconnection between students, educators, fibres and their production and distribution within global supply chains. In these environments, we are often insulated from the immediate impacts of the climate crisis where the consequences of exceeding planetary boundaries are experienced indirectly, filtered through reports rather than lived experience (Rockström et al., 2009; Richardson et al., 2023).

Given the challenges of fashion as a global industry and the shortcomings of globalised circular economic models, it must move beyond existing paradigms that maintain structural hegemony to be able to envision a regenerative fashion ecosystem that can embrace and develop a knowledge and application of regenerative approaches. Regenerative design is an approach that seeks to restore, renew, and revitalise natural systems through practices that integrate human activities into the environment in a way that enhances ecological health and resilience (Reed, 2007; Wahl, 2016; Mang & Haggard, 2016). As Wahl (2019) states, “a regenerative human culture is healthy, resilient, and adaptable; it cares for the planet and it cares for life.”

In this context, the notion of a bioregion becomes increasingly significant for fashion education, rather than politically defined boundaries, it focuses on the specific ecology and cultural traits of a specific area. Bioregions are defined by natural elements such as watersheds and account for the interdependence of land, people, and cultures. This approach encourages the use of locally sourced materials, endemic knowledge, and ecologic practices, enhancing the connection between the design, designer and its specific environment. It prioritises context-sensitive solutions over global, universalist methods that in their specificity, are more able to meet the needs and conditions of distinct communities within regional ecologies (McGinnis, 1999; Thayer, 2003). Thus, re-localisation of economies, where skills, capital and technologies are decentralised can be seen as critical in efforts to living appropriately within earth's ecological and human limits, which we are already well outside of on most fronts (Schumacher, 1973; Rockström et al., 2009; Richardson et al., 2023).

Examples of how this situated systemic bioregional approach is being taken to education can be found in the ETH DRRS-Designing

Resilient Regenerative Systems programme lead by Tobias Luthe and Daniel C. Wahl which significantly advance education in a bioregional context but without a specific focus in fashion practice (see Luthe, 2023; Wahl, D. C, 2024). Regenerative Design is being taught at UAL and engages an online community of designers to develop action research projects rooted in their individual and distributed local environments (UAL, 2024). The global conception of fashion should therefore be challenged; we argue that thinking bioregionally, particularly in the context of fashion education can equip future designers to foster ecological resilience, explore alternative economic models, reduce the environmental impact of production & consumption and preserve distinctive cultures.

These educational values, we argue, are vital for advancing regenerative practices in fashion education. However, to challenge the prevalent fibre-replacement narrative in circular systems and address the structural shortcomings of existing frameworks, we believed it was crucial to engage students in practical, reflective activities that re-examine the discipline. The Recompose workshop was designed with these values in mind, aiming to ground regeneration in sites of situated knowledge and foster a deeper understanding of the complex interplay between fibre, place, and production within the fashion system.

ENGAGING WITH LOCALISATION IN THE ‘RECOMPOSE’ WORKSHOP

This paper highlights the challenge of fibre in fashion and the need to think in locally situated ways by integrating concepts of locality, natural fibres, provenance, and regenerative systems into fashion education. We explore this in the context of a workshop held with MA Royal College of Art Fashion students called ‘Recompose’ which was designed to challenge students to rethink the cultural frameworks of fashion and encourage systemic reconstruction from within.

The workshop brought in the fashion designer Lee Roach who has extensive experience in high end fashion, and an independent label to work with the students, this intergenerational aspect allowed for a deeper enquiry into the regenerative education context of fashion and gave students a valuable lived experience perspective of the mechanisms of current fashion systems. Bringing in perspectives from Lee, in systems-based workshops with a younger generation

Day 1	Day 2	Day 3
Regenerative Spread, where students and lecturers brought spreads made from ingredients sourced within 25 miles of London. This activity highlighted the challenges of acting locally in a globalised world, drawing parallels between food systems and fashion supply chains-both struggling to reclaim local production. Grain Discussion with Andrew Gillespie, (Fresh Flour Company founder) who shared his experience in re-establishing local and ancestral grain production in the UK, illustrating the challenges of re-localising grain processing, such as adapting and hacking machinery for processing endemic local grains (landrace) suited to local climates.	Margent Farm, where the students were immersed in a regenerative hemp farm alongside architecture students. The farm provided students with a firsthand look at regenerative farming. The farm's focus on hemp cultivation for soil health demonstrated how regenerative principles can be applied in agriculture.	Pollinator Pathmaker, a gardening project we visited by Daisy Ginsbery designed for the living interests of insects. This visit sparked discussions on the challenges of maintaining regenerative practices in urban spaces where maintenance comes at the expense of cost saving. Microbial Workshop, a hands-on microbial fermentation and discussion session that micronised system-based thinking into jam jars whilst also challenging the students to think about communities and collaboration through fermentation.

Tab. 01



Fig. 02

THE RELEVANCE OF FIBRES AND PLACE-BASED APPROACHES THROUGH STUDENTS' REFLECTIONS

The key themes that emerged through the responses to the post-workshop questions were:

Holistic Approach to Production: The students emphasised the importance of addressing the macro-level issues in garment and material production, discussing the need to consider entire life cycles rather than isolated aspects. A key observation was that discussions on manufacturing within fashion education often prioritise environmental concerns over human welfare and that the protection of the planet tends to resonate more strongly than the protection of people, despite the interconnectedness of these challenges. Further, the need for community collaboration was noted. Participants agreed that regenerative practices are not truly implementable unless processes and knowledge are shared within the community.

Understanding Material Origins: Students stressed the significance of understanding the material origins in fashion. They commented that a deeper comprehension of the cultural and manufacturing processes behind materials would lead to more considerate design decisions. They suggested that fashion education should empower students with the knowledge to question the reasons behind material choices and explore new material and manufacturing opportunities. Additionally, the lack of accessible regenerative alternatives from suppliers was identified as a significant barrier to experimenting with alternative material systems.

Localisation and Small-Scale Production: Students appreciated how the farm visit demonstrated the feasibility of small-scale production, showcasing how a single fibre can be transformed into multiple products and how the workshop also challenged the conventional city-centric learning model. Smaller exercises, such as creating a local spread, were particularly effective in revealing the challenges of living bioregional. The students reflected that optimising available community resources before considering external materials, would be important things to consider in future in their practices and suggested that incorporating more hands-on, research-driven tasks that directly impact them could be beneficial.

Economic Barriers and Support Systems: Students expressed concerns about the economic challenges associated with pursuing regenerative practices, commenting that working regener-

atively often feels contingent on having significant financial privilege. They questioned the feasibility of such practices for individuals without the resources, especially within the context of urban living. This raised broader questions about the deep inconsistency at present with living regeneratively whilst still being interconnected to mainstream systems of human and planetary decline.

STARTING WITH HEMP AND INSIGHTS FROM DESIGNERS ON THE PRODUCTION CHALLENGES IN REGENERATION

During the workshop, questions emerged around the challenges of regeneration and production. In the context of Margent Farm we discussed the issues of hemp processing for clothing which does not have a well established global infrastructure in the way cotton does. Due to the need for specialised machinery and the labour-intensive nature of hemp processing, costs can be higher compared to other natural fibres like cotton or linen. Startups like Seff Fibre are an example of a UK based company developing technologies to *cottonise* hemp fibre so that it can more easily be integrated into fabric production systems (Fashion for Good, 2024), however, the production of these fibres into cloth still depends on the vast distances and dislocation of fashion supply chains. Currently SEFF is based in Bangladesh and partnered with Beximco, one of Asia's largest textile and garment companies (Seff, 2023).

LEE ROACH ON 'SEED TO FASHION' DISCONNECTION, HARRIET FLETCHER-GILHUYS ON PERCEPTIONS OF BRITISH WOOL

To expand on production challenges in regenerative approaches we interviewed fashion industry professionals Lee Roach and Harriet Fletcher-Gilhuys. Both highlighted the systemic obstacles that span various sectors within fashion, from wool to grains.

On fibre, Lee voiced a wish for greater awareness regarding the journey from seed to fibre to finished clothing in fashion. He observed that the systems are often disconnected from the process with limited education focused on the true origin and holistic environmental impact of materials.

Roach reflects on that while as a society we become increasingly focused on what we ingest, we have placed less focus on the materials that cover

our skin — the body's largest organ.

In conversation with Harriet Fletcher-Gilhuys, the challenges of local resource undervaluation were brought to light. Harriet highlighted significant issues with the infrastructure for British wool, noting the lack of machinery capable of refining it to the quality of merino wool. "The only machines capable of spinning British wool fine enough at present are located in Turkey and Romania," she explained, illustrating the disconnect between local resources and the necessary technology to process them effectively. However, these challenges are not purely technical but also cultural. The preference for merino wool, driven by both economic factors and cultural narratives which position merino wool as the regenerative fashion fibre benchmark. For instance, the Kings Foundation, which aims to "support wool growers across the Commonwealth in combating the rise of harmful synthetic fibres. This positions British wool as less desirable. High-end British and Scottish wool Fashion brands, which, despite retaining classic patterns, primarily use merino and cashmere "merino is seen as the most luxurious fibre; it is what the king wears". This perception issue is compounded by the centralisation of British wool processing, where limited options for grading and sorting further restrict the potential for high-quality local wool production (Fig. 04).

ANDREW GILHESPIE AND ALICE ROBINSON RE-MAKING LOCAL PRODUCTION CULTURES

Harriet's insights revealed parallels with Andrew Gillespie's experience in re-establishing local grain production. His work illustrated the need for appropriate innovation in both technology and practice of a particular scale—hacking and repurposing machines from abroad to serve local needs to re-equip local economies and make capacity produce locally. Both highlighted the difficulties in adapting and innovating within centralised industries that have been designed for large-scale, commercialised production. Harriet's concerns about British wool, like Andrew's with grain, underscore the need for reawakening local production capacities, emphasising the importance of re-engaging with the tools and practices necessary for sustainable, place-based approaches.

Alice Robinson, an MA Fashion RCA graduate, provides a practical example of addressing these challenges from the ground up. Faced with the difficulties of finding traceable British

leather, she focused on building a local leather supply chain. Through her work, she concluded that the only way to operate in a more regenerative manner was to rebuild her supply chain from the ground up. In her case, this involved addressing issues with tanneries. Most British tanneries use chromium and only accept large orders, making it challenging for small designers like Alice to pursue more ecologically responsible production on a smaller scale. Her approach to establishing her own production supply chain highlights the necessity of starting from the bottom, the soil to machinery as is reflected in the case with Andrew, connecting the dots from soil and land to the final product, and establishing networks and production methods that currently do not exist (especially not for smaller scales).

DISCUSSION

Fibres and materials are intertwined with culture, mutually constitutive of society, ecology, and economy. In regenerative design, this understanding should be central, acknowledging the interconnections and ecological care required in the design and making process. Regeneration is often seen thematically, rather than a practice deeply connected to earths and our vitality. The nature-culturing concept (Haraway, 2003; Puig de la Bellacasa, 2017) highlights the inseparable connection between nature and culture, emphasising their co-evolution. This perspective challenges the nature-culture bifurcation and calls for ethical responsibility and care for the nonhuman world, integrating environmental considerations into human practices (Puig de la Bellacasa, 2017). Student reflections in this study revealed a dualistic notion of nature (planet) and human (welfare) as elements in competition for attention. As we become more conscious here, regeneration compels us to question our understanding as *nature-cultures* and interrogate and contest the axiom of human separateness in educational settings, where situating the human subject differently could reveal other mechanisms for change.

It is important also to consider that material and fibre are active agencies (Ingold, 2013; Braidotti, 2016), beyond western new materialist theory. We can also connect to valuable indigenous perspectives on material animism, which highlight that materials and objects possess life, intrinsic agency and interconnectedness, integral to cultural stories and practices (Descola, 2013).



Fig. 03

As facilitators, recognising the shortcomings in fashion education in the lack of localised, environmentally situated learning, we found that grounding the discussion in the tangible realities of food and grain allowed us to start bridging the conceptual gap between systems in food and fashion. Students were keenly aware of the idealism inherent in discussions of regenerative systems and questioned how these could be realistically integrated into the existing economic and commercial framework of fashion. These discussions are crucial if we are to move beyond oversimplified, system blind thinking in fashion education that overemphasises fibre alternatives as a sustainability panacea.

We argue that narrowly focusing on fibres and materials is insufficient. While cultural storytelling around materials enhances their emotional value and perceived importance (Petreca et al., 2022), this must move beyond stories of materials and fibres in the narrow sense towards a storytelling about fashion systems. A narrow fibre focus overlooks the depth of enquiry into production methods, material combinations, global supply chains, overproduction, product afterlife, and the business models that shape economies

around fibre. This can be likened to a hermeneutic cycle: understanding the whole requires comprehension of the parts, and understanding the parts requires a grasp of the whole, revealing itself through deep engagement.

The material itself is only part of the puzzle; addressing broader systemic issues is essential for meaningful, lasting change, lest we become fibre-lucid at the expense of being system-blind. This represents a shift from the globalised, urban-centric model of fashion education toward a future where designers are more attuned to the ecological, social, and economic realities of their craft as understood in the context of bioregional theory (McGinnis, 1999; Thayer, 2003). While students recognised the importance of bioregional localisation, they also highlighted significant barriers, including economic constraints and the lack of accessibility to regenerative practices.

As the workshop progressed, discussions naturally converged on the challenges of production, particularly the need to re-equip and rethink production at a local scale. The additional insights from various sectors within fashion—wool, fibre, grain, and leather—illustrated by the experiences of Roach, Fletcher-Gilhuys, Gillespie,

Robinson, revealed common challenges in the regenerative process. These barriers, spanning technical, cultural, and economic dimensions, underscore the systemic issues that must be addressed for truly regenerative practices to flourish.

The workshop also brought in a fashion designer with deep experience in high end fashion, and an independent label (two of the classic ambitions of student designers) to work with the students, this intergenerational aspect allowed for a deeper enquiry into the regenerative education context of fashion and gave students a valuable lived experience perspective (rather than academic literature) of the mechanisms of fashion systems, offering a more grounded and reflective perspective. This approach allowed students to learn important lessons in avoiding similar mistakes, and critically engage with real-world contexts through authentic interactions.

In the UK, endemic fibre and material production at the local scale has been so hollowed out that there is a need to redevelop capacities; this mirrors challenges in the food sector. The fashion policy space is preoccupied with growing the retail sector whilst imagining that decarbonisation goals can be met with increasing production and international trade (British Fashion Council, 2024). While Fashion Roundtable (2025) plays a key role in convening stakeholders and policymakers to envision the future of fashion, these discussions largely focus on textile waste and the externalities of production, such as Extended Producer Responsibility (ERP). However, there remains a significant gap in policy engagement with the deeper systemic issues—the links between economic growth, ecological and social collapse, and the urgent need for a regenerative agenda.

Cases like British Pasture Leather, The Fresh Flour Company and what is happening with British wool demonstrate the ways that policy could go deeper, to support networks between material producers and processors domestically, whilst centering more regenerative and locally distinct practices. Fashion education can then build upon this to cultivate designers who can work intelligently, with an understanding of local systems and a transparency that evades most global material systems. Looking ahead, it is essential for fashion designers to engage with the expanding field of design for policymaking.

AN INVITATION TO SPREAD AND DIVERSIFY APPROACHES

What happens when regenerative / more ecological materials encounter unsustainable, non-regenerative systems? How does a direct engagement with an environment inform an understanding of the systemic conditions of fashion creation? Recompose demonstrated the need to engage in regeneration in the educational context beyond fibre discussion and connect this with fashion systems through engaging with locality and systems at different scales. Natural fibres should not be viewed merely as signals but should be appreciated within the broader ecological social and industrial context surrounding them.

The Recompose workshop was a valuable experiment in recontextualising regeneration for fashion education. What emerged was a reframing of the social environment of learning in a regenerative pedagogical context that also considered how we as educators and students could be regenerative, socially with each other. As much as we need to re-approach production and processing technology we need to think about the value of diversity, cultural narratives and the economic systems which could re-shape local and distributed production.

These insights point to the necessity of a more robust support system and a deeper engagement with systemic bioregional factors outside of fibres/manufacturing processes within fashion education to enable students to navigate these challenges effectively. This needs to come hand in hand with a cultural will, especially in fashion education contexts to engage with bioregional systems approaches.

Authors reflect on the conditions needed to field experiments in regenerative pedagogy within fashion education contexts. In our case we brought in practitioners from outside fashion, in food systems, to develop parallels between the two spaces, we engaged with regenerative agriculture through material systems in hemp and made use of locally accessible sites to explore questions in design and ecology, further, we considered deeply how the learning environment would be facilitated, opting for less instructive learning and focussing on the emergent discussions that occurred through a direct engagement with the various activities we facilitated. Approaches such as these are counter to the productivity, efficiency and growth driven imperatives of the contemporary tertiary education sector, where education is transformed

into a packageable output that belies the need for situated learning and collective reflection practices (Wieczorek, 2024, Szadkowski 2023, Shore 2024).

Alongside the perceived legitimacy of the unitary tertiary education sector, decentralised and more collaborative models for education are emerging and should be actively encouraged. One such example is Schumacher Wild, conceived as a regenerative, bioregionally focused learning organisation (Schumacher Wild, 2025). It reimagines its predecessor, Schumacher College, which was shut down—ostensibly due to being ‘perennially loss making’—by the educational charity that managed it. This closure highlights the limitations of the financialised and growth-oriented education sector, rather than the resilience of formats like these.

Whereas Schumacher Wild roots itself in the River Dart bioregion, other organisations like The University of the Underground take a more nomadic and situational approach. Operating across shifting global contexts, it assembles international cohorts in different localities each year, forming what could be seen as a ‘rhizomatic urgency’ that responds to pressing socio-ecological and political conditions, with learning formats dynamically tailored to each research setting (University of the Underground, 2025).

We encourage educators to develop context-specific relationships within their own localities, integrating regenerative practices beyond fashion and utilising locally accessible resources. Rather than replicating the exact methods of Recompose, we advocate for a ‘seeding’ approach—adapting the principles of regenerative pedagogy experimentally to local specificities. This flexibility allows for diverse, context-sensitive experiments to flourish, deepening knowledge and fostering innovation in regenerative fashion education.

We therefore invite educators to critically examine their own systems, experiment with new methodologies, engage with local practices, and foster a diversity of regenerative approaches within their fashion education contexts. Only by doing so can we cultivate a richer, more nuanced understanding of the complex systemic challenges and opportunities for transition that lie ahead.

CAPTIONS

[Fig. 01] Notes on Andrew Gilhespie’s landrace grain introduction; credits: Louis Alderson-Bythell (author).

[Fig. 02] Recompose visit to Margent Farm (regenerative hemp); Credits: authors own.

[Fig. 03] Haworth Scouring - The UK’s only significantly scaled wool fibre scouring facility; Credits: authors own.

[Tab. 01] ‘Recompose’: bioregional localisation activities.

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SUSTAINABLE DESIGN FOR HEALTHY COMMUNITIES

FASHION ACTIVISM FOR PROSPERITY THROUGH SERVICE LEARNING

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Abstract

Empowering students with knowledge of sustainable development can inspire them to become fashion activists. This case study, Sustainable Design for Healthy Communities, demonstrates how service learning deepens students' understanding of sustainability through real-world application. Design students engaged with concepts such as material selection, circular and zero-waste design, and lifecycle thinking, while also incorporating user experience strategies. Through rapid ethnography, students identified local community needs, built personas, and created journey maps to develop impactful, community-centered design solutions. This process shifted their perspective from fashion designers to fashion activists committed to community well-being. In collaboration with instructors and community partners, students produced a sustainable product collection, a web-based marketing campaign, and a series of educational craft workshops. These workshops empowered them to lead initiatives promoting sustainable lifestyle changes. The project illustrates how a systems-thinking approach can transform fashion education and activate students to use design as a tool for social change and environmental impact.

Keywords: *Sustainability, Fashion, Activism, Service-Learning, Eco-Local*

INTRODUCTION

The 1987 report *Our Common Future* highlighted the need for sustainable development: “development that meets the needs of the present without compromising future generations.” (Brundtland, 1987) This challenge is particularly pronounced in the fashion industry, where “sustainable” and “fashion” often conflict (Aakko & Koskennurmi-Sivonen, 2013). The fashion industry is notorious for promoting planned obsolescence, driving consumers to seek new products each season (Anian et al., 2020; Grose, 2019)

As the second-largest contributor to the global economy, the fashion industry (The World Bank Group, 2019; UN Environment Programme, 2024) faces significant issues like climate change,

waste, and social inequity, exacerbated by a “rush to the bottom” (Chang, Nasir, & Min, 2023) that compromises safety standards and exploits vulnerable workers (Grose, 2019; United Nations Department of Economic and Social Affairs, 2024). Fashion products are often designed for quick disposal, failing to meet consumer's needs (Hirscher, 2013). This presents challenges and opportunities for sustainable fashion designers, who must create perceived value and foster consumer attachment to counter fleeting trends (Copper, 2000; Hirscher, 2013).

To counter these challenges, Aakko and Koskennurmi-Sivonen (2013) propose several strategies for sustainable fashion design, including circular design models (Blum, 2021; Ellen

MacArthur Foundation, n.d.), functional design (Papanek, 2019), care and repair strategies (de Castro, 2022; Rodabaugh, 2018), and thorough evaluations during processing and production. They also suggest *fashion activism* as an “intentional effort for change in environmental, political, or social situations” (p. 18).

This paper discusses a study that uses a service-learning model to empower emerging fashion designers as community activists and sustainability leaders. Alvarez-Vanegas and Volante (2024) emphasize the transformative potential of service-learning (SL) in enhancing sustainability competencies for a better future. The “Sustainable Design for Healthy Communities” case study demonstrates how interdisciplinary methods in a summer fashion studio course can link to fashion activism. By adopting a system-thinking approach, students can explore how sustainable design fosters healthier, socially responsible communities, showcasing fashion as a platform for activism and positive change.

OVERVIEW OF THE RESEARCH PROJECT

This study explores sustainable development strategies through interdisciplinary pedagogy, engaging fashion design students with insights from various fields at a US institution. In the *Sustainable Design for Healthy Communities* (SDHC) course, students participated in a service-learning project focusing on critical making and public engagement to promote sustainable development. The goal was to encourage students to consider environmental, political, social, and interpretive sustainability to foster a prosperous community.

Faculty researchers used a mixed-method approach to assess student outcomes by analyzing reflections, workshops, surveys, and observations. They identified conflicts between product development, environmental concerns, and community needs, which led to discussions on consumer attitudes and design practices, promoting transformative change in students and the community.

LITERATURE REVIEW

The following section describes this research project's underlying pedagogical frameworks and theoretical underpinnings.

PROJECT-BASED LEARNING AND PROBLEM-BASED LEARNING

Design education focuses on project-based and problem-based learning. In project-based learning, participants analyze problems from multiple perspectives, including environmental and social factors (Wijnia et al., 2024). The SDHC project exemplifies this within a constructivist framework, as learners use their knowledge to address issues, employing abductive reasoning to explore options and deductive reasoning to devise practical solutions (Tejedor et al., 2019).

SERVICE-LEARNING IN DESIGN EDUCATION

Service-learning (SL) engages learners in action-oriented, real-world scenarios, often in local contexts. SL involves tangible community service within the educational curriculum, allowing students to identify and address pain points at the local level. (Alvarez-Vanegas & Volante, 2024) SL often involves two phases for effective deployment, with phase one related to learning. In contrast, the second phase involves some action to bring about a preferable solution or outcome based on a given situation (Blanco-Gutiérrez et al., 2022).

FASHION ACTIVISM

Activist research is project and problem-based research organized in conjunction with the target community, where the participants actively engage in the data collection, interpretations, and analysis, to design some form of transformative action. (Jones, 2018) Fashion activism is similarly structured as a tool for raising awareness, changing behavior, and generating a greater understanding of a topic, often through the experience of engaging in a participatory design process. (Hirscher, 2013) The goal of the SDHC project was to inspire a transition away from traditional forms of consumer behavior and instead focus on responsible citizenship by developing an alternative perspective on the relationship individuals have with the products they own.

CASE STUDY EVALUATION

BACKGROUND OF THE SDHC PROJECT

The SDHC study aimed to help students recognize and change their behaviors related to sustainable development in the fashion industry. Preliminary findings indicated that students needed help to link

apparel and textiles with sustainability. The SDHC research project encouraged reflection on how products, development, and community collaboration can lead to a more sustainable future. This service-learning project explored whether creating sustainable clothing could encourage participants to consider sustainability across different backgrounds and disciplines.

PARTICIPANT PROFILES

Two fashion design educators and three interior design educators participated in this project, all with expertise and a background in sustainable design research. Guest speakers from user-experience design shared their insights, and a fashion design graduate student assisted throughout the course, facilitating data collection and analysis workshops.

The participants in this fashion design project were a diverse group of college-aged students: 2% identified as male, 7% as female, and 1% as non-binary. Their academic levels included 1% sophomores, 6% juniors, and 3% seniors. Demographically, 3% identified as Black or African American, 1% as Hispanic, 3% as Asian, Pacific, or Islander, and 3% as Caucasian.

Student teams were created through self-selection and instructor guidance to boost engagement and leverage technical strengths, linking seniors with undergraduates. This method aimed to build interpersonal relationships and mutual respect. Educators helped students choose roles, fostering ownership in their responsibilities while acting as tutors and observers to support the teams during development.

METHODOLOGY: RESEARCH DESIGN AND PROJECT DELIVERY

The project delivery consisted of multiple phases, beginning with a didactic phase focused on building knowledge and preparation. During this first phase, the students engaged with educational materials and discussions to frame sustainable development in the fashion industry.

Educators utilized the Socratic method during classroom discussions to encourage critical reasoning (Whipple, 1996). Students explored related concepts, identified personal applications, and constructed logical arguments supported by facts.

The second phase focused on applying knowledge to develop solutions through action

research, emphasizing participants' actions (Howard et al., 2023). Students and educators engaged in an iterative process with feedback cycles for ongoing reassessment. This method, grounded in problem-based learning and Piaget's constructivist theory (1954), included peer feedback across modules. The final phase encouraged participants to evaluate their progress and foster transformational learning by applying knowledge to higher-order thinking.

COURSE MODULES

The course outline was carefully planned to avoid predetermined student outcomes based on grounded theory. It utilized three sequential modules—Explore, Create, and Disseminate—to facilitate transformational learning, with the faculty instructor curating the flow of information. Table 01 outlines the module flow and related activities for the course.

MODULE ONE: EXPLORE (PROBLEM IDENTIFICATION)

The "Explore" module introduced design strategies and research methods from experience design, prompting students to view the project as a community intervention. Once the student groups were formed and the project topic of sustainability was established, key touch points were created to enable students to engage with essential educational materials while aiming to learn through project development and share that knowledge publicly.

The course started with a survey to assess students' understanding of the topic and featured a guest speaker who was a subject matter expert in user experience and design advocacy. The speaker engaged students in discussing case studies, focusing on ethical community connections and participatory design for equitable outcomes.

As the course evolved, the facilitator encouraged students to think beyond traditional product solutions based on the new training methods they were learning. They trained in rapid ethnographic studies and data evaluation based on grounded theory, using the campus as their context. Initial exercises focused on participant vs. observer dynamics, data review techniques, and thematic classification. On the second day, students explored community locations to identify and define personas based on earlier discussions.

The students identified various personas from their community-based field study, which

Table of Module Flow of SDHC Course Activities.

Theme week	Goal	Activity	Specifics
1. Explore	Project Identification	Guest Speaker: Intro to Problem Identification	Guest Speaker UX, Concept Mapping Exercise
	Research Methods	Guest Speaker: Intro to Research Methods	Ethnographic Observation exercise on campus
	Field Work	Data Collection/ Ethnographic Observations	Launch of Pre-Survey, Site Visit to Denton Square
	Research Methods	Data Analysis/Personas & Journey Mapping	Identifying community members and their lived experience
	Case Study & Guest Critic	Guest speaker/Interior Design: Solar Decathlon Project	Present preliminary findings, feedback, and discussion
2. Create	Identify Methods and Materials	In-depth sustainability study	(CA) Life Cycle Case Study Analysis, Circular Design Process
	Identify Methods and Materials	Guest Speaker: Material Selection Expert	Re-assess findings, sort and analyze material options
	Plan Research Design	Guest Speaker: Interior Design	Reconsidering our Relationship to the Built Environment
	Field Work	Data Collection/ Ethnographic Observations	Embedded ethnography in GDAC community workshop
	Plan Research Design	Data Analysis and Discussion	Present preliminary findings and generate discussion
3. Disseminate	Identify formats for dissemination	Team Breakout Session	Launch of Project Website, PSA Campaign, and display items
	Execute formats for dissemination	Team Work Sessions	Design, Develop, and Execute products and com strategy
	Finalize formats for dissemination	Team Work Sessions	Finalize website, marketing materials, and display items
	Presentation and Discussion	Teams present final project to audience of faculty and peers	
	Post-mortem	Data Collection	Post-survey and reflective narratives

Tab. 01

they then narrowed down for manageability. They found commonalities among clients, tourists, and hospitality vendors, prompting them to consider individuals' motivations and underlying needs in the community context. The personas generated from their research demonstrated preferences for healthy lifestyles, linking sustainable choices to health.

Because the students recognized the fashion and textile industries as significant polluters, they used the information as a starting point to connect sustainability to their community. Their desire to provide alternative, more sustainable lifestyle choices led to discussions that broadened their understanding of "sustainable design for healthy communities," moving beyond simply creating another sustainable product collection.

MODULE TWO: CREATE (PROJECT IMPLEMENTATION AND PRODUCTION)

During the "Create" module, the facilitators encouraged the students to develop holistic strategies for their final design solutions. Guest lecturers presented multidisciplinary topics from the design department, introducing students to material specification strategies, lifecycle analysis, and the circular economy (Ellen MacArthur Foundation, 2021). These concepts prompted students to rethink traditional studio practices, encouraging them to use innovative materials and incorporate the three Rs of sustainable design: reuse, renew, and recycle, from a systems-thinking point of view.

Classroom workshops engaged students in discussions about sustainability and life cycle thinking in the fashion and textiles industries. The goal was to help them reach a consensus on their understanding and define the problem. In these workshops, educators acted as facilitators. At the same time, students shared their understandings. They presented their views on adopting a more sustainable design model for the apparel industry, aiming to communicate this effectively to their communities.

In this second module, the guest speakers also presented case studies of inhabitants in symbiotic relationships with the built environment. These interactions with faculty from different disciplines encouraged students to explore alternative approaches to their design problems.

MID-POINT OF PROJECT

At the midpoint of the second module, students presented their findings on their chosen community to a faculty panel, proposing strategies for addressing the SDHC challenge.

Under faculty guidance, they identified two potential community partners. The first was a distant regional community combining urban gardening with outreach for lower-income members, requiring transportation for engagement. The second option they provided identified the nearby Community Arts Center (CAC), which was more accessible and already had a relationship with the university. The CAC supports local designers and artists through workshops and exhibitions.

After selecting the CAC, students contacted its program administrators and attended a weekly open studio for a "meet and greet." This collaborative work session allowed them to engage with community members through various arts and crafts activities. By sharing stories about their experiences, students gained more profound insights into the community's values and needs, which informed their final projects and reflective narratives.

SDHC PROJECT OUTCOMES

Embedding the students within the CAC was transformational. It helped them better understand their audience and inspired multiple design alternatives. The cohort began to form sub-groups based on a shared vision for tackling the SDHC challenge. Two groups chose to pursue a service design solution for the SDHC project. One group proposed a swap event for community members to trade gently used items, preventing waste. The other suggested a mending workshop where community members could bring worn items for repair, supported by students' sewing skills.

Another student group suggested a traditional approach, suggesting products inspired by art from the community center using draping, flat patterns, and garment construction. Their designs would utilize natural dyes, organic materials, and zero-waste techniques.

However, the last group of students proposed a holistic approach to the SDHC problem, integrating ideas from other groups. Their strategy included workshops, a website, and a marketing campaign to engage the community through the arts center, emphasizing education on sustainability and personal choice impact.

They proposed arts-based workshops and exhibitions focused on sustainable techniques, introducing concepts like natural dye, local ecology, and upcycling materials to engage the community. These sessions raise awareness of a garment's lifecycle and encourage mindful clothing choices. An accompanying website would promote events, share resources, and showcase students' design projects.

MODULE 3: DISSEMINATE (PROJECT PRESENTATION)

After finalizing their design strategy, students completed their projects and presentation materials, showcasing their personas, user journey maps, garments, and marketing designs for workshops. They launched a website to archive their project development and shared a grant proposal for future funding. Faculty provided feedback to refine materials before the students presented them to arts center administrators. Figure 01 illustrates the research journey of the SDHC project and the students' outputs.

METHODOLOGY: DATA COLLECTION METHODS

To evaluate the impact of the SDHC project, the faculty research team conducted pre (N=17) and post (N=16) surveys about students' perspectives using questions based on a 5-point Likert-type scale (1 being "Strongly agree" and five being "Strongly disagree"). Independent t-tests were then used to compare means between pre- and post-project surveys. The results of independent t-tests showed that 12 out of 15 items significantly improved after implementing the project (Table 02).

Feedback from the post-course survey and reflection narratives revealed that students shifted from essential operational thinking to a deeper understanding of the topic, allowing them to integrate this knowledge into their lives and future careers. They also recognized the value of actively promoting sustainability practices within their community.

ANALYSIS: ASSESSMENT OF THE SDHC PROJECT

Each development phase included checkpoints for assessment and feedback, promoting self-evaluation and engagement with project objectives. Chandrasekaran and Al-Ameri (2016) emphasized that project assessment effectively evaluates student

learning through reflection diaries and narrative journey mapping. These modes can help visualize team projects and reflect indicators of personal growth, traits that had begun showing up on the students' project e-portfolio websites.

The fashion students documented their project development milestones using formats similar to traditional apparel product life cycles, aligning with industry practices. Peer reviews were encouraged to enhance skills in assessing social and environmental impacts (Hall & Velez-Colby, 2018).

The primary assessment of the efficacy of the SDHC project focused on team process development, aligning with problem-based learning that values theoretical application over physical outcomes (Sandri, 2021). Pre- and post-surveys evaluated students' understanding using questions from (Trippeer et al., 2022), focusing on critical design education attributes.

The students' prototypes were also reviewed through material sciences and ethnographic research lenses. Student reflection diaries and journey maps indicated that students' understanding of sustainability evolved to encompass health and well-being.

FINDINGS

One of the goals set by the educators in this study was transformational learning, which requires a reflection component. Schön (1983) emphasized that reflection is essential for knowledge transformation, enabling learners to deepen their understanding and connect their experiences to broader concepts beyond their immediate context.

Out of fifteen students, about one-third focused on product creation, while two-thirds concentrated on developing community workshops and marketing strategies. All students felt connected to their work and confident in contributing to a more sustainable future. A small group committed to continuing the workshop series with the CAC for two years as an extracurricular activity for the community.

SIGNIFICANCE

Sustainable development in the fashion industry is crucial (de Castro, 2022; Kent, 2024) yet challenging to implement (McKinsey Insights, 2024). Universities need strategies to integrate sustainability into curricula through life cycle assessments and interdisciplinary approaches.

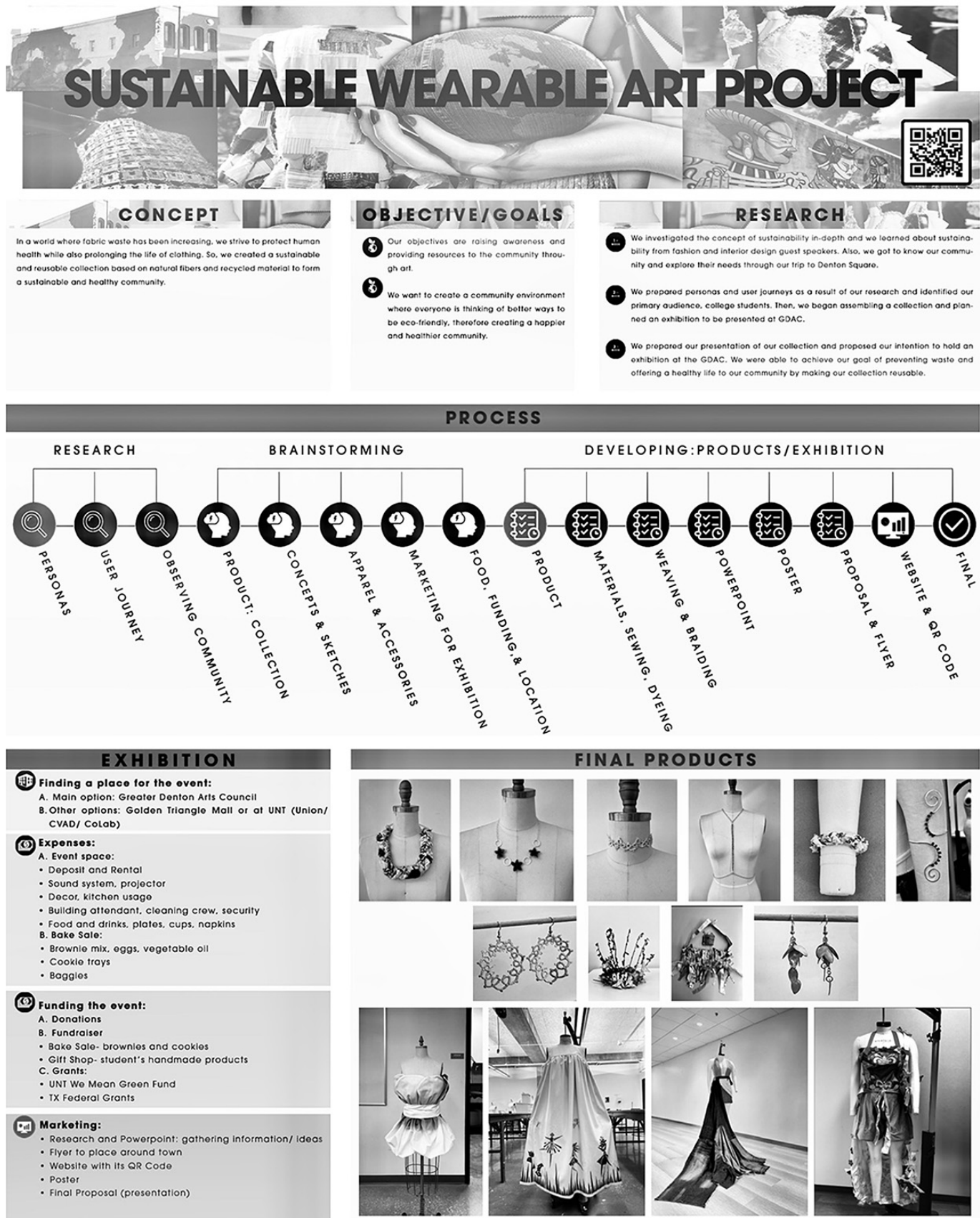


Fig. 01

Results of Independent t-tests.

	Pre (n=17)		Pre (n=16)		I-test
	Mean	SD	Mean	SD	
I understand the roles and functions of various industry sectors in which products are developed, produced, marketed, sold, and consumed, including construction, sourcing, manufacturing, marketing, and merchandising processes.	1.94	.64	1.31	.46	2.80**
I can Identify and interpret the needs and wants of consumers. I understand how industry processes are applied to plan, develop, produce, communicate, and sell profitable product lines.	1.88	.58	1.44	.50	1.96
I can use industry terminology in appropriate ways.	2.18	.86	1.38	.60	2.07*
I can apply research regarding appearance and human behavior to industrv.	1.88	.58	1.25	.43	2.87**
I understand the interrelationships among socio-cultural and psychological factors of fashion and their impact on human ochavior.	2.24	.73	1.56	.50	2.96**
I understand aesthetics and the design process.	1.65	.59	1.19	.39	2.55*
I can use the design process to create products that meet marketplace needs.	1.88	.76	1.31	.48	2.62*
I can relate the elements and principles of design to product development, use, and evaluation.	1.94	.54	1.38	.48	3.11**
I understand how dynamic and diverse political, cultural, and economic systems impact industry processes.	1.88	.76	1.31	.46	3.28**
I can analyze and evaluate issues related to environmental sustainability as they relate to industry activities and processes.	2.12	.76	1.31	.46	2.66*
I can demonstrate critical and creative thinking skills, including the ability to critically evaluate and compare diverse perspectives.	1.71	.67	1.50	.61	.94
I can apply quantitative and qualitative skills to problem-solving within the textile and apparel complex.	2.12	.76	1.44	.61	3.28**
I can communicate ideas in written, oral, and visual forms using appropriate technology.	1.76	.55	1.19	.39	3.45**
I can function as a team member and leader within professional and culturally diverse environments.	1.65	.59	1.38	.48	1.68*

* p<.05; **p<.01

(I= strongly agree, 5=strongly disagree)

Tab. 02

While some students wish to adopt sustainable practices, many need more awareness of the fashion industry's environmental impact. Sandri (2021) stresses the need for a "point of entry for learners to engage with sustainability" (p. 66). Structuring the curriculum around a sustainability project can inspire students and support community outreach efforts.

LIMITATIONS

Some project areas faced challenges in fostering team synergies and implementing the learning agenda despite positive feedback from students and educators. The interdisciplinary project initially aimed to unite interior design and fashion students for a shared experience. However, limited curricular time restricted exposure to both fields, leading to only fashion students participating in the compressed studio course. To address this, interior design and user experience faculty offered their expertise through lectures and workshops.

CONCLUSIONS

Teaching students about the impact of their daily habits on global sustainability can inspire them to become "fashion activists" (Hirscher & Niinimäki, 2013). Alvarez-Vanegas and Volante (2024) highlight the role of service learning in enhancing sustainability competencies, as illustrated by the case study "Sustainable Design for Healthy Communities" (SDHC), which showcases the use of interdisciplinary methods in a summer fashion studio course. This course became a springboard to train students as sustainability leaders within their community as a form of fashion activism.

Nelson and Stolterman (2003) note that sustainability encompasses moral and practical challenges. Achieving it requires a shift in aims and behaviors. Hall and Velez-Colby (2018) stress the importance of behavior change for genuine sustainable living.

Community workshops became a central platform to promote sustainable practices in this project. At the same time, student teams created a website and educational outreach materials designed to shift the public away from traditional consumer thinking and develop a more meaningful relationship with the textiles and apparel products they encounter daily. This new approach connects lifestyle goals with an understanding of consumer choices and demonstrates a new form of fashion

activism, once which inspires a more holistic relationship between persons, products, and nature.

CAPTIONS

[Fig. 01] Figure 01 illustrates the research journey of the SDHC project and the students' outputs.

[Tab. 01] Table of Module Flow of SDHC Course Activities. Table 01 outlines the module flow and related activities for the SDHC course.

[Tab. 02] Table 02 showcases the results of independent t-tests, indicating that 12 out of 15 items significantly improved after implementing the project.

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ON THE EDGE OF THE ABYSS

A STEP BACK TOWARD PROSPERITY FASHION

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Abstract

To approach prosperity fashion holistically, conventional constructs about fashion design processes and the interpersonal relations they lead to should be questioned and reoriented. To set this viewpoint in context, this article begins by reviewing the current state of fashion and its implications for production and consumption (both of which have expanded significantly), triggering a fluidity of identity focused on image and performance. Next, the article assumes an ontological perspective of fashion as art and/or design, examining to what degree each category emphasizes the esthetic, functional and use aspects; each paragraph is followed by our perceptions and appreciation for specific designs and designers, writing in the first-person plural and intentionally indenting these inserts. The third section highlights the significance of processes that emphasize the representation of the phenomenological body; by drawing on our sensory, bodily knowledge, backgrounds, and research practices, we utilize an autoethnographic format to describe our individual explorations in pattern design, both grounded on intuition as a creative force. To conclude, the extracted meaning from the two self-narratives conveys the concept of prosperity fashion as a meaningful and multidimensional (i.e., non-consumerist) understanding of the relationship between body[maker]—process—body[user].

Keywords: *Phenomenological body, Representation of the body, Art and design processes, Pattern design, Autoethnography*

‘I SHOP THEREFORE I AM’¹

“The ornate mahogany door of the wardrobe swung open soundlessly to reveal a row of tightly packed clothes. They were expensive but unexciting. (...) There were well-cut skirts of indeterminate colour, heavy coats tailored to last through a dozen English winters, woollen dresses which could offend no one. Once the wardrobe was closed it was impossible accurately to recall a single garment” (James, 1963/2002, p. 160).

The above quote from P.D. James’s *A Mind to Murder* not only hints at a time when fashion products were designed to last longer than just a few seasons but also the character’s indifference to fashion trends, which contrasts with the innate human drive for novelty.

In fact, from immemorial times, trends keep surfacing, each embodying a specific view on dress and the dressed body, each replacing the previous trend more or less hastily depending on the time in history. Many theories attempted to understand why users are drawn to the ephemeral. The art and dress historian Anne Hollander (1994), for example, upheld that “[t]edium in fashion is much more unbearable than any sort of physical discomfort, [therefore] a certain amount of trouble

¹ Phrase overlaying a found photo by the American conceptual artist Barbara Kruger, 1987.

and effort is a defining element of dress, as it is of all art” (p. 48).

Regardless of its factual cause, the frantic consumption of new trends in the twenty-first century has been dominated by a powerful stimulant, i.e., the wish, a feeling so insincere and childish that has nothing underlying it (Bauman, 2000, p. 76). Concurrently, the emphasis on economic prosperity led to a global and highly globalized industry, allowing consumers – particularly the young – to continually evolve temporary identities (Joy et al., 2012, p. 276).

One of the problems underlying the present framework of overproduction and overconsumption is today’s quest for an authentic self in an age where the fluidity of identity requires individual performance – an age of liquid modernity, a metaphor introduced by philosopher Zygmunt Bauman to refer to the present-day situation “of the radical melting of the fetters and manacles rightly or wrongly suspected of limiting the individual freedom to choose and act” (Bauman, 2000, p. 5).

Following the lines of fashion theorist Anneke Smelik (2011), the loss of distinctive social dimensions of class, gender, age, and etiquette, gave way to the ideology of individualism and the pursuit of authenticity – epitomized in the performance of one’s own distinctive identity through the consumption of fashion products. The paradox, according to Smelik, is that authenticity is nowadays constructed and performed in a ‘society of spectacles’, inevitably becoming an illusion that is no longer true or genuine: “Like the Prada and Louis Vuitton bags on the street markets, it is an ‘authentic fake’” (p. 77).

Today, social media is omnipresent. Aspirational imagery is fed to a large number of users through (apparently amateur) photographs and short videos that cause “a profound impact on the way we behave” (Brown, 2022). Simultaneously, fast-fashion brands employing industrial manufacturing models of ‘just in time’ or ‘real-time fashion’ quickly deliver cheap versions of must-have items arising in the social media context. Think about the micro-trends phenomenon, where specific ways of dressing or items of clothing ascend rapidly to popularity in social media apps, being made available by fast-fashion brands as fast as a few weeks, only to be discarded in a couple of months (Zhou, 2022; Schulz, 2024).

Back in 1987, conceptual artist Barbara Kruger converted the philosopher René Descartes’

1637 principle ‘I think therefore I am’ into the provocative sentence ‘I shop therefore I am’ (adopted as the title of this section) to highlight “that shopping can dull the mind” (Hubbard, 2024). The reality is that, almost four decades later, Kruger’s credo still stands.

WE ARE NOT IMMUNE TO FASHION

It is known that the fashion industry (now more than ever) is a major contributor to world GDP (Lee, 2016), and fashion (now more than ever) feeds on our cravings for authenticity – however illusory (Smelik, 2011). This cause-and-effect relationship determines that the present condition of fashion, epitomized by incessant change based on apparent superficial discourses on the body, perpetuates the notion of fashion as an insincere practice. That’s why philosophy professor Karen Hanson (1990) proposes that this simplistic notion contributes to philosophy’s ongoing antagonism toward “those wrappings of the wrappings of the mind” (p. 109)².

Nonetheless, fashion undeniably holds significant power as an art form. In this capacity, its functional aspect is (primarily) to provide a pleasurable aesthetic experience that stimulates the senses. This condition alone is insufficient for philosophers to classify fashion as a genre within the arts: for fashion to be an art form, its creations must be intellectually challenging, exhibit an individual point of view, and convey complex meanings, among other properties. In fact, before some fashion manifestations, it is implausible to persist in being unresponsive when faced with an intelligently crafted relationship between body and garment. How else would we interpret some garments designed, for example, by Rei Kawakubo?

When we stare at the collection Body Meets Dress – Dress Meets Body by the Japanese fashion label Comme des Garçons for SS 1997, with garments with peculiar stuffed protuberances covered in stretchy gingham, we are compelled to evaluate our preconceptions of body-dress. Simultaneously, we cannot but sense that Kawakubo’s work intended to explore the postural balance of the body when dressed in a garment.³

² Philosophical reflections in the Western tradition, from Plato to Descartes, typically support the dualism of mind and body.

³ The use of the cursive font to write part of the text in this section highlights distinct catalysts that guided the reflection on our own research explorations.

Despite the legitimacy of whimsical or unfunctional dress manifestations, fashion is concerned with creating tangible products for everyday life, ranging from workwear to leisure-wear, from streetwear to formal wear. Thus, its functional aspect is (or should be) primarily focused on the dressed body experience, whatever the situation is. How else would we interpret the garments designed, for example, by Madeleine Vionnet?

When we gaze at the free-flowing quality (reminiscent of Classical Greek dress) imprinted in the French designer's creations from 1920s-1930s, we are mesmerized by the idea that Vionnet pieced squares, circles, quadrants and triangles together to reveal the beauty of the body, i.e., to represent the body as a living, deformable entity, not a rigid, motionless object. In doing so, body and dress become one entity.

In any case, the quest of fashion, and also of all other design disciplines, has always been to “[change] existing situations into preferred ones” (Simon, 1996, p. 111) by improving the esthetic and/or functional, the us(age) and/or – the recently added – sustainable aspects of existing objects or systems, or to engender new, (un)necessary, ones, to satisfy the user. How else would we interpret the emergence and evolution of pants since ancient times?

When we try a pair of engineered jeans on, developed by the Danish designer Rikke Korff in 1999 (under Levi Strauss and Co), our skin, muscles and brain instinctively sense that the vertical seams (of the paired front and back panels that became the prevailing form since the late 18th century) were twisted to follow all body movements and positions.

The pledge of fashion and pattern design to divide the body with orthogonal planes at right angles to each other, each pattern piece and garment part contouring a specific body part – e.g., torso, arms and legs – is grounded in a metaphorical, technical and conceptual representation of the body standing still (Simoes, 2012). Although this long-lasting paradigm is associated with the “promise of success” (Kuhn, 1962/1996, p. 23), the quest for industrial efficiency is at the expense of processual approaches to body-dress in unique, nonconformist ways. How else would we interpret the work, for example, of Geneviève Sevin-Doering?

When we behold the one-piece patterns designed by the French costume designer from

the 1960s to the 2010s, we cannot help but think of Hermann Rorschach's 1921 inkblots: both are beautifully symmetrical and abstract. In a time that seeks to reduce textile waste (remember that Sevin-Doering did not work in the industry or on commercial commissions), the implicit beauty of la coupe en un seul morceau,⁴ with its unorthodox seam placements, reveals the designer's intuitive explorations of the balance of a garment on the body.

Whether fashion is art or design – whether fashion walks the line between art and design – it is easy to get aroused, for example, by a silhouette, a play of proportion, a color (or color combinations), a pattern shape, or a process. The connection between the designers mentioned in this section is that they all surpass(ed) and set us free from predetermined conceptions of beauty.

As a result, we experience the beauty of their creations and processes as “sensitive emotional indicator[s]” (Bohm, 1996/2006, p. 45) of a truth established between body-dress.

Thus, our interest in fashion overtakes a consumerist stance or view: on the one hand, it varies between assuming the roles of the viewer, user and maker,⁵ conscious that we play the triple role using our bodily knowledge as dressed bodies; on the other hand, our backgrounds, one in performing art and the other in fine art, naturally play a part in the way we see fashion at large and pattern design in particular.

TOUCHING AND TOUCHED, SEEING AND SEEN

Inspired by artists and designers who challenged external preconceptions and poured out their true selves in their work, this section focuses on two individual explorations in pattern design that place(d) the phenomenological body – and its representation – at the center. As mentioned before, our backgrounds serve as keys to interpret each perspective on pattern design – and fashion, for that matter –, besides guiding the decisions throughout each process. Despite the differences, both explorations reflect an honest admiration for the (living) body and its representation in pattern design, and they share a nonconformist attitude toward inflexible processes.

The following accounts adopt an autoethnographic format that involves the self-reflec-

⁴ Freely translated into ‘the cut in one piece’.

⁵ The decision to use the noun ‘maker’ has the sole purpose of facilitating the distinction of ourselves (authors) from all other designers mentioned in the text.

tive narrations of the processes by interlacing the makers and user(s) actions of “touching and touched, seeing and seen” (Landes, 2017).

None of them should be seen as unequivocal solutions for shifting the fashion design and fashion production paradigms; rather, they serve as an earnest plea to consider fashion’s true *raison d’être* – “the living, breathing, moving body it adorns” (Entwistle, 2000, p. 9).

THE BODY AND THE MAP

My research interest stems from the awareness that when I create a clothing pattern, I am designing a surface that will come into direct contact with the skin of the wearer or, at the very least, planning an object that serves as a boundary between intimate and external spaces. I have always been fascinated by the tactile sensations induced by wearing a garment and the possibility of connecting with another body through the design of a pattern.

I attribute this motivation to connect with the body of the wearer to my background in dance before transitioning to the study of fashion. After all, dance and fashion practices primarily focus on the human body, exploring multiple ways to represent it.

Because I interpret patterns as representations of a body, created by a body (the maker) and dressed by another body (the wearer), my research evolved into a new analogical approach that dwelled in the interpersonal potential of alternative processes in pattern design.

I was inspired by the performative qualities of the works of choreographer Trisha Brown, particularly *It’s a Draw* (1999-2008), and action artist Yves Klein, *Les Anthropométries* (1958-1960). Both works assumed the body as their generative force, using simple analogical processes for collecting its traces. And what is pattern design if not the articulation of traces of the body, gathered through direct or indirect processes?

The rationale of the process was simple: to allow the body to produce its traces on a two-dimensional surface to generate a functional pattern materialized in a tridimensional prototype.

I asked my friend H to help me with my first experiments. The traces were produced by painting H’s torso and arms with ink and having him leaning against or turning around on paper sheets that were 1) hanging on the wall, 2) or lying flat on a smoother surface, or 3) pressing the paper sheets with my hands directly on H’s body.

At first, I thought of asking more than one person to participate in this process. But as the experiments went by, the difficulty of finding an optimal compromise between the unmediated relation between the tridimensional body and two-dimensional surface – that of the imprints left by H’s body on paper – and the accuracy required to draft a functional pattern – the certainty of having collected all the information of the body and the ability to articulate it –, lead me to the decision of continuing the explorations with just one participant. I understand any argument against this decision: after all, the systemization of pattern drafting emerged from the ambition of transforming intuitive practices into efficient, repetitive procedures – as asserted by costume historian Claudia Kidwell (1979).

However, I interpreted the relationship established between H and me as that of a model with an artist. Experiencing this process with only one person throughout numerous experiment sessions, allowed for an empathetic relationship to develop and to cultivate in both of us a commitment to the exploration process.

It is hard to describe the sensations of frustration and amazement I experienced throughout this process. My inability to efficiently articulate the traces of H’s body, constituted by imprints somewhat vague and diffuse and impossible to match accurately with precise delimitations of his body, was counteracted by their stunning plastic qualities and the authenticity of the vestiges they displayed – the contour of the belly-button or the nipple, body hair flattened in a single or in multiple directions, small protuberances of the skin emphasized. The imprints allowed for the lingering of H’s presence, even when he was long gone from the studio.

Early in the process, I started to outline the imprints of the body on other sheets of paper. I remember thinking that it was probably a waste of time. Later, I realized that these drawings permitted me to take possession of information that was not yet mine. I associated them with maps that chart unknown territory to make it comprehensible and adaptable to foreign intentions. But isn’t that what incites fashion and pattern design practices? To conceptualize multiple representations of the same territory (i.e., the body)?

I eventually had an epiphany about how to operationalize the process – I mapped the limits of contact between H’s body and the sheet of paper



Fig. 01

directly *on his body*, using this information to make the imprints with ink (Fig. 01). The solution was so obvious but so challenging for me to grasp. After all, I needed to put aside pre-established divisions of the body and search instead for how the body naturally related to the flat surface.

MY BODY: ANYBODY: EVERYBODY

All my life I wanted to wear garments that feel comfortable throughout body movement. Not that I was ever a tomboy...

In the 1960s and 70s, my clothes were mostly custom-made; however, I complained about their fit around the joints, and so, every time I had a choice, I wore knits because they adapted more easily to my body while running, biking, or playing hopscotch...

In the 1980s, fashion design became one of my professional activities. Depending on seamstresses to translate my ideas into tangible clothes I despaired about their inability to do so. Not that my designs were ever fussy...

In the early 1990s, I learned pattern design at New York's F.I.T. and there I became enraptured by this practice. Perhaps because of my former training and unending interest in painting, I

realized that patterns are not merely technical drawings, as they are typically viewed; instead, they are representations of the body.

This fact becomes obvious when we see that the history of Western pattern design shows, time and time again, its restless vow to understand the entity without whom it would not exist: if, in ancient times, the representation of the body resulted in garments that were purely two-dimensional and only acquired the shape of the body once dressed, from medieval times on garments do not have to be donned to appear three-dimensional.

Regardless of my emotional responsiveness toward the achievements in the representation of the body by past and present known or unknown pattern designers, I realized that both *nonfigurative* and *figurative* patterns always represent the body as a rigid, unvarying object.

Like architectural elevation drawings, patterns impart the designers persisting decision to position the object of representation at a distance and at right angles to their plane to capture each view in full scale.

By doing that, pattern design stumbled into a paradox... The more I researched and practiced, the more it didn't make sense to deprive the

object of representation of the vital force rooted in movement that characterizes a body as a body. I found it illogical to fail to acknowledge the relationship between the designers' own body and the body before them.

So, in the 2010s, I began exploring ways to represent the deformable, mobile body in two dimensions and chose to address the challenge by creating a set of woven slopers as they are the frame of reference of the body par excellence.

Instantly, I thought of Marcel Duchamp's 1912 painting *Nu Descendant un Escalier* where several images of the same body are linked one after the other to represent the action of walking down a staircase, and Eadweard Muybridge's photographic studies of motion done at the end of the 19th century.

Besides my feelings of admiration for the mentioned works, I intuitively understood that the solution lay in amalgamating all movements that anybody and everybody performs day-to-day. Unlike the conventional method that represents each part of the body to be clothed "on the basis of objective and quantifiable properties" (De Boeck, 2003, p. 103), I devised an approach akin to self-portraiture, in which others and myself played the roles of the portrayer(maker) and portrayed(user) all at once.

Inspired by the performance artists Ana Mendieta's *Siluetas* series (1973-1981) and Esther Ferrer's *Autorretrato en el tiempo* (1981-2014), the process of making the self-portraits involved (1) projecting the body on the inner surface of the nonwoven textile (2) without controlling the degree of deformation acquired – and retained – progressively by the close-fitting one-piece garments (3) for a week of wear.

When I got the finished self-portraits back, I noticed that they resembled sculptures, possessing the residual quality of the bodies' absence being sensed as their presence. In amazement, I observed that they all displayed the same surface deformations: the forward inclination acquired by the torso and the curved/angled shape acquired by both sleeves and trouser legs (Fig. 02).

The evidence was before me: the finished self-portraits reflect(ed) a reality shaped by all the routine movements and body positions performed every day, a reality that discloses the amalgamation of the routine movements and body positions that anybody and everybody living in a similar milieu performs day after day.

At this point, I used photos that captured each self-portrait from four orthogonal views to mark the contour lines and merge them into a composite portrait. This new portrait (reflecting the effect of movement on our outward appearance) was converted into a tangible mannequin (representing the deformable, mobile body) on which I designed the torso, sleeve and pants slopers with a woven textile.

To be fair to myself, through a process of alternating 3D and 2D information, each stage seemed right. However, it was only when others and myself experienced the long-sleeved top and pants (made from the slopers) that my exploration, grounded on intuition, proved to be right.

TAKING A STEP BACK

How can prosperity fashion be imagined? Can fashion's drive to produce novelty for novelty's sake, (un)wittingly responding to the market's compulsion for unjustified consumption, be rerouted?

Returning to Anneke Smelik's (2011) reflection on the ideology of individualism being one of the forces driving the contemporary fashion industry, redemption is nowhere to be found, "Any quest for authenticity, either by fashion designers, or by individual subjects, will always be revoked by the spectacle of fashion, because it is embedded in the liquid modernity in which we live" (p. 82).

Let's not be naïve: the power of images will always be paramount in fashion – as well as in other fields of Western culture. Anne Hollander (1975/1993) emphasizes the obvious significance of idealized images of the human body in Western dress tradition. Social critic and feminist Camille Paglia (1990) reiterates the dominance of the eye (vision) in Western culture – materialized in visually appealing art objects –, linking this hegemony of beautiful images to the development of Western concepts of individualism and personality. Fashion's allure will always be centered on producing ideal images of the body.

The problem, though, does not lie in the production of ideal images per se. Situationist theorist Guy Debord emphasizes in *Society of the Spectacle* (1970) that today's social relations are mediated by images, and tangible experiences are exchanged for abstract representations.

Society, in general, continues to experience the compulsory breaching of the link between images and their real, authentic referents. How



Fig. 02

can this connection be restored? How can the production of idealized images of the human body be reconciled with the material and sensorial qualities imbued in fashion products?

We believe these questions can be answered, at least partially, if fashion would pay (some) attention to the phenomenological body, decentralizing (some of) its focus on the idealized body. By ‘phenomenological body,’ we do not mean just the other body. After all, garments are envisaged, designed, and constructed by bodies. To be aware of this sensitive loop – a dressed body designing dresses for bodies (Nogueira e Simoes, 2019) – should encourage richer reflections about the practice of designing and constructing garments.

In defense of designers, they are trained to think they are problem solvers, which presupposes that they must stand outside a situation to “diagnose what’s ‘wrong,’ and prescribe the ‘right’ therapy” (Dubberly, p. 274). One misconception of this belief, however exciting it sounds, is that designers “respond to problems” (Salituri, 2017) by always starting from past forms to derive new, provisional ones, as architect and design theorist Christopher Alexander implied in 1964 (Michl,

2009, p. 285). Another misconception is that “most issues facing the world (and designers) are not isolated, not static, and not clear; they are ‘systemic,’ connected in networks of cause and effect, ever changing, and defined largely by one’s point of view” (Dubberly, 2022).

Sure, it takes a village to overcome economic prosperity in fashion. Which means that designers also have a responsibility to take a step back.

By accepting the challenge, we deem prosperity fashion as encompassing a threefold pledge that intertwines (1) a profound admiration for the sensorial body – from who and for whom fashion products are designed –; (2) the multitude of possibilities to generate its representation – resulting in one whole image or one that is separated into distinct parts –; and (3) the deep connection designers/makers have with the creative process – which arises from their/our sensory, bodily knowledge and personal reflections.

It is clear that the explorations presented in section 3 assume prosperity in fashion as being based on processes that deal with personal and interpersonal relations and not with solutions for industrial production: (1) by reflecting on our sensory experiences as dressed bodies, we were able to grasp what motivates our exploratory researches, and try to summon these experiences to inform alternative representations of the body; (2) by letting go of pre-determined methods for representing the body in pattern design, we ventured in trying to reveal truthful/other dimensions of the body; (3) by delving in our backgrounds, we engendered alternative processes rooted in our dressed bodies’ intuition.

The self-narrative format aimed at disclosing the subjective and emotional dimensions within our explorations in pattern design. It should be noted that we do not intend to provide a *fit-all* solution for a complex, multifactorial problem – either in pattern design or in fashion as a whole.

Nonetheless, our explorations embody an honest consideration of what it means to represent a body, in and for pattern design, while expressing the commitment between body[maker]—process—body[user].

As makers, we advocate favoring processes instead of products, embracing self-reflection instead of prescribed ways of thinking and making.

To prevent a tendency for quick, do-goodism solutions, one potential path toward prosper-

ity fashion – among other conceivable ones – is to open up “the space for a sincere, poetic, sensible, and subtle form of design to emerge” (Schouwenberg and Kaethler, 2021, p. 19).

The designers we revisited in section 2, whose work was the result of a self-probing and introspective mindset, which enabled them to challenge external preconceptions and to pour out their true selves in their work, corroborate the feasibility of such an approach.

At the risk of sounding pompous, our own explorations in pattern design and the explorations by the revisited fashion and costume designers share an earnest interest in one's work that reflects the aim to find ourselves in the reality in which we live, a willingness to touch and to be touched, to see and to be seen, motivated by “[our] fundamental need to discover and create something new that is whole and total, harmonious and beautiful,” as stated by theoretical physicist David Bohm (1996/2006, p. 3).

CAPTIONS

[Fig. 01] An imprint left by the body on paper + the body and the map.

[Fig. 02] One-piece garment (or the blank canvas) + Self-portrait (or the absent presence). Photos by Francisca Manuel with highlighted seams.

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RELATIONAL COMMUNITIES

WOOL AS A COMPLEX ECONOMIC, ENVIRONMENTAL, SOCIAL, AND CULTURAL SYSTEM

STRENGTHS, LIMITS AND OPPORTUNITIES IN ITALY'S INNER PERIPHERIES

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Abstract

Wool has played a crucial role in the history of mankind for a long time, its versatility bringing together different cultures across the continents. A network of wool production, processing and trade flourished in inland and mountainous areas, fostering strong social, economic and environmental values associated with this raw material. However, the wool industry declined in the 20th century due to globalisation and competition from cheap synthetic fibres, reducing native wool to a by-product. Environmental challenges arose as wool was discarded or abandoned, and critical activities such as fleece washing ceased, exacerbating the crisis. Today, despite structural difficulties, initiatives aim to revive regional wool by creating small, independent systems that defy traditional production models. These projects focus on sustainable, short supply chains and systemic design, renewing the value of native wool through innovative, culturally significant products. This environmental movement involves the mobilisation of local resources and the promotion of sustainable co-existence between people and their environment. Through the analysis of case studies, this research seeks to explore how such initiatives can inspire future policies that promote a sustainable, holistic vision of prosperity, encompassing social, environmental and ethical well-being.

Keywords: *Wool, Rebirth, Prosperity, Sustainability, Social change*

INTRODUCTION

The progressive fragmentation of communities of inhabitants and of certain productive activities, which could be defined as collective entities for the construction, enjoyment and care of the living environment, is a significant factor in the qualitative decline of the territory. Here, the term “*territory*” is used to refer to a unitary and inseparable whole of natural landscapes, artefacts and human settlements. The current weakening of the sense of community – *a negative consequence of global processes of hetero-directional decision-making, information, production and trade* – reinforces practices of de-spatialisation and de-territorialisation that were initiated in the 20th century (Magnaghi, 2020). This is exemplified by the

weakening of proximity activities and conviviality relations, as well as the growing disruption to the circular links of co-evolution between human production and nature, resulting in a global exodus with a twofold impact. On the one hand, there is the depopulation of small towns, particularly in the region known as the “*Italy of the bone*” (Bevilacqua, 2018), which encompasses the Alpine and Apennine ridges, resulting in the subsequent abandonment of these areas, the decline of rural land management and the dissolution of local production networks. On the other hand, the exodus from rural areas to the suburbs of megacities has led to the homogenisation of urban environments and the dissolution of public spaces. In both cases, we observe the emergence

of phenomena of community disaffection and inattention towards the territory in question, which is no longer perceived as a common good and as a terrain open to new convivial, circular and proximity projects, particularly in terms of production.

Focusing on the initial issue, it is of no coincidence that wool processing in Italy's inner areas has also undergone a notable decline. In the past, these regions were home to a multitude of mills specialising in the processing of unwashed wool, which was used for a variety of purposes, including the production of clothing and mattresses. However, the advent of synthetic fibres and the market's preference for finer wools, produced mainly in Australia, New Zealand and China, has resulted in a progressive decline in demand for Italian wool, culminating in the 2008 economic crisis, which actually accentuated the difficulties of local economies (Pagani, 2022). European legislation in 2002 introduced further complications by classifying "greasy" wool as special waste, the disposal of which has become a cost for farmers, who have been forced into irregular disposal practices (European Parliament & Council, 2002).

Currently, sheared wool in Italian mountainous areas has only two routes: disposal, with related costs, or sale to textile subcontractors, now reduced to a few factories, located in the industrial areas of *Biella* and *Prato*, which can only meet the needs of large batches, leaving small producers behind. This context limits the possibilities of transforming local wool into high quality fabrics or other products and makes it difficult to compete with foreign wools, which are often finer than Italian wools, with fibres of medium thickness, around 30 microns.

The difficulties are exacerbated by the distance between processing plants and collection centres in mountainous areas, transport costs and the lack - or *disappearance* - of skilled artisans capable of processing these unique fibres. Washing plants also require significant investment and compliance with environmental regulations for water treatment, a heavy burden for small communities. Maintaining manufacturing facilities in these areas would require a constant supply of wool, which is difficult to guarantee. These factors make it difficult to preserve a tradition that is rooted in the social and economic fabric of the inner Alpine and Apennine areas, where the challenges of the globalised market and regulations

often penalise small local realities that were once fundamental pillars for the care of the territory.

It is clear that this scenario of progressive decline continues to create barriers and complexity for the sector, leading to the closure of historical activities that are fundamental to the short supply chain, such as the washing and processing of hides. This situation has created a significant production vacuum that has further aggravated the crisis, with particularly devastating effects on the inner areas of the country (Gaddi & Mastrolonardo, 2024). An emblematic example is the historic *Lanificio Merlino* in the *Aventino valley* of *Abruzzo*, once a model of quality production. Today, however, this local excellence has ceased its activities, leaving only traces of a precious past in the form of potentially functioning plants and abandoned buildings of high historical and cultural interest (Braccani, 2018).

The network of small Italian wool mills as a whole is therefore facing critical challenges that go beyond the mere decline in production. The loss of this sector of production also means a serious dispersion of artisanal knowledge and techniques, handed down over generations and rooted in specific territories. As mentioned above, landscape management practices closely linked to wool, such as the use of "sheep tracks" for grazing and the maintenance of green spaces, are also affected.

Without the care of the wool industry for the territorial balance, vast pastures and areas traditionally used for transhumance are increasingly abandoned, contributing to environmental degradation. The closure of workshops and wool mills, which were once the mainstay of these rural communities, has led to a crisis of employment which, among other things, has accelerated the phenomenon of depopulation. The disappearance of the micro-activities involved in wool processing not only deprives the territory of an economic resource, but also partly jeopardises the cultural and social fabric that once sustained it.

On the basis of this initial consideration, with regard to the inner areas, it is worth reiterating that in recent decades local development practices have often focused on the mere patrimonialisation of the historical and identity assets of territories. This traditionalist perspective has influenced local administrations, communities and planners, leading them towards initiatives such as ecomuseums, events linked to traditions and thematic routes.

Such interventions have often been limited only to tourist enhancement and musealisation, and thus ended up replicating stereotypical and homologising images, thus “*crystallising*” places into mere instantaneous aesthetic products, neglecting the potential for genuine community and productive regeneration (De Rossi, 2018). This approach, especially with regard to the reality of indigenous wool, has created a separation between the *formal dimension*, oriented towards immediate tourist fruition, and the structural dimension, fundamental for the long-term residential sustainability of the territory.

In this context, characterised by systemic difficulties and a lack of synergy between the various actors in the supply chain, there are attempts, albeit timid, to “*revive*” and valorise certain regional native wools. Today, some realities, located in the inner areas of the country, are then trying to reunite the *formal* and *structural dimensions*, inspired by regenerative models (Leclercq & Smit, 2023), trying to promote the recovery of craft skills and indigenous production networks.

Therefore, in an attempt to overcome the linear model of production and the paradox of patrimonialisation, real counter-stories are emerging, aimed at the regeneration of small, endogenous and independent supply chains, able to capture the entire value of wool, from material to cultural, recognising it as part of a complex system (Marino, 2022).

Through an initial mapping of case studies, united by the desire to adopt a systemic vision and to regenerate, from the bottom, a short and sustainable wool supply chain, the contribution aims to highlight the strengths, challenges and opportunities of these realities (Fig. 01). The case studies focus on small realities distributed along the Alpine arc and the Apennine hinterland, which, through innovation, revitalise autochthonous wool for the production of artefacts and related services. Today, respect for the environment means a commitment to mobilising local resources and promoting community re-identification, capable of undermining established hierarchies of value. It is a matter of designing new sustainable and prosperous metabolisms of social and productive relations, necessary to trace a renewed civilisation that reaffirms the synergy between inhabitants-producers and the quality of their *living worlds* (Manfra & Turrini, 2020).

The case studies were therefore selected through deliberate sampling, with the aim of highlighting innovation in three distinct but closely related areas. Firstly, process innovation, characterised by the introduction of new methods, technologies and practices that improve the efficiency, quality and sustainability of small-scale production. Second, product innovation, which involves the revival and rediscovery of indigenous Italian wools, adapting them to contemporary needs and extending their use beyond traditional clothing. Finally, service innovation, which aims to introduce new types of services aimed at improving the user experience and consolidating long-term loyalty relationships. In this context, innovation also generates a process of care and valorisation of the territory, promoting a closer link between production and the local environment (Fig. 02). The comparative analysis of these cases will provide important insights for rethinking the concept of prosperity, moving away from the economic dimension alone towards a more holistic vision that integrates social, environmental and ethical well-being (Moore et al., 2023).

PROSPERITY AND ECO-SOCIAL RESPONSIBILITY IN SMALL “PERIPHERAL” ITALIAN WOOL MILLS

The *Cooperativa Filo&Fibra* serves as a notable example of initiatives that combine tradition, innovation, and sustainability in a cooperative project based on the principles of the circular economy. Founded by a predominantly female community with the support of the *Comune di San Casciano dei Bagni*, the cooperative was able to realise its projects thanks to funding from the *Regione Toscana*, which facilitated the enhancement of a resource that is both precious and complex: Italian wool. In this context, local wool becomes both an underutilised material with untapped potential and, paradoxically, a waste product that is difficult to dispose of. This is particularly true for the wool from *Central Italy*, characterised by coarse fibres, low commercial value, and unsuitability for traditional textile processing. This challenge prompted *Filo&Fibra* to experiment with new uses and develop alternative products for revitalisation within the market. Among the most emblematic projects is the “*Cassetta di Cottura*”, a product that encapsulates the dialogue between tradition and innovation. Originally used by Italian soldiers

Wool as a resources of **prosperity and identity**



Fig. 01

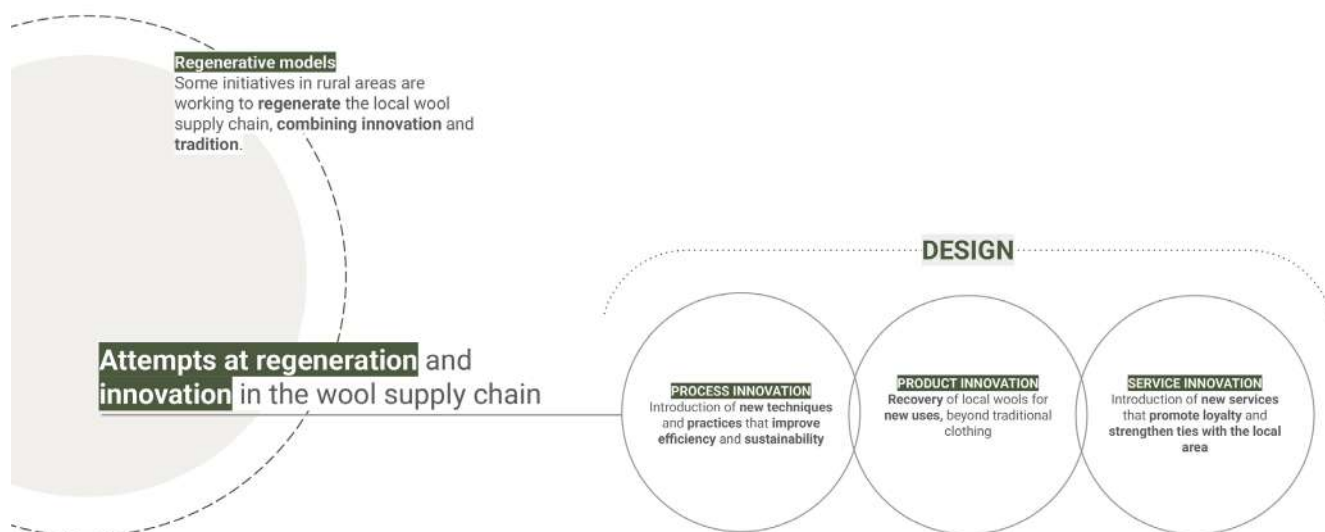


Fig. 02

in harsher times, it consisted of wooden boxes insulated with materials like straw or plant fibre, which were capable of maintaining a temperature of around seventy degrees to provide a hot meal even in cold climates (Cacace, 2022). Through the revival of this ancient low-energy cooking technique, today, the insulating properties of wool are harnessed to create a *slow-cooking tool*, which has also been awarded by the *Slow Food consortium*. The locally sourced wool, usually underused, is transformed in this initial example from waste into an everyday object, combining functionality and sustainability while also reviving an ancient practice tied to a specific region.

Consistently aligned with the principles of circular and distributed economy, and in addition to the focus on product innovation, *Filo&Fibra* also stimulates process innovation (Bompan & Brambilla, 2021), involving a network of small family-run businesses and other local cooperatives that collaborate in the collection and processing of wool. This model contributes to counteracting the depopulation of villages, while also creating job opportunities through a virtuous “*contamination*” of knowledge and skills. The cooperative’s approach is not only economic, but profoundly social and cultural, as it aims to preserve the historical memory of local traditions, recovering ancestral knowledge, and promoting an innovation that stems from the intertwining of people, territory and resources.

Similarly, the *Lamantera* project was born out of a disillusionment of founder *Benedetta Morucci* with the prevailing “*fast fashion*” industrial dynamics. It was in *Abruzzo* that she rediscovered wool as a resource for a renewed sense of community by setting up the *Lamantera* project. The already existing social and solidarity-based economies, short supply chains and deep and authentic human relationships, carried out by the *Cooperativa ASCA* in the *Sagittario valley* (AQ) since 1977, have welcomed *Lamantera* into a territorially sustainable community work model. While *ASCA* is concerned with both preserving the local heritage while avoiding a purely touristic purpose, and organically managing the production of cheese and meat, respecting the ecosystem and virtuous social relations, *Lamantera* is instead concerned with channelling wool waste, supplied by *ASCA* itself, activating artisanal networks dedicated to wool processing, an expression therefore of cultural resistance capable of encompassing almost

all production phases in the territory, except for washing, which is still necessarily carried out in the *Biella* textile district. The project’s ambition is to trigger, in the medium to long term, an indigenous and independent supply chain, from the collection of raw materials to spinning and natural dyeing, obtaining high quality yarns for a diversified range of products, such as handmade garments - *scarves, jumpers and hats* - and innovations that see wool applied to sectors such as padding and bio-building, certainly more consistent with the type of wool, which is medium to coarse (Coltr , 2024). Together with the “*Donne Rurali*” spillover, *Lamantera* participates in the co-design of events to spread knowledge of native wool and the traditional trades related to it, interweaving care of the land with the recovery of local practices for sustainable environmental management, such as maintaining flocks in undergrowth areas to preserve ancient transhumance routes, to safeguard areas from hydrogeological risks and to protect biodiversity. These, which can be counted as service innovations, introduced by *Lamantera*, represent a new economy for inland areas that ensures territorial prosperity capable of strengthening the social fabric and protecting environmental resources.

Sibillana, on the other hand, represents the excellence of the *Marche* region in the sector of *Sopravissana* wool, distinguishing itself for an authentically sustainable approach that enhances animal welfare and strengthens the link with the territory. The family-run company, located in *Montefortino* (FM), stands out in particular for the wool management of *Sopravissana* sheep, an ancient breed with “*Merinos derivation*”, born from the crossbreeding of *Marchigiana Vissana* sheep and French *Merinos Rambouillet* rams, distributed in the Papal farms during the 18th century (Guidetti et al., 2009). What makes *Sibillana* unique is its choice not to “*delocalise*” any phase of the production process, contrary to what, still necessarily, happens in other small realities of the sector, where the wool washing phase is often entrusted to external centres, such as those in *Biella*. Starting with the shearing of the fleece, always carried out with respect for the animal’s wellbeing, avoiding the trauma and suffering typical of intensive production (Pagliarino et al., 2016), *Sibillana* carries out the washing in *Montefortino*, carried out without the use of chemical additives in the company’s laboratory. In this phase, *Sibillana* uses a Marseille soap, chosen for its natural delicacy,

which allows the wool fibre to remain intact, eliminating impurities without altering its quality.

Sibillana's innovation, with regard to the process, also lies in the spinning and dyeing, which are carried out entirely by hand, using traditional methods that recall ancient knowledge, giving the final product an important symbolic and cultural value. As far as dyeing is concerned, *Sibillana* is distinguished by the use of guado and other natural dyeing plants, cultivated directly on site or gathered spontaneously from the surrounding area. These natural dyes, together with other aromatic and dyeing plants from the area, make it possible to obtain a wide range of colours without using chemicals, keeping the ecological footprint of the production process as low as possible. In this way, each stage of wool processing becomes an act of recovery and valorisation of local natural resources, transforming a traditional product into a symbolic element of sustainability, culture and territory. In addition to product quality, *Sibillana* is a model of circular economy, as the by-products of processing are reused for permaculture, demonstrating how each stage of the process is designed to minimise waste and respect the environment. The company also promotes local cultural events that tell the story of wool and the strength of an integrated production chain, showing how tradition, innovation and sustainability can be combined. With its vision, *Sibillana* re-educates the community in the valorisation of local resources, strengthening the link with the territory and proposing a responsible and environmentally friendly production model.

Increasing in scale, in terms of number of employees and quantity of raw material processed, *Lanificio Paoletti*'s design choices, rooted in a centuries-old tradition, have also transformed wool into a resource of prosperity and identity, contributing to enhancing the territory and its traditions. Located in *Follina* (TV), this wool mill with over two centuries of history represents one of the few realities that has been able to withstand the economic difficulties of the 20th century, preserving the precious know-how linked to the processing of wool from the *Alpago* sheep breed. This fibre, initially considered to be of poor quality and destined to be discarded, has been revalued and transformed into precious fabrics, giving life to unique products that tell the story of an entrepreneurship attentive to tradition and innovation. From the very beginning, the company has

maintained a strong link with the local community, supporting it economically and culturally. Significant was the contribution of *Antonio Paoletti*, who in 1865 participated in the foundation of the *Società di Mutuo Soccorso degli Operai* in *Follina*, offering economic and health assistance to workers. During the Second World War, the wool mill continued to support its employees by organising summer camps for their children and protecting workers from the risks of the front. An equally notable commitment was made to vocational training, passing on craft skills through collaborations with training institutes. In the 1980s and 1990s, the wool mill welcomed the first textile designer trained on the handloom, integrating refined technical knowledge that still today guarantees excellence in the production of carded wool yarns and fabrics. The handicraft and production know-how represents, for the company and the territory, a cultural heritage and a symbol of resilience, making wool a raw material and, at the same time, an element of identity. *Lanificio Paoletti* is therefore not only a commercial actor, but also a socially responsible one, capable of interweaving tradition and innovation in a perspective of cultural and territorial regeneration. Its history shows how a sustainable wool industry can promote valuable relationships, revitalising local resources and reaffirming wool as a symbol of shared prosperity, attentive to the territory (Franzo, 2022).

Finally, it is in the south of the Italian peninsula, in equally peripheral contexts, that *Lanificio Leo* represents a historic manufacturing enterprise that has made wool a valuable resource since its foundation in 1873. Located in the Calabrian hinterland, it combines tradition and innovation, ratifying the concept of a “*company museum*” (Grechi et al., 2023). Its cultural richness is expressed through vintage machines that are still in operation, symbols of craftsmanship and the historical processing of wool, from yarn to finished fabric. Today, *Lanificio Leo* maintains two production lines: one dedicated to traditional fabrics and the other, more innovative, which explores contemporary design, both aimed at continuing the tale of the history of the territory and the evolution of local craftsmanship, balanced between memory and modernity (Procopio, 2023). The *Lanificio* has also initiated numerous cultural projects, collaborating with renowned national and international architects and designers, transforming it into a creative centre, animated by events

and initiatives that celebrate wool as a cultural and productive resource. In addition to the valorisation of wool and its social, cultural, artistic and economic role, the company invests in the training of new employees, emphasising the importance of human skills for its continuity. The longevity and success of *Lanificio Leo* shows how prosperity can come from both material resources and the commitment and passion of the people working there, giving wool a cultural and lasting value.

The wool companies considered in this discussion, thus attempt to strike a balance between tradition and innovation - in terms of product, process and service - facing contemporary challenges through the valorisation of local resources and cultural heritage, without however falling into mere patrimonialisation. Located in the country's inland areas, they are now attempting to create short supply chains that transform indigenous wool into an opportunity that is not only economic, but also cultural, and that contributes to territorial rebirth and the broader care of the territory. Product, process and service innovation, developed synergistically by these realities, is also designed to respond to the constantly growing demand for authenticity and traceability. What the

case studies examined have in common is thus the ability to transform a resource often considered marginal, such as wool, into a vector of prosperity for inland areas through economic models oriented towards cooperativism and mutual aid, which not only generate economic value, but also strengthen local social and cultural ties over time. The recovery of such resources, and of the traditional knowledge inherent in them, is thus interwoven into production models oriented towards environmental and social preferability, with a strong commitment to animal welfare and the reduction of environmental impact.

CONCLUSION

In conclusion, the arguments outlined in the contribution reveal how design and innovation, oriented by a systemic vision and inspired by sustainability values, can transform wool from “*special waste*” to a thriving and sustainable resource, resistant to contemporary market pressures and able to respond to regulatory challenges. This approach not only promotes the revitalisation of the Italian wool industry but is also a tool capable of triggering a profound cultural

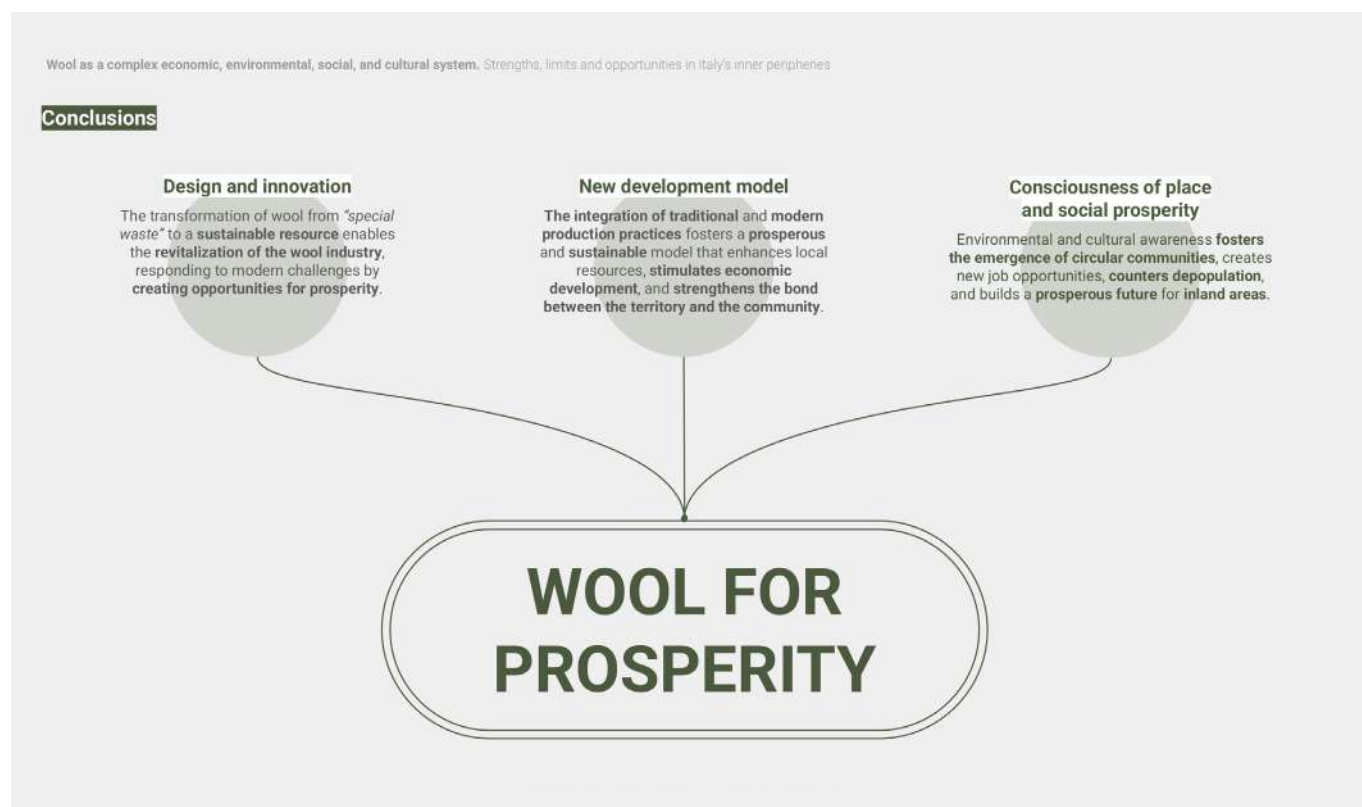


Fig. 03

renewal, strengthening the roots and history of the community and rediscovering the landscape, an essential element of the shared heritage.

The enhancement of the territory and its endogenous resources through new sustainable production practices and a design that knows how to integrate traditional knowledge with contemporary solutions becomes the foundation of a prosperous and lasting development model (Fig. 03). The creation of new synergies between integrated and complex supply chains not only redesigns the economic function of wool, but redefines the territory as a “*common good*”, configuring it as a central node of productive and social relations. Thanks also to design, capable of giving value to indigenous wool, the territory can thus be reactivated and cared for, contributing not only to the protection of the material and immaterial goods that reside there, but also to the recovery and valorisation of endemic practices in harmony with nature, often forgotten or marginalised.

In this framework, the central element becomes “*place consciousness*”, understood as awareness of potential and responsibility towards the environmental and cultural context. This consciousness contributes to countering depopulation, offering new work and settlement prospects that stimulate reverse migration to places that, thanks to the renewed productive and social fabric, become attractive to young people and professionals. This revitalisation also favours the emergence of “*ecological communities*” based on forms of collective participation, in which social capital is intertwined with circular productive practices and proximity relations that enrich conviviality and a sense of belonging.

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CAPTIONS

[Fig. 01] Mapping of the realities identified as virtuous case studies for a “wool for prosperity”; Credits: Giannetti Vittorio, Manfra Marco

[Fig. 02] Main attempts at regeneration and innovation in the wool supply chain from a design perspective; Credits:

Giannetti Vittorio, Manfra Marco

[Fig. 03] Schematisation “wool for prosperity”; Credits:

Giannetti Vittorio, Manfra Marco

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WOOL, “RIFIUTOCREATURA” IN EVOLUTION

VALORIZATION AND REGENERATION OF ITALIAN NATIVE WOOL AND POST- CONSUMER WASTE

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Abstract

This study explores how the transition to sustainable models can restore the value of wool, a traditional material rich in environmental and cultural potential, through innovative strategies of recovery and renewal of production processes. Greasy wool, often considered an unnecessary and costly by-product, is valued when integrated into a sustainable supply chain, stimulating local economic development and creating new opportunities for communities dependent on wool production, particularly those using indigenous sheep breeds. In this context, the concept of “Rifiutocreatura” (WasteCreature) is emerging as a fundamental tool for rethinking textile waste management. No longer a problem to be disposed of, but a potential resource ready to be regenerated in a resilient and conscious production system. This paradigm shift: waste becomes a “creature” waiting for a new life through recycling, eco-design and upcycling processes. The aim of this study is to provide a critical and proactive vision for the valorization of wool, illustrating how the regeneration of this fibre can be a central element in building a sustainable and ethical future textile. This study pretends to concretely demonstrate how such a model can reduce environmental impact but also contribute to a fairer redistribution of resources along the production chain and its territory.

Keywords: *Recycled Wool, Textile Industry, Natural Fibers, Innovative Ecosystems, Material Culture*

SOCIAL AND IDENTITY WOOL

For many millennia, wool has been an indispensable element in human existence, satisfying both material and immaterial essential needs. Among the first textile fibers used by man to protect himself from the elements, it has always represented an essential component in the development and evolution of the human species, contributing to the establishment of collective cultures and identities.

Since the beginning of its use, once shorn, wool was subjected to a consolidation process similar to pre-felting that allowed the sheep's coat to be compacted and used as an object to protect the body, a precursor therefore of what would be, in the future, a fabric and an item of clothing. It goes without saying that this initial process of using

wool, even long before the discovery of spinning, was widespread and guaranteed protection to entire communities in different settlement contexts. Since prehistoric times, allowing entire communities to produce and use protective artefacts, made with the social technologies present in the community, has fostered a common language between the technique and the textile object produced. With the creation of an idea of community and togetherness, we soon began to respond to the social needs of belonging to a cohesive group, sharing a form of integration and belonging where individuals could recognize themselves and give rise to a specific culture, accompanied by a transversal identity, expressed through shared symbols and elements. Wool, a material used mainly to produce clothing

in general, still maintains an inseparable link with the territory where it is born and develops, assuming its characteristics and reflecting them in the properties of the textile fiber produced, both animal and vegetal. The territory as an integral part of the construction of what is produced within it, adapting the characteristics in compliance with its natural, cultural and identity ecosystems, originates its *Genius Loci* spirit, as widely described by the ancient Romans (Lokas et al., 2023). There is no doubt that wool has always been a material with multiple applications and that it has always been an inseparable interface of the relationship between the individual and the social world where he lives and participates (Lipovetsky, 2010). There are many examples of the use of this material which, thanks to its aesthetic and mechanical-elastic characteristics, have allowed the construction of entire communities based on the production of yarns and artefacts created with this raw material, at a national and international level. Some of the best-known communities in Europe are probably found in Great Britain and with greater focus in Scotland, where local wools are abundant and have, for a long time, shaped entire territories and communities. We can include among them Shetland wool which is produced in large quantities on the islands of the same name, or Harris Tweed fabrics which are produced on the island of Lewis and Harris and which, even today, are approved as “genuine” only if all the stages of fabric production are carried out within the same island (Wilson et al., 2021). Even in Italy, as in other countries, there are specific cases of communities developed around a wool reality with a cultural and strongly territorial imprint. There are wool production districts in the Italian national territory, which with more or less territorial coverage, and specific characteristics dictated by the product or material give a high technological and productive response. Some of the most important in the wool sector is undoubtedly the Biella district, for very fine wools (Rosso, 2021) and Prato district, born from the need to regenerate the wool present on the national territory and, today the forefather of carded wool materials (Bellini & Leonardi, 2020). The Italian north-west, rich in processing wool textile and manufacturing high quality industry, is still a textile district where traditionally resided internationally known industries of the weight of Lanerossi and Marzotto.

AN EVOLVING PATH

Wool is one of the oldest natural fibers used by humans (Rast-Eicher & Jørgensen, 2013), a material that has gone through centuries of history and innovation and that today faces critical challenges related to its valorization and sustainable management (Barlucchi et al., 2022). On the one hand, native wool, once the cornerstone of the textile economy, is now subject to increasing economic devaluation due to competition from synthetic fibers, but also due to the lack of adequate infrastructure for its recovery (Doyle et al., 2021). On the other hand, post-consumer [but also pre-consumer] textile waste constitutes an environmental emergency and an unexplored opportunity for the circular economy, where waste can be transformed into a resource through regeneration processes (Binotto & Payne, 2017).

The current crisis of native wool and the problem of managing wool textile waste are two sides of the same coin: both reflect a production system that struggles to recognize the value of available resources and to be able to re-integrate them into virtuous cycles of production and consumption (Fletcher & Tham, 2019). The marginalization of greasy wool and the dispersion of textile waste derive from an economic vision that is still too linear, which contrasts with the urgency of more sustainable and circular models (Barlucchi et al., 2022). This research work intends to analyze the wool ecosystem in its double face: as a material heritage to be preserved and as waste to be regenerated, highlighting the opportunities offered by sustainable models that can restore value to a resource that is too often forgotten.

ECOSYSTEM OF A RESOURCE: PROSPERITY AND VALORIZATION

The ideology of a wool ecosystem evokes a concept of interconnection and sustainability, where wool loses its material meaning and connects to an integrated system that embraces nature, production, consumption, recovery and recycling, thus also representing a paradigm of immaterial sustainability, contextualized in current environmental challenges. In recent decades, wool has undergone a progressive economic devaluation due to the competition of synthetic fibers, which have dramatically expanded its market share (International Wool Textile Organisation [IWTO], 2019). If wool was once a pillar of the textile industry, today its production is in a structural crisis, aggravat-

ed by the lack of adequate recovery policies and the growing inattention of the international and national market (Doyle et al., 2021).

According to the Association of Man-Made and Synthetic Fibers, the market share of man-made raw fiber worldwide has increased from 51% to 76% in the last twenty years, to the detriment of cotton, wool and, more generally, other natural fibers (Trivellin, 2022). This has led to a drastic drop in the value of wool, often making it a marginal by-product in the livestock industry. Natural fibers, despite their excellent technical properties, have been progressively replaced by man-made fibers due to technological, economic and cultural factors. Synthetic and artificial fibers, thanks to the possibility of being produced with extremely small diameters, offer greater softness and lightness, improving comfort in contact with the skin and reducing the risk of skin irritation, caused by some natural fibers, such as wool above 28/30 μ m (Naebe et al., 2015).

The decline in the use of wool on a large scale, as reported by (Doyle et al., 2021) has had an even more marked impact on varieties from regional or local sheep breeds. These wools, produced in limited quantities and characterized by a high variability of fibers within each flock, escape the logic of standardized industrial use, due to the high costs of analysis and certification. The progressive devaluation of wool has led to a reduction in its market value, compromising the economic sustainability of local supply chains, often family- or community-run. These production realities, generally small-scale, are frequently integrated into conservation programs of native breeds, with a key role in biodiversity and genetic variability (ERSAF Lombardia, 2023).

In many European regions, there is a high level of disinterest in local wool, and traditional spinning and weaving practices struggle to meet the demands of an increasingly restricted market with high management costs. According to Cariola et al., (2013), in Italy there are approximately 6 million sheep raised for the production of cheese and meat, and it is estimated that the wool from their shearing is around 8500 tons per year: from this enormous quantity, approximately 1700 tons of textile material could be obtained for the various industrial and artisanal sectors, with an enormous capacity for the development of new products. Currently, this wool is considered a waste from sheep and goat farming, as it is not competitive with more valuable

qualities (e.g. merinos) imported from Australia, New Zealand or Argentina, and is therefore buried in defiance of disposal regulations that entail excessive costs for farmers or exported below cost to foreign markets where it is destined to produce carpets (p.164).

Italian greasy wool¹, as extensively argued by Cariola et al., (2013), is exported below cost to countries such as India, China and South-Eastern European countries, where it is often mixed with synthetic fibers (Pagani, 2022), used to produce fibrous materials with little added value, such as padding, insulation or materials for industrial use (Cariola et al., 2013). This low profitability has pushed sheep farmers and related businesses to reinvent their business, moving towards more economically sustainable production and commercial chains (Cariola et al., 2013). The progressive depreciation of wool has led to a reduction in the profitability linked to its processing and transformation. Consequently, in many regions, this material is now perceived as a marginal by-product within the livestock industry. This dynamic has led to a transformation of sheep farming, with the progressive abandonment of medium and small-sized breeds, even when they produce fine or semi-fine wool, in favor of breeds selected for their high milk and meat productivity. This shift in priorities has led to a progressive disinterest in the quality of wool, which today struggles to find a reference market (Doyle et al., 2021).

In a primary sector increasingly oriented towards the production of meat and dairy products, wool is often considered a waste by-product, whose low economic value is not enough to even cover the costs of shearing. As a result, raw wool is frequently stored without a concrete use, abandoned in rural areas or disposed of in landfills, sometimes in a manner that does not comply with environmental regulations (Bhavsar et al., 2016).

This phenomenon is not isolated but represents a clear indicator of an inefficient natural resource management model, in which wool is not recognized as an economic resource or as a material with ecological potential. Its failure to valorize, reports Gaddi & Mastrolonardo, (2024), not only leads to a waste of raw material, but also raises issues that require a rethinking of integrated production chains and the valorization of

¹ As other wool is impregnated with fatty substances (mainly lanolin) and other impurities, baled immediately after shearing without being subjected to cleaning and washing processes.

the special characteristics of this raw material. Inefficiency in wool management not only generates significant waste of raw material, energy and water resources, but also raises environmental and regulatory issues. In Italy, this situation is accentuated, especially in some regions with a strong tradition of pastoralism, such as Sardinia and Abruzzo, where a significant part of the wool produced is abandoned or discarded. The abandonment and illegal disposal of wool contribute significantly to the loss of a precious resource (The European Parliament and the Council, 2009). If the wool is not collected from the farm, it must be disposed of as special waste², resulting in economic and management costs for the farmer (Camilli & Burgassi, 2012). This scenario highlights the need to develop strategies to valorize wool as a resource, reducing waste and promoting sustainable management practices (Gaddi & Mastrolonardo, 2024).

Yet wool has intrinsic characteristics that make it a unique and sustainable fiber. Natural and biodegradable, it has historically been appreciated for its insulating and durable qualities (IWTO, 2020). However, in the context of the transition to circular economy models, it takes on an even deeper meaning. In the context of the transition to a circular economy, wool can be reintroduced into a sustainable production system, enhancing its regeneration capacity and its integration with other resources in continuous cycles. From this perspective, wool considered rustic should not be considered a product destined for disposal, but a dynamic element, which reduces the environmental impact and promotes ethical and responsible practices (Fletcher & Tham, 2019) of an economy that wants to be increasingly integrated and sustainable. The integration of wool into a sustainable ecosystem (Alhamad, 2006), requires a transformation of the production chains, with greater attention to the biodiversity of sheep breeds and the morphological specificities of the fleece. Each breed has fibers with peculiar physical characteristics, influencing the quality of the finished product and its performance in use (Botha & Hunter, 2010). This has led to a progressive

disinterest in the quality of wool, making it difficult to valorize it on the market (Gaddi et al., 2024).

To reverse this trend, it is essential to develop new strategies for valorizing native wool, transforming it from a marginal material to a key resource for sustainable development. The recovery and reuse of wool in innovative and shorter production cycles can reduce waste and open up new opportunities for local supply chains. Innovation in manufacturing processes and the rediscovery of artisanal skills not only allow the preservation of cultural heritage, but also promote an inclusive development model, in which waste is regenerated into a resource. In this context, wool contains a set of special characteristics that can make it a driver of economic, social and environmental prosperity, contributing to collective well-being and territorial resilience.

RIFIUTOCREATURA: PROSPERITY AND VALORIZATION OF POST-CONSUMER WOOL

Global change and resource depletion pose an urgent challenge, requiring a systemic approach to ensure a sustainable future (Rockström et al., 2009). The impact of the Fashion Industry on the Earth System, in terms of resource consumption and greenhouse gas emissions, is widely discussed; in particular, the production and disposal of waste, no longer seen as waste but as a resource, represents a significant challenge for the transition towards more sustainable models. The recovery and regeneration of textile fibers are fundamental strategies to reduce waste and promote a circular economy.

Pre- and post-consumer textile waste represents a strategic opportunity for the redefinition of production chains, encouraging the development of systems dedicated to its management, transformation and reintegration into the market. The implementation of recent EU directives on Extended Producer Responsibility³ (Brown & Börkey, 2024), together with the action of textile recycling consortia, is encouraging both cultural and economic evolution. This change is reflected in the adoption of circular economy models that promote the systematic recovery of waste and optimize its management, thus contrib-

² European regulation EC 1069/2009 classifies shorn wool as a by-product with a health and hygiene risk, requiring specific treatments for its marketing. This status imposes high costs for the transformation of wool into technical products intended for spinning. <https://eur-lex.europa.eu/legal-content/IT/TXT/?uri=CELEX:32009R1069> However, EC Regulation 510/2006 recognizes wool as an agricultural product, making it eligible for protection through PGI or PDO. http://www.agroqualita.it/_files/reg_ce_510_2006.pdf

³ As part of the European Green Deal, the EU Strategy for Sustainable and Circular Textiles (2022) was launched to make the textile sector more sustainable. This strategy promotes the introduction of extended producer responsibility rules for textiles, with the aim of improving collection and recycling, and reducing waste generation.

uting to a better sustainability of the textile sector.

There is a strong relationship between the fashion system and waste, determined by the fact that fashion is based on the development of new materials that simply replace old ones (Binotto & Payne, 2017). Therefore, it could be said that where fashion ends, waste begins (Torstensson, 2011). Every year, the fashion industry generates large volumes of textile waste, the ineffective management of which mainly leads to landfill disposal, rather than their reintroduction into production cycles. The abandonment of these materials as waste involves a considerable loss of resources, both material and immaterial, that go beyond the production process itself. In fact, considering the energy, raw materials and labor used not only during the production phase, but also in the preparation for production, a significant negative impact emerges in re-exploiting these resources. Added to this is the deleterious effect of carbon emissions along the entire supply chain, with direct repercussions on the environment and climate change. An adequate valorization and reintroduction of these wastes into the production system could contribute to the reduction of waste and the transition towards more sustainable and circular models (Binotto & Payne, 2017; Strähle & Matthaei, 2017). Textile waste management is a complex issue that requires integrated systemic solutions to effectively address the environmental impact and optimize the use of resources. As Marco Armiero (2021, p. 19) states, the current era of human beings is marked by a “techno-stratigraphy of waste materials” that accumulate on Earth, where, in recent decades, waste has transformed the environment into a real landfill. In this context, “discarding means deciding what has value and what does not” (Armiero, 2021, p. 20). The Wasteocene⁴ (Armiero & De Angelis, 2017) described by Armiero (2021) represents an era in which waste not only accumulates inert objects, but also involves living beings, knowledge, places and memories, creating an environmental, social and cultural crisis.

Despite this, initiatives such as wool recycling in the textile district of Prato offer an opportunity to develop circular economy models, reducing waste and improving the efficiency of natural resources (Furferi et al., 2022). However, the success of these practices depends

on a coordinated effort between institutions and industry to implement supporting policies that incentivize wool collection and treatment (Gaddi & Mastrolonardo, 2024).

In the Wasteocene era, waste is no longer just a sign of exhausted consumption, but a material waiting to be transformed. The concept of *Rifiuto-creatura*⁵ overturns the traditional vision of waste, recognizing its intrinsic potential for regeneration. No longer an object destined for landfill or incineration, but an entity in progress, capable of assuming new forms and functions through processes of sustainable innovation. Thanks to eco-design, advanced recycling and upcycling strategies, waste is transformed into *Rifiutocreatura*, gaining a new life within more virtuous production cycles. This change in both technical and cultural perspective implies a proposal to rethink materials, industrial processes and consumption habits, promoting a vision in which nothing is truly wasted, but everything can become a resource. *Rifiutocreatura*, therefore, is no longer the residue of a linear system, but the symbol of a creative and regenerative circularity, in which the end of one cycle is only the beginning of another.

PECORE ATTIVE AND MANTECO: SUSTAINABLE REGENERATION OF WOOL TEXTILE WASTE

In relation to what has been discussed so far, there are numerous Italian companies that forcefully emerge as excellence in the field of sustainability, contributing significantly to the development and responsible management of resources. The case of Manteco and Pecore Attive (Camilli et al., 2013) as virtuous examples of eco-innovation, demonstrate how sustainable innovation can be effectively applied in the wool textile sector, transforming waste and local resources into valuable products, and at the same time promoting environmental protection and the socio-economic development of the territories involved.

Pecore Attive is an initiative dedicated to the recovery and enhancement of native wool from Puglia, with the aim of restoring value to the territory of Alta Murgia Barese and its communities. For over a decade, the association has acted as a catalyst for the development of products and experiences related to the wool

⁴ The term “Wasteocene” was introduced into the cultural debate in 2017 by Marco Armiero and Massimo De Angelis through an article published in *South Atlantic Quarterly*.

⁵ Thought developed during the critical elaboration of the research concepts by Elena Pucci for the National PhD Program in Design for Made in Italy: Identity, Innovation, and Sustainability.

textile sector, promoting the use of sustainable and local materials. A central element of Pecore Attive's work is research into the valorization processes of sheep wool. This includes the use and application of traditional and manual processing and transformation techniques such as carding, spinning, weaving and felting, to create innovative products that combine tradition and contemporary design. The history of Pecore Attive is closely intertwined with that of the cultural territory of the Alta Murgia upland of Bari, an area rich in rural heritage and historical identity (Saviano et al., 2018). The encounter between human work and nature in this territory is fundamental to the vision of the association, which aims to build a local ecosystem based on shared knowledge, resources and skills.

This approach promotes a new interconnected wool economy, supporting local breeders and valorizing native sheep breeds, such as the Gentile di Puglia, whose wool is appreciated for its qualitative characteristics in the fashion sector (Sardaro & La Sala, 2021). Pecore Attive is also committed to building human values, aiming to improve society by strengthening the territorial fabric and creating solid foundations of trust between people. The association supports local producers in enhancing their skills and production, contributing to environmental sustainability and the well-being of the involved communities (Fig. 01).

Next, the analysis of the Manteco⁶ case study highlights a virtuous model of circular economy in the textile sector. The company, based in the textile district of Prato⁷, has developed an innovative production system based on the reuse of wool, transforming textile waste into new high-quality raw materials. Through the use of advanced recycling technologies and careful management of resources, Manteco has obtained significant environmental benefits. Compared to the production of conventional virgin wool, M Wool[®] reduced its water and energy consumption by about 17% and ReviWool[®] has reduced its resources by around 37%. The CO₂-eq emissions usually produced by the company have been

6 Since 1943, Manteco has established itself in the production of fine wool fabrics, combining innovation and environmental responsibility to limit the ecological impact. Among the most advanced solutions developed by the company are ReviWool[®], a low-impact virgin wool, and M Wool[®], an evolution of recycled wool.

7 "The Prato textile district extends over a geographical area of 7,000 sq km. Currently, it counts 46166 total employees in Textile Clothing, 6805 companies, a full production value estimated at 7,500 million euros over an export value at 2540 million euros." (Tufarelli et al., 2022; Confindustria Toscana Nord, 2020)



Fig. 01

reduced in 2023 by around 37% (Manteco Sustainability Report 2023, 2023).

Among the most relevant initiatives in the field of circular economy, Manteco is actively involved in Project43, a program aimed at eliminating waste through the recovery of waste generated by clothing manufacturers that use its fabrics. These residues are transformed into new high-end fabrics, ensuring a process with a reduced environmental impact. Manteco's textile production is mainly oriented towards mono or bifibre fabrics, a characteristic that facilitates mechanical recycling to obtain new M Wool[®] fibres, the new generation of recycled wool, subsequently used in the production of high-quality circular fabrics. Furthermore, the waste generated along the entire production chain - from pre- and post-consumption recovery to spinning, and from weaving to finishing - is collected and divided according to composition and colour tone, to be reintroduced into the production cycle in the form of new resources. Thanks to M Wool[®], in 2023, Manteco (Manteco Sustainability Report 2023, 2023) achieved significant environmental savings:

Water: 18.05 hm³ saved, with a decrease of

17.43% compared to 2022.

Energy: 162.63 TJ saved, with a reduction of 14.9% compared to 2022.

CO₂-eq: 98,267 tons saved, with a reduction of 17.43% compared to 2022.

These results were obtained by comparing the use of MWOol® with the use of generic virgin wool fibers. Furthermore, thanks to Project43, Manteco recovered 253,660 kg of industrial wool waste, with an increase of 17.78% compared to 2022. Of these, 79.4% was reused in the production cycle, marking an increase of 11.05% compared to the previous year. Finally, through the same project, the company recovered 69,067 kg of packaging waste, with an increase of 22.39% compared to 2022 (Manteco Sustainability Report 2023, 2023). These data demonstrate Manteco's commitment to promoting sustainable practices and adopting a circular economy model, significantly contributing to reducing the environmental impact in the textile sector, but also the financial sustainability that projects of this type can bring to an industry capable of transforming itself to the concept of Rifiutocreatura and adapting to new social needs (Fig. 02, Fig. 03).

A further study conducted by Manteco, in collaboration with the University of Leeds, has analyzed the recycling potential of wool in a closed loop system, providing fundamental scientific data for the implementation of circular economy strategies in the textile sector. Published in the *Journal of Cleaner Engineering*, the research shows that wool can be recycled up to six times through carded spinning, maintaining high mechanical performance and a reduced environmental impact (Glasper et al., 2024).

The study examined the durability and recyclability of wool fiber, highlighting that fiber length, textile structure and recycling machine settings are determining factors. Shorter wools, such as merino wool, are more vulnerable to fragmentation, while knitted fabrics better preserve fiber integrity. Furthermore, optimizing recycling processes has a significant impact on the mechanical properties of fibers. Tests have shown that recycled wool fibers maintain over 92% of their original tensile strength, confirming the durability of the material even after repeated recovery cycles. When fibers become too short to be reused in the closed cycle, they can be recycled in an open system, finding application in other sectors or in lower-quality textile materials (Glasper et al., 2024),



Fig. 02



Fig. 03

justifying the research developed in industries such as Manteco, which argues (Manteco Sustainability Report 2023) that the results of their study reinforce the role of wool as a strategic resource for the transition to a circular textile model. The same researchers from the University of Leeds highlight how optimizing recycling processes could significantly expand the value of recycled wool in sustainable supply chains. This research represents an essential scientific contribution for the textile sector, demonstrating that the adoption of recycled materials does not compromise the quality of the final product and promotes a reduction in the environmental impact of the fashion sector.

CONCLUSIONS

Wool, one of the oldest natural fibers used by man, is today in a critical position between economic devaluation and new prospects for sustainable valorization. On the one hand, the progressive loss of value of wool is linked to the predominance of synthetic fibers that ensure a constant and a controlled transversal cut in relation to natural fibers, to the fragmentation of local supply chains and to the lack of adequate infrastructures for its recovery. On the other hand, pre- and post-consumer textile waste represents a strategic opportunity for the circular economy, where waste can be transformed into a valuable resource through innovative processes of regeneration and reuse. The current marginalization of wool, especially local wool, and its dispersion as a waste reflect a production system that is still too linear, unable to fully recognize the value of available resources and the needs, on the one hand of sheep producers and on the other of environmental sustainability needs. Wool has intrinsic characteristics as – biodegradability, thermal insulation, mechanical resistance, flame retardant – that make it a unique and ideal raw material to be reintroduced into a more sustainable production model. To overcome the current crisis, it is necessary to rethink wool valorization strategies, develop new recovery chains and promote the diversification of its applications, applying integrated concepts such as those associated with a Rifiutocreatura, to new design areas, as a of sport performance, where wool is gaining incredible visibility nowadays. Technological innovation, the strengthening of local chains and the integration of artisanal skills can contribute to the construction of a wool ecosystem in which production, consumption, recovery and recycling

are closely interconnected and valorized. From this perspective, wool is not just a material, but a dynamic element that, if adequately valorized, can become a driver of economic, social and environmental prosperity. This condition implies an urgency for radical change in our relationships with the world, underlining how waste management – including those that could be seen as resources, such as post-consumer wool waste – becomes a crucial point for the future. In fact, just as plastic and waste materials weigh more than all living beings put together, discarded wool could also be recovered, reworked and valorized as a resource, rather than being abandoned as waste. The crisis we are experiencing, therefore, is not only environmental, but also a crisis of economic and cultural vision that leads us to discard and forget what could be reused and regenerated. This scenario requires a profound transformation of our ways of thinking and acting, in which respect for life and sustainability become the foundations for a world capable of recognizing waste not only as a failure, but also as an opportunity for creativity and regeneration.

CAPTIONS

[Fig. 01] Project created with native wool preserved by the Pecore Attive association. Photograph is available on their website. <https://www.pecoreattive.it/about>

[Fig. 02] Sorting post-consumer waste at the Manteco company. Photograph kindly provided by the authors

[Fig. 03] Manteco regenerated textile fiber. Photo courtesy of the authors

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START FROM CRAFTS

WHEN ENTREPRENEURS TAKE A STEP
BACK TO RE-CREATE SMALL-SCALE
COMPANIES

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Abstract

Old fashion system lays on a network made of family businesses, from prestigious tailors and bootmakers to modest clothing retouchers. In the global capital of fashion, Paris, they have been almost wiped out by the delocalisation along the 20th century. However, since its damages have been measured, there is a trend through young fashion entrepreneurs aiming the renewal of French fashion savoir-faire. Since 2019, I am studying some of these initiatives in the field of leatherwork (maroquinerie), and focusing from 2021 on one particular Paris brand : Laperruque. Working there both as an anthropologist and as a craftswoman, I have questioned the stakes of developing a small-scale company, limiting its growth, and identified the limits of such entrepreneurial initiative. Starting from scratch, with barely no investment fund, the two founders of Laperruque refer to traditional business model and not to start-ups, laying on financial speculation. However, the company is not just an unchanged reproduction of ancient familial businesses, since they also try to fix some of the contemporary working failings and the main fashion industry's issues. The following paper highlights the ideals constructed through the young craftsman-entrepreneurs' discourses and the negotiations necessary for their project to last.

Keywords: *Workshop, Leather, Entrepreneurship, Small-scale production, Fashion accessories*

INTRODUCTION

The international conference « Fashion Prosperity », which took place in February 2025, aimed at challenging the future of fashion through a new vision of prosperity. According to scholars' analysis and the testimony brought by professionals of its industry, fashion is hard-hit by several crises (social, ecological and financial). The awareness of its failures is strongly perceptible in the discourse of the sector players. Some of them attempt to escape its prevailing *modus operandi* by creating companies, renewing not only fashion items but also the philosophy of working and the corporate life. Such entrepreneurs raise an interesting paradox, by being a part of the fashion system while trying to find alternatives to its up-to-date

functioning. Among young brands' founders, I have had a long-standing interest in craftsmen applying ancient technics to manufacture fashion items in order to create long lasting pieces of accessories. As an anthropologist, I have investigated this trend alongside craftsmen-entrepreneurs in the leathersgoods' field. As a leather-craftswoman, I have experienced working in an independent brand's workshop, producing belts, handbags and functional accessories, which is at the core of my ethnographic survey and my PhD thesis (Barancourt, 2024). In that respect, this article is based on the anthropologists' traditional method – observing participation – and extended to autoethnographic materials. The methodology in question will be specified after introducing the

fieldwork-company.

Laperruque, based in Paris, offers an unusual layout for a French fashion brand founded in 2016: the designing, the manufacturing and the selling of the items take place in a single location, in the center of the French capital. It reminds some traditional types of trades characterised by the adjacency of the workshop and the shop - and even the dwelling (Sennett, 2010, 77) - such shops have almost disappeared from Paris streets. The causes of this depletion are most likely the combination of global factors such as the massive importation of fashion items from southern countries (Kurkdjian, 2021) which has disturbed short supply chains and local stakes, for instance the raise of lease payments in the city center. Not only reproducing an old fashion type of shop with its workshop in the basement, Laperruque also embodies the contemporary craftsmanship's evolution. Its two cofounders – Robin Hureau et Robin Nozay¹ - have met online in the 2010's, as they used to hold blogs about fashion crafts and menswear, which they finally overhauled in a single one (<https://redingote.fr/>). Hureau remembers : «We were interested in clothes, we said that we would write about it, almost by chance. It was the age of first blogs, back then, they were no blogs in France». With no formal training in the fashion field or the craftsmanship, they first enriched their cultures of these topics thanks to online resources. At a later date, they both decided to make a career out of their hobby, the first one by returning to school studying luxury management and the second one by getting a technical degree in leathercrafts. Then they decided to start their small-scale business together, in addition to their freelance jobs in sales of high-end fashion.

As their own company did not initially cover their basic necessities (covered by their freelancer missions), Hureau and Nozay have constructed an ideal of fashion business, partially departed from economic sustainability. It would be more accurate to say that they have established a projection behind the immediate need of returns. The following paper aims to question the viability of their ideal after celebrating the eighth birthday of their company, as their duo has now been joined by two trained craftswomen (including myself), an apprentice in the workshop and a sales manager in the shop.

¹ The two business partners have the same surname. Later, I will speak about each one only using its family name.

My ethnographic survey has allowed me to document several steps of the business growth. To collect the inquiry materials, I have been holding an ethnographic diary while working as a salary in the company since 2021. Moreover than constituting an autoethnographic testimony of the daily life in the company, this methodology is inspired by previous researchers questioning work in France. In that specific field of studies, the engagement of the observer is particularly noteworthy in the approach of french philosophers hired into factories in order to understand the working class from the inside (Weil, 2002 ; Linhart, 2003). In the 1990's in France - later than in anglosaxon countries – companies start to welcome academics, sometimes both as researchers and as employees (Sélim, 1993). Eventhough it has been strongly influenced by this tradition, my own study differs from the one of Monique Jeudy-Ballini, which has been asked to investigate in Louis Vuitton's factories (1991). As she has been trained for basic tasks on the lines and in the shops especially for her researcher's work, I had started to learn technical skills before my arrival in the company. During my time as an employee at Laperruque, I have written my ethnographic diary after working hours, and organised interviews with my colleagues. This article lays mainly on a tape-recorder discussion between Hureau, Nozay and me, dating from november 2022, on several excerpts from interviews with customers and on informal talks reported in my daily notes.

This survey is at the intersection between the fashion industry and the craftsmanship. It led the two business partners creating their brand to borrow from role models which are sometimes diametrically opposite. Their ambition for the quality of their products is to be as close as possible to items traditionally made by prestigious French ateliers - Hermès or Moynat for example - by using the same types of high-quality leathers. In the meantime, they turn down the strategy of seeming unreachable by maintaining a close relationship with their customers and by keeping prices as low as possible. Trying to conciliate such opposite purposes is only possible at some costs. First, the idealistic vision – which i called a « modern day crafty tale » - of Laperruque's founders will be exposed as it appears in the story-telling of the brand. Then, I will examine some compromises needed for the company to face an unfavourable economic context. At last, I will try to consider

the assets of short supply chains to overcome difficulties, in order to temper two fantasy images: the idealistic vision of a virtuous fashion and the pessimistic idea of its absolute impossibility.

MODERN DAY CRAFTY TALE TELLING THE LAUNCHING'S STORY

As I arrived in Laperruque's workshop in 2021, the data I had access to in order to document the prior hours of the company was the story told by my two employers, Hureau and Nozay. I heard the narrative of the company's launching many times, not only when I conducted research interviews with them but also when they told it to their customers. As I was also involved in running the shop, I sometimes had to rehearse it myself. Then, as I have analysed it through my anthropological research, I have noticed that it echoes other brands' founders involved in the renewal of made-in-France fashion items, such as resistant pantyhoses or reparable shoes. The strongest marketing argument is the willingness to undertow the global fashion system that creates trends making goods obsolete before they are worn-out (Erner, 2004). Its main dynamic is summarised by Roland Barthe's equation, when the rhythm of buying objects exceeds its wearing (1983, 299-300). Doing her ethnographic survey in a very similar context as mine, anthropologist Aurelia Gualdo testifies that the idea of putting an anticonsumerist ideal at the core of a brands' strategy is perceived by some fashion activists as a non-sense (2023, 141). However, according some fashion professionals from both her fieldwork and mine, it is the best (or the least worst) way for them to conciliate their ethic and their taste for fashion. I will first focus on the specificity of Hureau and Nozay's shared vision of how fashion goods should be consumed to improve the customers' satisfaction, also offering to the brand's team some significant fulfilment and a meaningful job.

Hureau and Nozay are on hand to pitch their own business. As they both have worked as salespersons and created some blogs about fashion in the 2010's, they have sharpened their expertise and their culture of fashion, especially the menswear and the workwear. Nozay says : « I spend a lot of time on the Net to find out about it, I had witnessed the birth of blogs, especially on menswear ». For example, he refers to the American website (<https://www.acontinuouslean.com/>) which offers many articles about footwear, clothes or accessories made in the USA according

to old-fashion savoir-faire. Later, for his own brand, old-established labels also serve as models, such as the British company Drake making ties and pocket squares. The story-telling of Laperruque rests on two mens launching their business from scratch, starting thanks to a crowdfunding campaign. In order to do so, they reused their professional skills into their personal project : creating long-lasting fashion items. Not counting their time and effort to accomplish something they strongly believed in, Hureau remembers : «We sold 300 pieces [...] Thanks to the crowdfunding, [we were able to] buy some tools, like the cutting tools, because before, everything was cut by hand. And... Later, the cutting press». In like manner, he hand-stitched every leather piece until affording an industrial sewing machine.

RECIPE FOR NEVER-OUTDATED ACCESSORIES

The motivation to create their own workshop came from Hureau and Nozay's personal affection for the pieces of cloth and accessories they wear, use and cherish. Mostly buying second-hand items, they are sensitive to the ageing of cloth and accessories. When they acquire some piece, they care for it to make it last and do not want to see it outdated by new ones. Laperruque's leather items are surviving short-time trends and aging nicely by two means. The first tool is a very pure design without superficial details and the second one is the application of traditional technics, ensuring its maintaining and reparation. According to the two business partners, every-day life objects, even the ones that are not necessarily meant to be seen, such as wallets and card-holders spending most of their lifetime in their owner's pockets, should be high-quality and long-lasting. As Hureau summarises: «we wanted to create objects for the everydaylife, but a nice everyday life». In addition to that hedonistic philosophy, they also attempt to make it affordable, by calculating low margins when they price their goods. Their vision has a political dimension that reminds the ideas of the British multitask artist, architect and writer William Morris. Along the 19th century, he expressed through his political career the importance of making high-quality artefacts for every social classes (Morris, 2010) and fought against the disasters of the industrial production in the merging consumerist society. He inspired some of the German Bauhaus founders (Midal, 2009). The founders of Laperruque do not mention Morris as a reference, but its founders

cite the Bauhaus school as a source of inspiration, both formal and intellectual. In more recent time, they are the inheritors of some communities sharing knowledge and technics through digital technologies, such as the makers in FabLabs. In the running of their workshop, they tend to combine their culture of the traditional crafts and some tools inherited from both the manufacturing industry and news technologies such as computational design and 3D printing. For example, they turn down the traditional hand-cutting of leather pieces and design custom-made tools (based on vectorial drawings) to dye-cut the objects of their catalog. Working mostly in series is a mean of keeping the items prices relatively low: it permits the compensation of the cutting-tools' cost. The pricing is calculated depending on the estimated duration of the work required, lowering when series are made instead of single pieces². That is why they do not develop novelties each season just like most of fashion brands do (creating at least two collections per year) and they re-edit constantly the same catalog. The running of the company leads us to its main paradox, which shows simultaneously the co-founders' success as craftsmen and their issues as the owners of an accessory brand in progress.

Designing an item at Laperruque includes the feed-back of the customers which allows the team to refine its process constantly. Nozay underlines how rare it is for a fashion brand to have such a long time to fine-tune its production: «we have almost seven years of feedbacks, we took almost all of them in consideration». Through the shop, located above the workshop where the items are made, the staff can directly measure the satisfaction of customers and identify their special needs. In addition to online sales, Laperruque's shop is a perfect monitoring center to evaluate the customers' contentment, and also a pedagogic tool to explain their unusual approach, re-engaging with the pre-capitalistic trade's form of the local shop. They seem to have achieved the goal of creating a place which is not only about selling accessories but sharing the story of their project: their shop in Paris became a place where customers show their trust in the brand, sometimes stopping by to chat and to show their personal belongings' patina. As craftsmen, it can be seen as a full success. In the

² Excerpt from the fieldwork diary, dated from 2021/12/13: «[Nozay] shows me an Excel table where is referenced for each product raw material costs, working time, etc. 'It is an ingeneer's thing', he says. I ask about the items I have just been trained to manufacture, in order to know how many must be ideally produced in a day of work».

meantime, this strategy is challenging in order to maintain the company's place on the scene of made-in-France fashion items.

BACK TO REALITY

CRAFTING THE COMPANY GROWTH DESPITE AN UNFAVOURABLE CONTEXT

Laperruque's custom-base extends slowly : purchasing durable accessories is not the key to trigger sales. As a matter of fact, the brand's customers rarely buy new leather goods to replace the ones they already get from the shop. With a limited set of accessories in its catalog, it hardly gains shares on a more widely defined market. If customers do not renew their own items from the brand, they often gift some to their relative. Step by step, the circle of retail customers increases. However, to count on this growth mechanism is not enough to provide the increased needs of the company. To reach its current size and efficiency, the co-founders staffed the workshop, then the shop. Their challenge soon became to maintain financial balance by becoming regularly incomes. To do so, they identified the need of going a step further in Laperruque's growth. Using their knowledge of the fashion market and the city of Paris, they tended to a new goal.

The current location of Laperruque's shop is at the border of the Marais, a historic top place for fashion in the French capital. This Paris neighborhood is well-known for its art galleries and fashion shops, also appealing for tourists. If it used to be a place involved in the production of fashion goods, which is still perceptible through the fact that some suppliers' shops remained in the area, most of the manufacturing workshops have been replaced by fancy retail outlets. Laperruque store's street is full of trendy second-hand shops, coffee shops that are popular on Instagram and exhibition spaces for artists and designers organizing pop-ups. Some of the neighbouring store send customers to Laperruque's shop, such as a specialized book-store for architecture or the nearby hotel sending its guests. However, the street is not as busy³ as the ones located in the center of the Marais and the small size of Laperruque's shop is bounding for the renewal of the merchandizing set. In order to be more attractive and to enlarge their custom-base, Laperruque's co-founders tried to reach their dream-set. They wanted to move in a larger shop,

³ The amount of visitors in the shop increases in December, as I noted on 2021/12/6: «Many visitors in the workshop this week, I imagine that the rythm of visits steps up with Christmas approaching».

allowing them to install the workshop part on the ground-floor⁴. By exhibiting their specificity - which is the maintaining of a local manufacturing - through their window shop (Rodriguez, 2001), they hoped to advance from a stage where the brand is the matter of a restrained circle of connoisseurs to a wider visibility through public space.

UNESCAPABLE COMPROMISES

After some trials to afford this type of local, for which the liquidity of the company was insufficient, the two co-founders decided to compromise. In order to extend their production volume and to report this step of growing, in 2023, they moved the workshop from the Paris-basement to a bigger space, located at the border of the capital in the city of Pantin. From now on, the production and the selling of the items is about 5 kilometers apart. This distance is most often travelled by bike or by subway by the team members channeling leather goods from the workshop to the shop. After one year in this new configuration, they face new difficulties related to an unfavourable context leading to sales arrears. The company had to adjust its managing and marketing strategies, finding that customers are reluctant to shop unless there is some sales promotions and discounts. According to Nozay, the fashion market is evolving in the direction of the cars' or the furnitures' market, on which only one on four product is sold at his full price. He talks about «deadweight effect» and he notices the customers «need an opportunity before purchasing goods». What kind of tools Laperruque can use to adapt in such context?

BALANCING SMALL-SCALE WORKSHOP'S ASSETS AND WEAKNESSES

THE DOWNSIDE OF LASTING LONG

Laperruque's company is facing a paradox. Its own added value comes from the characteristics of its products, long-lasting and well-made. This working process, in addition to the calculation of low margins, is hard to combine with a broad marketing strategy. Reducing the price of the items equates to running two risks : to produce at loss and to damage the brand image. However, in 2023 the company compromised for the first time and organized an exceptional archive sale. Flawed objects have been sold at a cut-price. Until then,

only seasonal colours of leather were discounted twice a year, according to the classical calendar of most brands (Barancourt, 2025).

From now on, the challenge for the company is to find a way of strengthened its desirability in order to maintain the shop-and-workshop-ensemble functional. Spending time and efforts on perfecting its catalog's existing models almost avoided its team to develop some novelties for over three years. The two business founders have decided to take benefits from the skills they develop in the workshop to diversify their brand's offer and develop a simpler version of their accessories to reach new customers with lower budget. Named the « unlined » line, it is an offshoot of the existing catalog with rougher finishing. The pieces are made of a single piece of vegetable tanned leather – instead of calf leather on the outside and goat leather lining the inside – and their edges are bee waxed – instead of painted layer upon layer. The declination of the catalog shows a refined knowledge of the traditional crafts, because it is inspired from saddlery's processes.

CRAFTING HANDILY

By easing the manufacturing, Hureau, the craftsman-founder of the brand, tries to break open time for designing some novelties. The latest is an open-source collection, described on the brands' website (<http://laperruque.co>)⁵ as a mean to create a stronger connection between the customers and their items and to reinforce the relationship between the firsts and themselves: « we therefore wanted to offer the curious, amateurs and do-it-yourselfers the chance to create an even more durable personal version of our objects. In an act of radical transparency that contributes to the fight against emotional obsolescence, we are sharing the patterns and instructions for making these objects.» New seamless pieces, such as air pods pouches, are now sold in the shop. As shown by the quotation of the webpage, the items' patterns are also available for free on laperruque.co, giving the opportunity to crafty customers to make their own. This kind of offer has two functions. First, it participates of renewing the catalog, inviting regular customers to enlarge their set of Laperruque's accessories with new pieces. Second, the open-source collection has been inspired by designers with a strong ethical and political commitment, for instance Viktor Papanek.

⁴ In 2023, the team visited such a shop, but the landlords never followed up.

⁵ <https://laperruque.co/produit/etui-pour-airpods-open-source-en-veau-a-double-tannage-noir/?v=11aedd0e4327>

His work is a criticise of the industrial context of production, and he was involved in sharing his knowledge about construction of housing and furniture, offering people alternatives to the consumption society (Hennessey and Papanek, 1973). Referring to the «roots [of] the counter-cultural movement of the 1960s in the [U]nited [S]tates⁶». Mentionning not only American designers but also Enzo Mari and Gerrit Rietveld, the two business partners strengthened their creative identity. It is an obvious reminder of their initial utopical vision of the company. However, there is an unavoidable paradox in the fact they are referring to anticonsumerist projects in an off-peak period for the company.

To Hureau et Nozay, the common ground of self-making thanks to open resources and purchasing long-lasting objects is the attachment to artefacts, sending them back to the starting point of their project. Caring for their own items, the two founders of the brand have created through their shop a place to share and nurture this vision of consuming artefacts. Nozay sums up their process with this tagline: «it is an iterative design process integrating our costumers' feedbacks». According to Johnathan Chapman a way for design to increase its durability is to create a stronger meaning: it is emotionally durable design (2015). This way of thinking artefacts suits very well to leather items used every day, each one getting a single patina. Even though this rhetoric is quite efficient, in Laperruque, some tools have been borrowed from a more conventional marketing (sale promotions and launching novelties) enterprise-wide to maintain its position.

TO CONCLUDE

Laperruque is an interesting observation unit to measure the ambiguity of creating a company in the field of fashion that aims at counteracting the logic of renewal in its industry. The crafting of an independant unit, taking in charge both the manufacturing and the selling of leathersgoods, has increased the financial needs of the company. To fulfill these obligations, the skilled craftsmanship meet its limits and the company has to operate some levers that it did not intend to in the first place. Depsite the intention of offering an alternative to the traditional fashion market modus operandi, by sending long-lasting accesso-

ries, its fonctionning absolutely needs to create and maintain the intention to purchase in their custom-base. In that way, Laperruque is faithful to the traditional business company, looking for its own growth. However, the growth curve keeps a gentle slope because it is limited by the own workshop's producing capacity, on a slow course. In the words of the two co-founders, this dynamic will stop and the running of the company will be stabilised when it will reach a stade they call its «cruising speed ». It remains to be seen if such a gait is achievable alongside competing brands with fewer production constraints and more financial resources to invest.

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ALGORITHMIC CULTURE AND SARTORIAL PROSPERITY

FROM LABOUR TO COMMUNITY BUILDING

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TERIKE FROM BUDAPEST

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Abstract

The article defines the term “prosperity fashion” by focusing on the nature of work in contemporary fashion. Our aim here is to redefine the concept of labour by balancing solitary work against collective imagination, creative invention against algorithmic creativity informed by sartorial knowledge, and solitary genius against empathy towards local communities. The paper deals with three main assumptions. First, it posits that in contemporary fashion design there is a newfound interest in tailoring and sartorial literacy. Secondly, it argues that this interest in tailoring is a consequence of contemporary algorithmic culture. Tailoring can be seen as an agency that unites craftsmanship, algorithmic culture, and a spiritual approach to clothing. Thirdly, in the final part of the argument we deal with the case study of a contemporary designer community (Terike from Budapest) connected through sartorial literacy, highlighting how this community embodies the principles of the sartorial turn. The article concludes by advocating for the decolonization of tailoring as a civilizing process (Wild 2014), using the Terike community as an example of local sartorial creativity and of “defashion” (Niessen 2022). This examination underscores the need to recognize and preserve diverse sartorial practices that challenge dominant narratives within the fashion industry.

Keywords: *Algorithm, Algorism, Community building, Tailoring, Central and Eastern Europe*

AGAINST FASHION AS SOLITARY WORK

As Li Edelkoort highlighted seven years ago in her now-famous anti-fashion manifesto, contemporary fashion education continues to produce “single individual star designers for the catwalk” (Edelkoort, 2017). While the industry showed sensitivity to this criticism during the pandemic, the past few years have seen a regression to the unsustainable norm of creating and exploiting solitary stars. This feature is structural, as cultural industries often rely on “symbol creators who become stars – their names promising certain experiences” and who “are rewarded enormously, while most creative workers exist in a vast reservoir of underused and under-resourced talent, picking

up work here and there” (Hesmondhalgh, 2013, p. 32). This duality is particularly evident in the fashion industry, where the charisma and glamour of an individual designer are so dominant that fashion houses continue to operate under the name of a deceased creator, whose legacy still guarantees a specific consumer experience.

The extraordinary valorization of the solitary genius is comparable only to the film industry; however, even there, it is rare for a living creator’s work to be credited under the name of a long-deceased predecessor. Pierre Bourdieu and Yvette Delsaut employed the concept of magic to illustrate how the symbolic value of a designer’s name is fundamental to the haute couture industry (Bourdieu & Delsaut, 1975, pp. 20-21). While they

addressed the transfer of value from one designer to another, they did not underscore how tyrannical, inhumane, and unsustainable this process could be.

Since the 19th century, with Charles Frederick Worth as the first prominent example, the emphasis on the designer's name on the label has contributed to growing inequalities. Although designers like Madeleine Vionnet were committed to fostering humane working conditions for their collaborators (or, in another context, the workers) (Chapsal, 1989, p. 314)¹, the normalization of what is now termed “social unsustainability” (Eizenberg – Jabareen, 2017) began to take hold within the fashion system. While such observations might seem self-evident within the current framework of systemic industry critique, practical actions inspired by these insights remain isolated and rare.

This article builds on these foundational ideas and proposes a definition of “prosperity fashion” that centers on the nature of work in contemporary fashion. The authors—a collective of fashion designers working under the name Terike from Budapest, art management experts, and a fashion theorist—seek to redefine the concept by balancing individual work with collective imagination, juxtaposing creative invention against algorithmic processes informed by sartorial expertise. This approach underscores that contemporary fashion stems not from individual brilliance alone, but from the collaborative and contextual facets of creativity. Recognizing that the mystical notions of creativity and imagination need tempering through speculative realism², this perspective is informed by contemporary sociological reflections on work and labor.

What constitutes the work of a designer? Is one still a designer when focusing solely on conceptualizing a new textile piece, while leaving weaving, knitting, tailoring, sewing, ironing, studio upkeep, client interactions, social media content creation and brief interpretations, etc. to others?

1 The names of all those who contributed to the work can now be found on the film credits. Why don't we add, albeit in very small print, the name of the worker who made the dress under the designer's hand? It's so important for a craftsman to sign his work. On some of the stones of cathedrals, the names of those who carved them are discreetly engraved. However, in Haute Couture, in addition to the couturier, we only pay tribute to the woman who wears the dress, forgetting the *chiffonnières* without whom it simply wouldn't exist! Isn't elegance, unlike other arts, a collective art? (Translation from French by the authors.)

2 A philosophical approach that critiques the tradition of Western philosophy, drawing inspiration from Immanuel Kant's emphasis on the primacy of the relationship between consciousness and the world over any presumed objectivity of 'things in themselves' (Mackay 2007: 4). In fashion studies, this approach has been adapted and translated through new materialist perspectives (Smelik 2018).

Or does true design encompass all these diverse forms of labor, encapsulated under the broader term “sartorial prosperity”? This discourse aims to illuminate these questions and propose a balanced vision for the future of fashion.

FASHION DESIGNERS AS TAILORS

Our investigation began by referencing Katja Praznik's feminist conception of ‘unpaid work’ (Praznik, 2021). Praznik's notion is shaped by her research on the nature of artistic labor in former Yugoslavia. The study argues that artistic work shares significant similarities with reproductive labor within the capitalist market. During socialism, discourses on creativity and artistic autonomy were often deemed bourgeois, prompting socialism to reframe artistic labor as exceptional and unique work that was rewarded, in contrast to the often invisible nature of reproductive work. According to Praznik, a crucial aspect of her argument is that this association of creative work with exceptional labor ultimately contributed to the exploitation of artists following the dissolution of Yugoslavia after 1991. Similar arguments concerning the precarity of the workforce in the neoliberal market were addressed by Angela McRobbie in relation to the British fashion system, which was celebrated by the government without implementing a protective framework. The cultural theorist underscores how the gender pay gap and differing gender perspectives were significant issues at play in this context. McRobbie highlights that this lack of systemic support allowed the creation of a precarious labor market where workers, particularly women, faced economic and professional insecurity. Moreover, the glorification of creativity masked underlying inequalities, perpetuating cycles of underpayment and limited career advancement (McRobbie, 2002).

The process described by McRobbie coincides with the moment when the manual work required by fashion creation had already disappeared from the creative process. The productive turn in the field of design can be interpreted as a rebellion against misconceptions surrounding the nature of the creative work, which is often viewed as intellectual, white-collar work. This shift reinvigorated the recognition of the dirty, arduous, precise, and manual labor necessary for creating garments and design objects. It sought to reframe such labor as an essential component of creativity, challenging the undervaluation of

hands-on craftsmanship within the industry (Adamson, 2011; Auther, 2010).

As a consequence to this, we can assist in contemporary fashion design to a newfound interest in tailoring and sartorial literacy. As a striking example to this, we reference Demna Gvasalia's SS2024 Balenciaga collection (the famous return of the designer after his social media scandal) where he referenced tailoring as core value of his credo as a designer³. Tailoring serves as the crucial link between the body, textiles, and technology, acting as a primary driver behind the object-oriented ontology of contemporary fashion defined by the formerly referenced new or speculative materialism.

Tailoring is not simply a direct return to materialities. Cutting the fabric is already an act imbued with hegemonic penetration, yet it is guided by a deep understanding of the fabric's and the body's agency. The tailor possesses the knowledge to interpret the voice of the fabric and contemplates the ontology of the body. The power of the tailor resides in being positioned in the in-between—informed and educated by this intermediary space where conceptual thought and material practice converge. Cutting on the straight or against the grain necessitates an intimate knowledge of the fabric and a profound understanding of its properties.

Regarding the understanding of the body, the tailor is not only a professional in recognizing the flexions, proportions, and balances of the client's body, but also a specialist attuned to the comfort and wellbeing of his own body. As Liberty's tailoring book from 1933 states, the position of the tailor defines not only his craft but the harmony between his work and his physical form, that's why learning the tailor's pose is the first step in the life of a tailor apprentice:⁴ "When sitting cross-legged the weight of the work is around the tailor on the board, and there is no need to hold the work up as well as holding it for sewing. It is a position which, after a little practice, will come quite naturally, and should certainly be adopted by the beginner. It must be remembered that comfort and convenience are a great asset to a happy existence, and when loss of time, however small, means loss of wages, it behoves the artist at his craft to introduce as much time-saving method as is possible" (Liberty, 1933, p. 3).

³ <https://www.balenciaga.com/en-us/summer-24?srltid=Afm-BOoqiKplfhrw-X1VrpoC7Su-Xp2I2fwX57AfGXyOXgP0zL4UZ44uv>

⁴ On the importance of this pose cf. Matthews Davis 2005: 262.

TAILORING AND ALGORITHMIC CULTURE

Our contemporary culture is often described as dominated by algorithms. Algorithms function as methodologies for creating systems, categorizing, establishing order, shaping perspectives, and forming patterns of thought. We argue that the renewed interest in tailoring is, in part, a response to this algorithmic culture, as the precision and technique inherent in tailoring align with the logic of pattern making. While it is easy to view tailoring as an algorithmic framework within the contemporary fashion system, it is crucial to engage with cultural critiques of algorithmic culture to better understand the nuanced role of pattern cutting in fashion.

Ted Striphas in his seminal article on algorithmic culture made a distinction between algorithm (a set of mathematical procedures aimed at uncovering truths or tendencies in the world) and algorism (coding systems that may reveal but are equally likely to obscure)⁵ (Striphas 2015: 404-405.) Pattern cutting closely relates to mathematical procedures, as it is based on a system of proportions and idealized measurements linked to a geometrical vision of the human body. With the first manuals published in the latter half of the 16th century, tailoring has often been seen as a form of technicized knowledge about the body. However, we argue that, while tailoring may appear to be a purely mathematical operation, the system of garments created by tailors—for both the upper and lower body, with symmetrical and structural variations—functions more as a coding system. Through this system, the human body is encoded into idealized textile constructs.

This interpretation becomes especially relevant when considering AI-assisted fashion creation. Here, algorithms engage with elements of fashion's coding system (algorism - e.g., trousers versus skirts, soft versus rigid materials, textured versus smooth surfaces), producing unexpected combinations. Rather than relying on the mathematical operations of pattern cutting, the algorithm responds to the structural oppositions inherent in the garment system. The transla-

⁵ So, on the one hand, we have algorithms – a set of mathematical procedures whose purpose is to expose some truth or tendency about the world. On the other hand, we have algorisms – coding systems that might reveal, but that are equally if not more likely to conceal. The one boasts of providing access to the real; the other, like an understudy, holds its place. Why in the early 20th century did algorithm become preferred over algorism, so much so that the latter form is now all but an archaism?

tion of a design into a pattern—a mathematical process in itself—is left to specialized pattern-cutting programs that handle the technical precision of garment construction.

Historical research on the labor of tailoring has shown the significance of heritage and historical entitlement within this industry. Anne Kershen demonstrates that, by the end of the 19th century, tailoring workers in two historically distinct cities—Leeds and London—were differentiated based on their rootedness in a tailoring tradition dating back to the 17th century. According to this logic, non-English workers (referred to as “aliens”) were often excluded from the highest levels of bespoke production (Kershen 1995: 5). Mastery in tailoring is not achieved solely by learning techniques, procedures, and coding systems; one must also be deeply imbued with the spirit of this specific artisanal knowledge. In this context, tailoring can be seen as an agency that unites craftsmanship, algorithmic culture, and a spiritual approach to clothing. While algorithm plays a central role in tailoring, particularly when confronted with mathematical data on average and proportional bodies, a strong tradition within this craft emphasizes an element beyond operational data: heritage and authentication through patrimony. This tradition underscores the importance of legacy and the cultural validation that comes from a deep connection to historical practices.

TERIKE FROM BUDAPEST. WHAT'S IN A NAME?

case study of a contemporary designer community in Budapest (Terike from Budapest - which I co-founded) connected through sartorial literacy, highlighting how this community embodies the principles of this newfound interest in tailoring. The presentation concludes by advocating for the decolonization of tailoring as a civilizing process (Wild 2014), using the Terike community as an example of local sartorial creativity and as a case study for “defashion” in the sense proposed by Sandra Niessen (Niessen 2022). This examination underscores the need to recognize and preserve diverse sartorial practices that challenge dominant narratives within the fashion industry, promoting a more inclusive and multifaceted understanding of fashion as both situated bodily practice, algorithm and labour.

DEFASHION – RETAILOR

To bring together the elements of our argument: in the age of deFashion, redefining the designer as a tailor—or “reTailor”—can serve as a form of activism. For Sandra Niessen, deFashion represents a critique of the colonial, exploitative, Western-centric, and designer-focused paradigms in garment creation and body covering. Tailoring is a form of labor within the creative process that not only engages with technology and algorithmic logic but also remains deeply embedded in the materiality of fabrics and the human body. Unlike the simplified approach to upcycling and recycling—often seen as merely combining preexisting garments by cutting and sewing—tailoring integrates sartorial culture, craftsmanship, and mathematical precision. Tailors act as agents who transmit tradition, embodying a nuanced skill set that bridges technical knowledge with cultural heritage. This reimagined role positions the tailor as a crucial advocate for sustainable, thoughtful, and ethical fashion practices in a world increasingly aware of its ecological and social responsibilities. In contrast to an overly harsh critique of contemporary fashion and textile ideology, the respect for tailoring preserves and honours not only the community of fashion consumers but also that of garment creators - individuals deeply engaged with the fundamental algorithms of textile culture.

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LIVING MATERIALS

GROW ME A WARDROBE

HOW THREE-DIMENSIONAL BIOFABRICATION STRATEGIES FOR BACTERIAL CELLULOSE CAN REFRAME FASHION PRACTICES THROUGH MAKING AND INTERACTING WITH NON- ARCHETYPAL BACTERIAL CELLULOSE- BASED WEARABLE OBJECTS

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Abstract

With the world in a state of climate emergency, fashion faces significant challenges due to its massive environmental and cultural influence. Clothing accounts for over 60% of textiles, with production doubled whilst use has declined by 40%(Ellen MacArthur Foundation, 2017). Existing linear supply chains leave significant ecological impacts, with waste being a predominant factor. Rissanen (2013) estimates that 15% of fashion waste occurs during garment assembly. Given the complexity of textile and fashion industries parallel to rising environmental degradation, multilevel solutions are crucial to ease environmental strain. This study aims to bridge the gap between fashion and textiles by employing bacterial cellulose growth patterns to create textiles imbued with fashion attributes, focusing on form as the main designable quality. Fabrication is recorded and evaluated through contextualisation during body-artefact juxtaposition in workshop contexts, aided by visual and written documentation. The output consists of two artefact series illustrating proposed biofabrication methods bridging fashion and textiles, augmented by a revised methodological flow informed by resulting design process and material outcomes. Contextualising biofabrication in practice and prolonged interaction expands possible ways of making, dressing and embodying unconventional aesthetics, resulting in more prosper forms of fashion.

Keywords: *Bacterial Cellulose, Biofabrication, Three-dimensional growth strategies, Multi-species Interdisciplinary Design, Regenerative Fashion Systems*

INTRODUCTION

With the world in a state of climate emergency, fashion faces significant challenges in curbing hazards consequence of production due to its massive environmental and cultural influence. Clothing accounts for over 60% of textiles, with its production doubled whilst use has declined by 40%, mainly due to fast fashion (Ellen MacArthur Foundation, 2017). Existing linear, segregated supply chains leave significant societal and ecological impacts, with waste being a predominant factor amongst several others (Ahmed et al, 2023; Ellen MacArthur Foundation, 2017). Rissanen (2013) estimates that 15% of fashion waste occurs during garment assembly. Given the complexity of textile and fashion industries parallel to rising environ-

mental degradation (Mikulčić et al., 2022), holistic, multilevel solutions are crucial to ease environmental strain.

Addressing such wicked problems highlights the importance of the framework contextualising fashion's many design-make chain links. As deep enmeshment between fashion and humanity within larger ecosystems becomes recognised, arguments supporting "perspective[s] that transcend anthropocentrism to ensure collaborative survival" become consequential. Designing beyond the human implies interacting with the non-human, a relationship that, within the scope of fashion, has delivered reciprocal benefits by producing textiles and materials with enhanced properties (Phan et al., 2024), novel manufacturing

methods (Arnadottir et al., 2022; Arnadottir et al., 2021) and potential for environmental safe-guarding (Groutars et al, 2024).

BACKGROUND

Despite the desirable alternatives afforded by biomaterials' ecological advantages to fashion and textiles, their functionalisation, industrial adaptability and dissemination remain unconquered. Novelty and curiosity have motivated a plethora of innovative forays into grown design, which struggle to break into existing fashion landscapes as current fashion industrial complexes have not been built to contend with the autopoiesis of biomaterials, instead framing the process integrally through anthropocentric perspectives (Camere and Karana, 2017).

Manufacturing (bio)technologies

BC commonly presents as a flat sheet interfaced between culture and oxygen, and has primarily been investigated as such. Growing interest in biodesign and livingness (Karana et al., 2020) has led scholars and practitioners to challenge the prevalence of this form, probing for alternative ways of creating more complex structures and fabrication pathways.

Derme et al. (2016) developed three-dimensional BC membranes by combining biosynthesis, digital fabrication and computational modelling, demonstrating novel techniques of in-situ self-assembling, as well as relevant biocompatible scaffoldings. These methods clarify which factors affect BC' biological pathway by altering the membrane's physical qualities, suggesting enhanced and new functionalities. Including complementary technologies, such as scaffolds, demonstrate that BC is modifiable during growth and fermentation, and may benefit from synergistic interaction with complementary technologies towards conceiving three-dimensionally fabricated artefacts.

Relinquishing complementary technologies as integrated part of the outcome, Arnadottir et al. (2022) propose principles for a microbial 3D printer, consisting of a bioreactor operated through digital and biological inputs where BC growth was modulated through interaction with other non-human entities, in this case, *Escherichia Coli*. Interspecies interaction in-vitro sought, firstly, to modulate growth by dripping cellulase onto the surface of the BC membrane with a robotically controlled syringe head; and secondly, to develop a method similar to stereolithography by project-

ing Z-axis slices of a 3D digital model onto light-responsive *E. Coli* cells, which in turn modify the growing pellicle.

These projects elaborate on autopoiesis beyond techniques resembling cut-and-sew practices, and leverage growth in synthesising three-dimensional prototypes. Ultimately, both centre material engagement with BC's biological processes in a designerly manner, but are still subject to the limitations of small-scale production, as well as rapid decay without finishing processes deterring the effects of dehydration (Phan et al., 2024).

Turhan et al., (2022) challenge these limitations, as well as formal and technique complexity by proposing a composite formulation of BC adaptable to 3D print methods and hardware. Attempting to compensate for BC's shortcomings as a design material by introducing supplementary materials to create a composite suggests ways that BC properties may benefit from synergistic material entanglements, lending itself as a valuable resource across design and fabrication fields. The artifactual results show that compounding BC with pectin and jute fibres "enhanced the structural load-bearing capacity of the overall form", suggesting potential design-make innovations by using bioactive compounds, as well as a departure from the long-established membrane form that BC is often analysed as.

Expanding possibilities of what can be designed with BC requires shifting towards collaboration where BC biological patterns may flourish in making artefacts, which requires understanding its agency and sensitivity, given that BC has the ability to perceive surrounding stimuli (Karana et al., 2020). Dynamic behavioural response unfolding into design expression highlights the importance of temporality and reciprocity as elements of experienced materiality. Being rooted in habitability and relation with other external entities, co-designing with living non-human entities demands a degree of intentional interaction, which carries its own set of idiosyncrasies.

Interaction

Giaccardi and Karana (2015) lay out a framework to discuss "how materials shape ways of doing", articulating the malleability of practice relative to materials experience according to configurations, levels and patterns of experiential proximity. Drawing attention to the link between material aesthetics and performance, basing repeated

interaction in the unique properties of a given material produces unanticipated practices, an effect exacerbated by acknowledging non-human agency. Karana et al. (2020) elaborate by emphasising the importance of careful crafting to attend to livingness when designing material qualities with artifactual results as an active phenomenon. According to the actors, numbers, temporalities and spaces in which interaction occurs, Groutars et al. (2024) expound on possible types of interspecies relationships, proposing the adoption of alternative mindsets that embrace such emergent aspects of designing with nature, specifically unpredictability and dimensional variety. As this directly opposes fashion's conventional tenets of perfection and systematic production, examining artefact and practice in parallel is key to establishing potential pathways for designing collaboratively with the non-human, specifically BC within the scope of this research, as an agential stakeholder as well as a design artefact.

APPROACH

As “things do not exist in a vacuum; rather, they are embedded in different relations, configurations or networks that determine how they are interpreted” (Wakkary, 2021), slightly tweaking existing design practices to accommodate living materials would hinder the experiential dimensionality of co-designing with non-human entities. Investigating a field where an artefact's inextricability from the body (Geczy, 2019) and subsequent material perception (Biofabricate, 2020; Ahmed et al., 2023) generate intricate, manifold layers of interpretation, understanding human-technology-context relations and their influence over artefact significance and contextualisation (Rosenberger and Verbeek, 2015; Wakkary, 2021) is paramount to achieving effective design strategies and their intelligible expression.

Things, or technologies (Wakkary, 2021), co-shape many facets of human experience; how we perceive our environment, our situated sense of self, and how we navigate it (van der Zwan et al., 2020). Given an artefact's multistabilities and mediating roles, a critical reflection on iterative practice hypothesising through prototyping (Rosenberger and Verbeek, 2015) addresses both theory and practice indispensable to establish foundations for fashion systems tailored to BC's biological patterns. Incremental and cyclical construction of prototypes exploring BC crystallises understanding of textile technologies of these living textiles whilst building

knowledge of ways of designing and wearing them (Koskinen et al., 2011), creating a generative symbiosis between ‘what’, and ‘where’ and ‘how’ of BC artefacts. This addresses potential materialities of crafting BC artefacts embodied within practice stemming from performance and collaboration in making and wearing (Giaccardi & Karana, 2015) these artefacts.

AIM

BC's autopoietic aptitude opens up the elements employable to achieve design expression beyond what is feasible for traditional textiles, blurring the line differentiating material and product, even offering variety in how this is accomplished (Groutars et al., 2024; Camere & Karana, 2017). Textiles are hereby interpreted as processed design materials without application-specific features, whereas fashion is defined as textile given specific attributes enabling wearability.

This study aims to bridge the gap between them by employing organic growth patterns of BC to create textiles directly with fashion-specific attributes designed through body-artefact interaction. These textile-fashion hybrids focus on form as a designable element without resorting to archetypal garment configurations. The resulting artefact collection ultimately seeks to reframe conventions inherent to making and wearing fashion by positing these acts as interface contextualising BC's organic materiality within the human body.

MATERIALS AND METHOD

As the overall process investigates production methods derived from BC's autopoiesis, the design process progresses from small-scale material sampling to full-fledged artefacts examined through situated interactions to effectively analyse resulting and future design expression. The fabrication process concerns prototyping with BC towards achieving form through material rigidity. Smaller samples testing various degrees of this property gradually upscale in size and interactive potential, providing a progressive, materially-informed and practice-based exploratory expansion from textiles into fashion objects (Markussen, 2017).

Augmenting prototype size requires design choices to be made, which are here deduced through interaction directing possible and desirable design pathways. Contextualising the material outcome as an empirical base for fashion practices reciprocally reflects on human-artefact interac-

tion of BC textiles through a post-phenomenological lens (Ritter, 2021), subsequently elucidating how interaction can enhance materiality towards bridging the gap between textiles and fashion through embodiment acts.

The research concludes by proposing strategies reinterpreting fashion according to observed BC qualities. Designing with agential materials broaches speculation regarding ways in which textile-fashion hybrids can be interpolated within design-make cycles and their transformative effect on practice (Giaccardi and Karana, 2015).

METHOD

Given that this study establishes 'defined attributes enabling wearability' as differentiation between fabric and garment, understanding what designable features configure the development of BC textiles and which are responsible for enabling wearability becomes crucial. Previous explorations regarding fashioning methods for BC (De Lara, 2024) identify two fabrication methods through which BC's autopoietic nature is best leveraged; A) through composites employing knitted scaffolds where BC is applied and reassembled; and B) direct, selective manipulation of processed BC fibres. De Lara (2024) also identifies 'colour', 'form' and 'texture' as key designable categories of textiles and garments.

Aldrich (2020) stresses the importance of the body's three-dimensionality when translating flat patterns to finished garments, stating that "the garment's success and originality rests with the quality of the pattern cutting" when discussing methods of creating shape. 'Form' is thereby interpreted as the principal property transforming fabric into garment as it limits which entities the resulting garments may be juxtaposed against, whereas 'texture' and 'colour' don't pose such strict limitations. To streamline the obtention of form, proposed incremental size and interaction variation suggest sequencing the experimental flow as follows:

a) Sampling; b) Prototyping; c) Artefact development

In understanding how resulting artefacts may be worn de facto or fledged into full garments, interaction and embodiment acts flesh out the semiotics implicit in working with BC within the realm of human garb. These acts therefore become the probing tool of design of this study, informing the progression from Prototyping to Artefact Development, and later aiding in evaluating Artefact

Development as a conclusion, as well as leaving open-ended proposals for future design (Fig. 01) described in section *Discussion*.

Biofabrication

Sampling: From the overarching category of form (De Lara, 2024), 'rigidity' was selected as the tested variable designing form enactment due to its unusual tactility and textile manipulation potential. BC pellicles were processed using a domestic food processor, producing a fine paste. Water content was partially extracted from the paste at (a)0%, (b)25%, (c)50%, (d)75% and (e)90% volumes, creating biofilms of 50mm thickness when wet. The resulting paste samples were then poured in 80mm x 80mm PLA molds, allowed to reassemble for 36 hours, then air-dried at room temperature $\pm 25^{\circ}\text{C}$ (Fig. 02). Conclusions from this stage are applied during Artefact Development as a finalised design; exploratory experimentation of Prototyping phase is realised using wire as temporary tools enabling BC rigidity.

Prototyping: In order to analyse how rigidity would influence textile form, four different crocheted scaffolds were produced with two linear and circular configurations each (Fig. 02). Sub differentiation in scaffold morphology examined the overall formal variation and potential emergent embodiment patterns during interaction.

Scaffolds were autoclaved at 121°C for 15 minutes and blocked at room temperature $\pm 25^{\circ}\text{C}$. BC paste with original water volume was applied to the upside, covered with saran wrap and left to reassemble for 48 hours. This process was repeated with the underside of each prototype before uncovering and air-drying.

Wires ($\varnothing$ 10mm, $\varnothing$ 8mm, $\varnothing$ 6mm) were placed against structural crochet lines and loosely sewn to emulate results from Sampling stage, enabling form manipulation and implicit artefact investigation probing for designerly expression. Resulting prototypes were placed within a workshop context, where participants were invited to probe and interact with them to explore materiality, properties and situated expression. This process is described in subsection *Embodiment as Design Tool*.

Artefact Development: Photographic, video and written documentation from the Sampling phase and workshop session contrasted with documentation of the making process and the author's own reflections were examined using

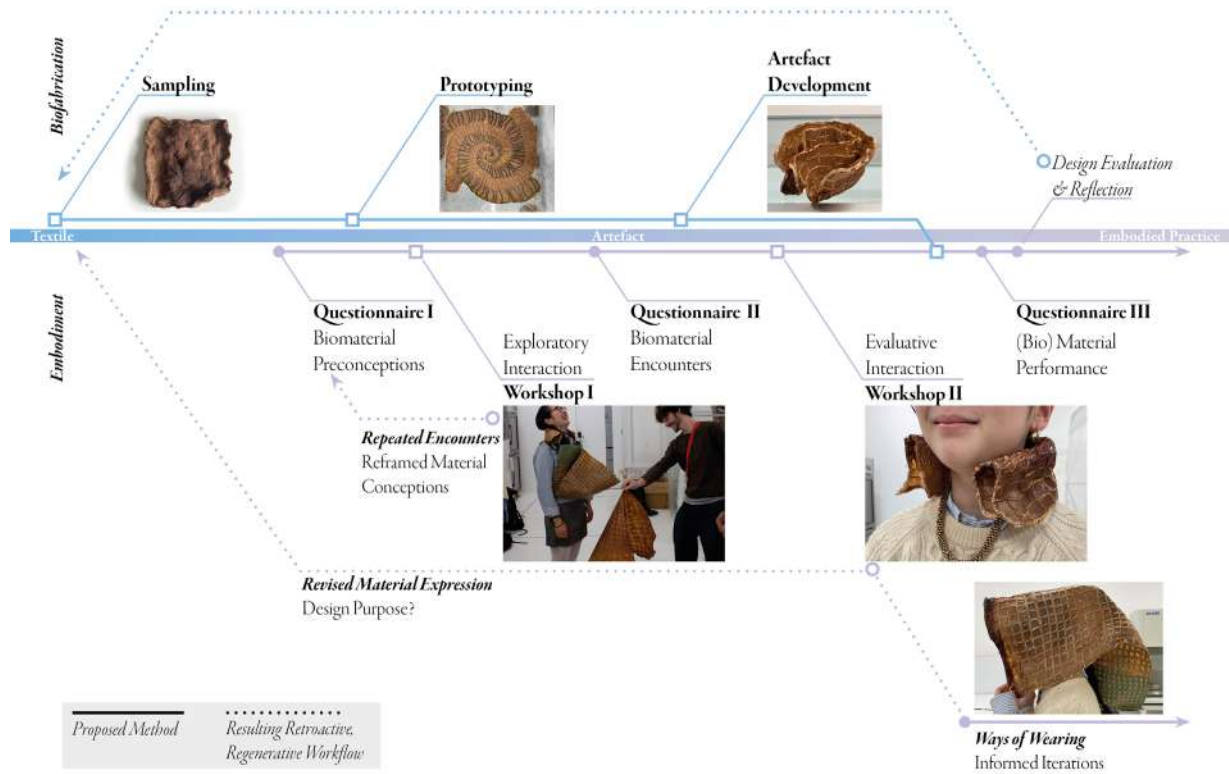


Fig. 01

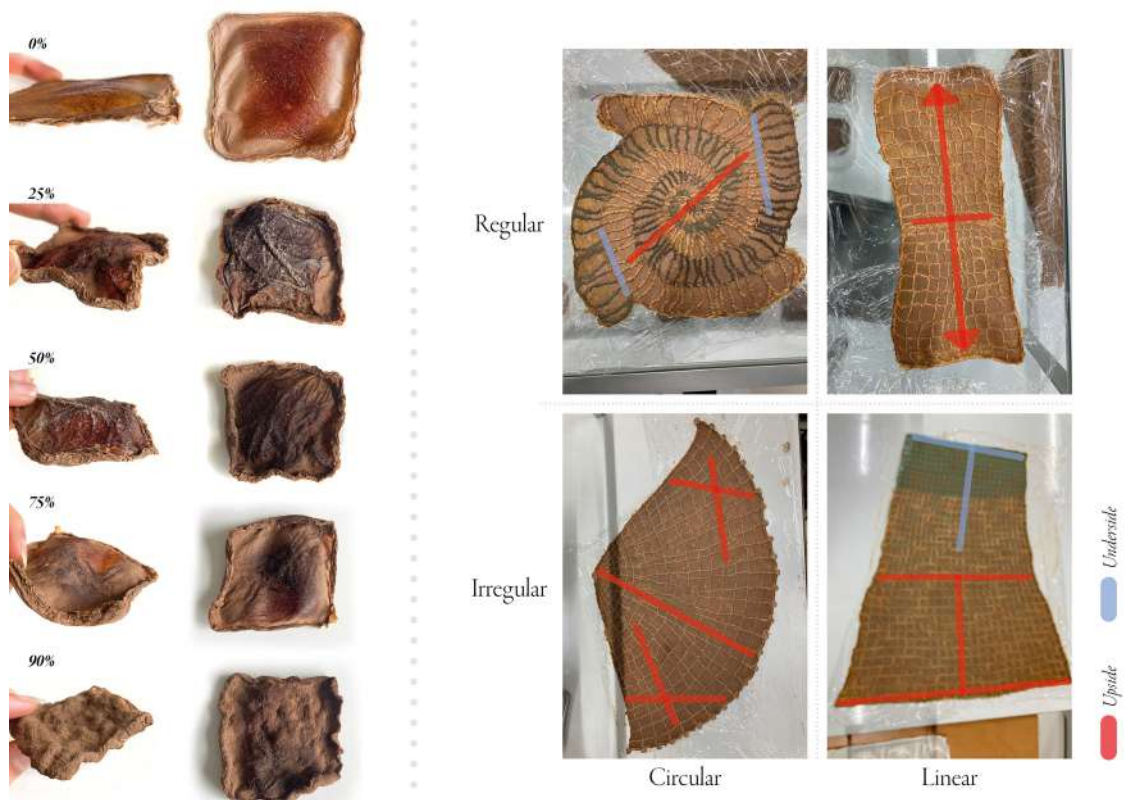


Fig. 02

the annotated portfolio method (Gaver & Bowers, 2012) to capture not only material conclusions, but to discern experiential patterns arising from the prototypes. Conclusions from the annotated portfolio served as tool to design the finalised artefact forms.

Sought forms compounded desirable aesthetics with the most prolific performative interactions explored with workshop participants. Once each design was decided, wires were shaped into the desired form for posterior BC application. In preparation for this, prototypes were partially rehydrated with a water mister to enhance the fastness of new BC applied over the surface. Processed BC with the desired rigidity was then manually applied over the structural scaffold lines to retain the shape effected by the wires, covered with saran wrap for 48 hours and air-dried at room temperature $\pm 25^{\circ}\text{C}$.

Embodiment as Design Tool

In a workshop context, five participants were invited to interact with the wired textiles in an exploratory capacity. Resulting encounters (Fig. 03; Fig 04) were documented through photography and video, as well as written records accompanying human-textile interplay. Interaction first examined the prototypes as insular technologies segregated from the body, prompting conversation about their disembodied textile properties. Participants were encouraged to sense and manipulate the textiles freely, and discuss findings and curiosities with one another. Artefacts then came to be interpreted as embodied textile, encouraging participants to juxtapose human and artefact through draping on the body, seeking possible, potential and desirable ways these artefacts could be worn. Once the session concluded, participants were asked to reflect on the session and retrospectively exploring encounters and performative experiences through a written questionnaire.

Documentation from this session was contrasted with participant's questionnaire responses to determine possible, preferable and desirable material qualities correlating to performances unfolding into peculiar "ways of doing and their assimilation into practices, [...] mediated and affected by the material character of such performances" (Giaccardi & Karana, 2015). The decided forms were then permanently enacted in the prototypes as described in Artefact Development subsection.

In a second workshop session, the original participants were invited to review the artefacts' finalised form in order to examine how bodies interact with intentionally-made BC objects, and elicit ways of wearing. This phase targets the performative embodiment of non-archetypal artefacts through practical speculations about ways of wearing from knowledgeable perspectives by probing for interaction rooted in material character and previous material encounters. This contextualisation seeks to reveal potential future ways of wearing, as well as how the act of wearing can reciprocally inform ways of designing tailored to BC morphology.

MATERIALS

Selected materials are composites of BC and crocheted yarns. Output is recorded through photography and video, and supported by written documentation of the make-design process.

Bacterial cellulose pellicles were obtained through a modified Hestrin and Schramm medium (De Lara, 2024) synthesised, processed and reassembled (De Lara, 2024) at the Biomaterial Factory in Kyoto Design Lab. Yarns were purchased at Daiso Japan, and are 100% cotton, 50% of which labeled recycled.

RESULTS

Material output consists of two prototype series testing rigidity and enacted form, and were fabricated employing BC autopoiesis combined with human intervention. From a processed (De Lara, 2024) state, they successfully reassembled into textile-like materials, with virtually no waste from either BC pellicles or knit, as well as scarce energy and manufacturing resources - these limited to use of a domestic food processor and human labour. This demonstrates how leveraging organic properties of BC, amongst other biomaterials, can bridge the divide between textile and fashion, reducing waste across supply chains, as well as delivering novel material expressions articulating emerging design narratives.

Sampling stage (Fig. 02) tests reassembled successfully, with 25% and 50% water volume removal displaying the sturdiest results concerning the reassembly process. Surfaces on the remaining sample present more irregularly; 0% sample shows uneven BC fiber arrangement due to irregular water evaporation rate within the mould. 75% and 90% samples required manual kneading into the



Fig. 03



Fig. 04

mould, resulting in slight variations in thickness and surface smoothness. Evidence of shrinkage becomes obvious as more water volume was removed, as well as warp distorting the initially flat sample. There doesn't appear to be a recognisable pattern in the warp, nevertheless, control over warp through design interventions and actors in this type of expression are elaborated on in the discussion section.

The fabrication method hypothesised that BC paste with removed water volume would modify unaltered BC paste, however, upon application and posterior drying, the rigid BC paste failed to attach securely to the unaltered prototype. The dried rigid paste was rehydrated, reprocessed and reapplied to its original location with increased manual pressure, as well as sealing the plastic wrappings in place for drying in order to prolong the drying period, thereby increasing the time that moisture would have to transfer between dry and wet paste and ensure attachment.

When upscaled prototypes (Fig. 04) combined unaltered and reassembled BC, warp became more evident across artefacts, occasionally distorting forms given through shaped wires. This demonstrates dimensionalities perceptible through X, Y and Z axes even when designed flat, which, from designerly perspectives, opens up discussions regarding definitions of three-dimensional textiles contrasted with that of garments. The warp present in the rigid BC areas affected the remaining textile gradually, as the separation between rigid and intact BC applications became blurred upon rigid BC application, indicating bacterial engagement from both densities applied and conforming the textile.

DISCUSSION AND CONCLUSION

This research represents a first step towards compounding textile and fashion design by endowing textiles with garment characteristics. Material testing confirms the feasibility of such hybrid stage, revealing design potential in the act of embodiment by augmenting its aesthetic expression through intentional BC-human interaction (Fig. 01). Future design directions fusing textile and fashion towards garment production may benefit from applying design expression conclusions at early-stage material planning, rather than waiting for end-of-growth phases to then modify the material outcome. This will require anticipating the behaviour of the non-human and contend-

ing with unexpected artefact outcomes, which further questions how and whether producing such prototypes could or should be scaled up.

Early-stage material planning, combined with findings surrounding fabrication processes, suggests reconsidering step order. This study concludes that more effective ways to build form through textile making would be to fully dry the prototype only after all BC layers have been attached and shaped. Another consideration would be to switch the order of steps; applying rigid BC paste before fully coating the prototypes with unaltered paste. This reorganisation addresses the difficulty in compounding wet and dry pastes manually, and proposes that unaltered paste may be more effective in encapsulating and supporting the shaped, rigid BC paste, instead of attempting to modify the form of unaltered paste by applying rigid paste.

Human-bacterial interaction takes many forms, several yet unknown or not understood, but a common element of design leveraging interaction as a fabrication method is that these interactions occur across timelines. As opposed to traditional, extractivist methods where material is harvested before processing and manufacture begin, this type of collaborative design relies on growth and regeneration throughout the fabrication process. This means that material will be obtained in 'on-demand' bases, and calls the question of what and when is being made, as bacterial growth can be interpreted as a form of design expression - roughly translated to human terms. Engaging with bacterial growth from a human perspective demands contention with unexpected outcomes of growth and stimuli responses, as well as broaching agency as a design element through intentional crafting of temporalities.

A key problem biodesign must address is its application to large-scale outputs (Groutars et al., 2024; Arnadottir et al., 2021; Biofabricate, 2020), whether this be by introducing facilities and tools adapted to interspecies collaboration (Arnadottir et al., 2022; Turhan et al., 2022), or devising fabrication methods enabling large scale fabrication within temporalities appropriate to produce biological responses (Karana et al., 2020; Giaccardi and Karana, 2015) towards material expressions. Autopoiesis has been here investigated successfully through additive manufacturing approaches, revealing a possible way to enhance textile economising during manufacturing. Creation of

form has further shown variation in texture, which may be translated into a number of components across garment archetypes, which require individualised, dual exploration to achieve performance and artistic standards beyond the production of flat, soft textiles.

Participants appeared reluctant at the start of initial encounters, but display a higher level of interest and curiosity as this encounter is prolonged, and becomes performance (Fig. 03; Fig. 04).

Vocabulary featured heavily in workshop discussions in, for instance, describing assembly as 'grown' or 'constructed' rather than 'sewn'. This suggests that a lack of specific wording and material knowledge may hinder audiences from interacting with and expressing curiosity for this and other living materials. During the first workshop, participants seemed more focused on coming to grips with the material, basal assembly techniques, growth methods and material properties, especially regarding texture. Draping attempts were done mainly on extremities, only shifting to participant's torsos towards the end of the first session. Proposed artefact uses centred accessories rather than close-fitting garments. However, during the second session, participants inquired about potential ways of permanently joining these prototypes, or hypothetical duplicates, into larger artefacts through traditional cut-and-sew techniques, bacterial-based joinery systems or modular design, suggesting an amplified ability to envision full garments and outfits constructed using this biofabrication method. Their draping evaluations verified the previously selected design forms, and quickly shifted to more draping explorations starting at the torso and progressing to the head, which hadn't arisen as an option previously. Additionally, when discussing potential artefact uses, participants identified specific existing uses where BC artefacts could be potentially used; furoshiki, business card holders and headgear for Awaodori dance festival. Context of proposed artefacts involves a degree of material and artefact care, as these belong in well-regarded contexts, suggesting positive attitudes towards BC material after having interacted with BC prototypes.

Currently, the interaction involves a BC-produced object, but explores aesthetic expression from a post-growth perspective, without living bacteria. Amongst workshop participants' reflections, the possibility of human and bacteria

coexisting in living states was brought up during the second session. This was followed by discussing the purpose of maintaining artefacts alive, concluding that it could be a useful endeavour although they struggled to imagine specific, detailed contexts involving fashion. Regardless, potential future uses for symbiotic wearing were enthusiastically encouraged. Possible novel design forms could call for maintaining BC alive by shifting interspecies interaction from commensalistic to symbiotic, especially concerning repair through regrowth strategies, as observed in architectural (Arnadottir et al., 2020) fields. Furthermore, as living material properties continued to be discovered and understood, the possibility of live usage applied to fashion can't be discounted until more profound conclusions are drawn from an integrated science and design approach. In the case of fashion, the proximity of the human body to bacterial source implies challenges for consumer acceptance which design must contend with for this path to thrive.

While this study suggests rearranging the fabrication steps, it successfully delivered textile-fashion hybrid prototypes, positing how autopoiesis may reduce fashion waste. In contextualising, participant interaction reveals increased human-artefact interaction as BC familiarity nears performance (Giaccardi and Karana, 2015), positively correlating sustained interaction with design iterations. Finally, following the variety of potential design avenues specific to each artefact, the result broaches the topic of scalability, not in size, but intentionality, as well as purporting individualised purposes for each artefact.

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CAPTIONS

[Fig. 01] 'Sampling' (left) and 'Prototyping' (right) objects. 'Sampling' objects show different water volumes removed from BC swatches. 'Prototyping' objects show flat scaffolds marked up for BC paste application in preparation for the next stage, artefact development.

[Fig. 02] Photographs taken during workshop sessions, illustrating and detailing the progression of experimental interaction as participants became more familiar with the objects and the BC textile. This progression includes both design development and participant engagement with the biomaterial, where earlier stages represent encounters and

later stages align with performances, as described by Giaccardi and Karana (2015).

[Fig. 03] ‘Sampling’ (left) and ‘Prototyping’ (right) objects. ‘Sampling’ objects show different water volumes removed from BC swatches. ‘Prototyping’ objects show flat scaffolds marked up for BC paste application in preparation for the next stage: artefact development).

[Fig. 04] Diagram of the proposed method and the resulting workflow, outlining how situated expression and interaction enable retroactive and regenerative method loops in material design workflows. Future design directions demonstrate feasible development from material-led perspectives as well as interaction- and context-led experimentation.

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SENSORY REPAIR

CRAFTING INCLUSION THROUGH DESIGNING WITH THE SENSES

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Abstract

This paper explores clothing as a multidimensional sensory experience and examines how fashion might better support neurodivergent individuals, a group who often experience heightened sensory interactions with the environment. In current fashion practices, the visual design of clothing is typically prioritised, often overlooking the needs of those who prioritise non-visual senses. Neurodivergent wearers may find certain design elements, like garment labels or fabric textures, impactful to their comfort and subsequent wellbeing. This research investigates the intersection of fashion, neurodivergent experience, and the senses. Using participatory design methods, this paper illuminates strategies to create garments that support neurodivergent needs, advocating for an approach that prioritises the wearers wellbeing through non-visual, sensory experiences in fashion.

Keywords: *Inclusive Fashion; Sensory Fashion; Participatory Design; Fashion Design*

INTRODUCTION

Wearing clothing is a multisensory experience (Chong Kwan, 2020). For instance, a jumper provides a proprioceptive weight on the body, envelopes with texture, carries a smell after washing, and, of course, visually impacts us. These sensory experiences—touch, smell, sight, and more—define how we interact with clothing daily (Lavery, 2021). While many people primarily experience clothing visually, some, particularly neurodivergent individuals, may find that tactile, auditory, olfactory or other sensory aspects have a stronger influence on their experience. For example, the noise of certain fabrics rubbing, or a particular texture, might be uncomfortable for neurodivergent wearers, leading to distraction,

stress, or confusion (Kyriacou et al., 2021).

Generally, there are limited considerations of the multi-sensory experience of wearing clothing. This visual approach overlooks a substantial population who might benefit from more sensory-aware design practices. Neurodivergent is a term generally used to describe individuals whose neurological functioning differs from what is typically considered neurotypical, for example, individuals with ADHD and autistic individuals. For neurodivergent individuals, neurological functioning can affect sensory processing, which in turn can influence how they experience and interact with the environment. This sensory processing can make everyday sensory stimuli—for instance loud city sounds, as in the case of

one autistic mental health counsellor I spoke to—overwhelming. In the context of clothing, similar sensitivity applies: fabrics that feel soft to some may be unbearable to those with heightened tactile awareness, and certain textures or sounds can cause extreme discomfort (Kyriacou et al., 2021). The connection between wellbeing and the senses is significant when designing for neurodivergent users. By exploring clothing as a means of creating a sensory-friendly environment, designers can transform clothing into a tool that actively supports neurodivergent wellbeing.

Inclusive design aims to be usable for as many people as possible, with particular attention to groups who have often been overlooked or excluded in mainstream design practices. Additionally, inclusive design methods have often been approached as problems to be solved (Pullin, 2009). This research instead responds to; *how do individuals foster a sensory experience through materials and trims? What are participants' approaches through exploration and curiosity rather than designing a 'solution'?* This work with individuals hopes to shed light on if there is continuity in how a range of participants create similar sensory experiences. The goal of this research is to contribute towards a shift of clothing as a form of design that actively supports wellbeing (Gaudion, 2014).

As addressed by Temple Grandin “So many professionals and nonprofessionals have ignored sensory issues because some people just can't imagine that an alternate sensory reality exists if they have not experienced it personally... That type of narrow perception, however, does nothing to help individuals who do have these very real issues in their lives” (Grandin, 2008, p. 58). This research seeks to promote understanding into a diverse range of sensory experiences, acknowledge a range of sensory experiences and to be informed directly by those with a sensory experience that is often seen as “different”.

Additionally, the use of language throughout this paper uses neurodivergent to refer to the participants worked with, with the majority favouring this term and identifying as neurodivergent. This choice of language does not reflect the greater preferences as part of the neurodivergent community. Additionally, neurotypical is used to refer to non-neurodivergent individuals, though it does not condone what is seen as ‘typical’.

THEORETICAL BACKGROUND

The term neurodivergent was originally used to describe autistic individuals but has now broadened to include ADHD, Dyslexia, Tourette's, and Dyspraxia (Gaudion & Phillips, 2024). Approximately 1 in 7 people are neurodivergent (“Support for neurodiversity”, 2024), with over 1 in 100 individuals diagnosed as autistic (Milton, 2012). The wellbeing of neurodivergent individuals, especially within the autistic community, is markedly lower than in neurotypical populations. For instance, autistic individuals are four times more likely to experience depression than non-autistic people (Hudson et al., 2019). This disparity highlights the pressing need for greater understanding and support for neurodivergent individuals across various aspects of daily life. While clothing design may not directly prevent depression, for example, the sensory interactions inherent to design can influence wellbeing and impact individuals over time.

Sensory preferences vary between people. Some individuals may seek certain types of sensory input, while others may avoid particular sensory experiences, with a wide range of variation in how these preferences are expressed. For example, weighted blankets are commonly used to provide proprioceptive feedback, helping to calm the nervous system for individuals who prefer this type of sensory input. Conversely, earplugs are generally used to minimise or control auditory stimuli. Such tools provide ways for individuals to manage their sensory environment, which can be a critical factor in daily wellbeing. Sensory management and coping strategies are used by many neurodivergent individuals as a form of control over incoming sensory stimuli and can be pivotal for everyday life (Kyriacou et al., 2021). Extended or intense sensory input can have an impact on individuals, leading to raised stress (Bogdashina, 2016) as well as be confusing and painful (Caldwell, 2011). Similarly to Gaudion's research on designers needing to further understand the sensory qualities of the environment (Gaudion, 2014), this research aims to foster an understanding of the sensory qualities of clothing for fashion designers.

Historically, autistic individuals have often been positioned as subjects of research rather than as researchers (Milton, 2019). Although roles for neurodivergent individuals in research are expanding, there is still a significant need for studies that are led and shaped by neurodiver-

gent individuals. The political principle of ‘nothing about us, without us’ emphasizes that autistic people should be actively involved whenever autism is discussed, an approach this research seeks to support and promote.

PARTICIPATORY DESIGN METHODS

To investigate the clothing-focused sensory priorities of neurodivergent individuals, participatory design methods were utilised. Participants, neurodivergent artists and designers across Amsterdam, Rotterdam, and The Hague, were invited to participatory design workshops. In these intimate settings (ranging from one-on-one to groups of six), participants were asked to create low-fidelity prototypes that explored how clothing might better support their sensory needs. Participants worked with a small variety of materials and trims, synonymous with dress-making, modifying existing garments or creating prototypes to physically communicate their preferences. These workshops were followed by the creation of subsequent high-fidelity prototypes, made by myself, the designs of which followed the participants’ creations. Participants tested these high-fidelity prototypes in real-life contexts to gain insight into the garments’ impact and effectiveness.

Participants were not asked to identify a ‘problem’ to be ‘solved’ through design. In this context, asking participants to identify a ‘problem’ felt both unnecessary and counterproductive, as it seemed to imply that the designer viewed neurodivergent experiences or behaviours as issues to be fixed or avoided. Instead, participants were encouraged to follow their sensory curiosities, using their tacit knowledge to guide the design and making process. Due to limited time (1–3 hours), energy, and resources, participants in the workshops weren’t expected to create a ‘perfect’ or final garment. Instead, the aim of these low-fidelity prototypes was to provide insights into participants’ sensory priorities and how these could be designed for using trims and materials. Working with a range of participants helped reveal commonalities in sensory interests and how these were fostered through design choices.

As a neurotypical designer conscious of biases in interpreting neurodivergent experiences, participants were considered as equal contributors to the research. These participatory design methods were used with an urgency to include

members of a community who are often excluded from design research (Gaudion, 2014), in a way that aligned with a suitable method of contribution and to ensure participants felt included and empowered (Milton, 2014). Physical prototyping in a group setting was a method that aligned with the backgrounds and experience of participants who were studying or working as artists and designers, as they were accustomed or familiar with these methods of working. Through direct engagement of participants, designs aimed to not be inhibited by the designers’ preconceptions of neurodivergent-friendly clothing such as a focus on removing seams or labels due to common dissatisfaction with these elements (Kyriacou et al., 2021), instead being led directly by members of the neurodivergent community.

GUIDELINES FOR CRAFTING SENSORY EXPERIENCES THROUGH CLOTHING

The majority of participants in this group explored the use of materials and trims to engage the proprioceptive sense, which refers to the body’s ability to sense its position and movement in space. Although there was a commonality in exploring this sense, each individual fostered this feeling in a unique and personal way through a series of design decisions. This highlighted that even for those participants fostering a similar sensory experience, there were a range of ways in which this sensation could be created. As each prototype was distinct and unique, it is preemptive within this research to share specific design guidelines for stimulating the proprioceptive sense. While the findings didn’t determine the ideal way to stimulate the proprioceptive sense that would appeal to the majority of wearers, insights were gained into the considerations designers may make when working *with* prompting the senses.

To develop sensory-driven garments, designers should use materials and trims with an awareness of their sensory impact, engaging participants in reflection on these properties. Throughout the remainder of this paper, one participant’s prototype will be referred to illustrate a range of insights, going forward they will be referred to as K. In the case of K’s prototype, when making the high-fidelity counterpart, an alternative elastic was used as the original one could no longer be sourced. This elastic, although visually similar, was stiffer than the original elastic used. When

testing the high-fidelity prototype, the tactile and proprioceptive properties of the elastic altered the experience of wearing the garment for the wearer. Although 2 months had passed since the workshop, K noticed and remarked negatively on the change in elastic. This moment created some insight into the participants' tacit preferences of the elastic and highlighted the designer's lack of wider sensory clarity of the elastic. Due to the tacit and personal nature of the research, designers are encouraged to prompt participants to gain a thorough understanding of the wider sensory properties of materials and trims. These insights subsequently guide future design decisions made by the designer and impact the effectiveness of the design. In the example of K, the lack of awareness as to the greater sensory-properties of the elastic choice negatively altered the sensory experience of wearing the high-fidelity prototype. Additionally, participants' use of materials and trims often shifted practical design considerations toward a focus on emotional and sensory comfort. For example, K explored creating pressure through the use of buttonhole elastic, subverting the usual functional use of buttonhole elastic. K demonstrates how participants can use trims and materials in an innovative way, rooted in wellbeing and far from the functional use that a traditional fashion designer might use this trim for. Designers are encouraged to allow participants to be an equal contributor to the research to create space for participants to explore the ways in which existing materials and trims can be used in innovative ways.

Many participants' prototypes incorporated adjustability into their low-fidelity prototypes. Very few participants created a garment that created a constant interaction with the body, with the majority of participants creating a design that could be interacted with on their own terms, as and when needed. In the example of K, they used buttonhole elastic to create the feeling of pressure to stimulate the proprioceptive sense. The buttonhole elastic sat flush along the straps and led down to the centre front of the garment, here it was fixed into place with buttons that were sewn onto the bodice. When the buttonhole elastic was pulled tighter and fixed into place with the buttons it created a stronger feeling of pressure for when the wearer was seeking proprioceptive sensory input, such as in a moment of stress or anxiety. Conversely, the elastic could be loosened and held into place with buttons when the wearer was no longer seeking that sensory input.

This adjustability aligns and acknowledges that sensory preferences, such as seeking deep pressure, are not constant but rather they can fluctuate and change. Acknowledgment of these shifting sensory preferences can be supported through adjustable design elements, such as, in this case, the use of buttonhole elastic, or, for example, a design element that can be easily removed by the wearer when not in use.

While fabric choice was not a primary focus for participants, likely due to limited options, it remains a crucial element in providing comfort and ease for wearers (Kyriacou et al., 2021). Research indicates a general preference for softer fabrics, such as satin over spandex (Kyriacou et al., 2021), though nuances within these preferences warrant highlighting. There is a significant difference between actively choosing to touch a fabric and experiencing it continuously against the skin (Kyriacou et al., 2021). The body, as a sensory receptor, has areas with varying levels of sensitivity, making fabric and design placement essential considerations for designers. For example, K, explored design placement at the chest, while others focused on the waist and back. These choices reflect each individual's unique sensitivity in specific areas; although K stimulated proprioception at the chest, another sensation, like a light touch, may not have been as pleasant. Although some general trends exist, such as heightened sensitivity in the upper body (Kyriacou et al., 2021), these individual differences emphasise the importance of combining fabric choice, design, and placement with sensitivity in mind. In practice, this may involve panelling or lining with softer fabrics, especially where abrasive materials might otherwise cause discomfort. Together, these findings illustrate overarching guidelines for designers to consider when promoting a sensory-experience.

THE NEED FOR CRAFTING SENSORY EXPERIENCES THROUGH CLOTHING

From the participants that tested their prototype in context, they reported positively as to the effect the prototype had on their wellbeing. Although the prototypes were not perfect, final garments, participants acknowledged the potential that the garments would have on their wellbeing. K, for example, reported that they first wore the garment in a moment of anxiety and that the garment helped them feel soothed, reflecting that this was probably

due to the proprioceptive feedback provided by the straps. K also mentioned that the top seemed to support their concentration, attributing this to the grounding effect of proprioceptive input, similar to their weighted blanket. Here we see the impact that sensory-drive design has on the wellbeing of wearers and how it can be utilised as a tool for wellbeing rather than simply worn.

Participants reported they felt the garments tested gave purpose to their movements, fidgeting and stimming. Additionally, some participants relayed that they felt encouraged to further explore their own sensory preferences through clothing. Not only did participants contribute to the research directly but they were able to learn more about their preferences and curiosities, suggesting there was some empowering outcome for some participants. The workshops provided an opportunity through which they could learn more about themselves as well as provide insight into the ways fashion can learn from the neurodivergent community directly.

Without K and the other participants' contributions to the design process, it's uncertain how the garment's design or effectiveness might have evolved. Their input was vital, with each participant bringing tacit knowledge and personal experiences to these workshops, shaping outcomes in ways that theoretical research alone might not.

FUTURE RESEARCH

This research included a small sample of neurodivergent individuals, suggesting further collaboration with a wider range of participants is needed. Due to this small sample, it was preemptive to draw conclusions into which materials and trims can be used to foster a particular sensory experience that would appeal to a wide number of wearers. To further research on prompting the senses through fashion, designers are encouraged to continue collaboration with neurodivergent participants. Designers are able to learn a lot about the sensory experience of clothing, and how to design accordingly, through direct and meaningful collaboration. The role of each participant should be aligned with their capacity and preference for engagement. In this research, participants created low-fidelity prototypes; however, this approach would not suit all neurodivergent individuals with suitability being impacted by a number of aspects such as age and ability. By adapting participatory design methods to provide options for partici-

pation, designers can create opportunities for a wider range of individuals to lead and contribute to the process in a way that feels comfortable and meaningful to them.

CONCLUSION

This research aimed to further understand how individual members of the neurodivergent community might foster a sensory experience and to identify commonalities in these design choices. Due to the wide and varied prototypes that emerged this research doesn't share guidelines for designing a sensory experience but rather provide guidelines for working with creating a sensory experience. Designers are able to support sensory-driven design through; adjustability to cater to fluxes in sensory needs, design choices and body placement to acknowledge the range of sensory receptors in the body, developing sensory-insight of materials and trims to shape a sensory experience. These guidelines can assist in the building of a sensory experience that can positively impact wearers.

Inclusive design practices tend to focus on identifying a 'problem' to be 'solved'. Moving away from this approach to avoid interpretation that neurodivergent experience and behaviours are an 'issue', in the context of this research, designs were informed by participants' personal curiosities in terms of clothing and sensory experience. This way of working relied heavily on participants bringing tacit, personal knowledge into a tangible and experiential form. Through this collaboration, insights are gained into how to design with the senses, the effects of this design on wellbeing and a more thorough and empathic understanding of a number of wearers.

The research was limited to collaborating with a small group of neurodivergent individuals, primarily autistic women from, and/or living in, Western Europe aged 18-35. This provides a window into a small subset of individual sensory preferences only. Of course, this demographic does not represent the full spectrum of neurodivergent experiences, highlighting the need for continued work to expand understanding and acknowledge the nuanced diversity within this community. Broadening the scope beyond this participant group would further enrich the approach to sensory-driven design and highlight the range of ways in which participants can contribute to the design of items that impact them.

By shifting the approach of fashion practices from emphasising the visual to the remaining senses, fashion is able to create opportunities for a range of wearers to prosper through wearing, and interacting with, clothing.

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ARTISTIC CONNECTIONS

RE-FRAMING PRINTED TEXTILE DESIGN PROCESSES FOR FASHION BASED ON THE CHINTZ

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Abstract

In an era dominated by tidal waves of visual stimuli across various digital platforms, we find ourselves scrolling and swiping incessantly. Images flicker momentarily before disappearing, stored away in unseen databases. When we consider imagery related to fashion, particularly printed textiles, we observe that these pieces also showcase a multitude of visuals but, unlike their digital counterparts, printed textiles are permanently situated within a specific time and place. This permanence highlights a stark contrast with the rising tide of fashion waste, revealing the fleeting nature of our throwaway culture. Print lies at the core of the waste crisis in today's fashion landscape. Alarming statistics surrounding fashion production and waste underscore the issue; printed garments are disposed of just as swiftly as digital images are scrolled into oblivion. Wearing printed art is both majestic and powerful, yet contemporary fashion seems to be out of sync with this value. This research delves into the illustrious chintz, a motif that has maintained its appeal over centuries and has been cherished in the realm of fashion. An exploration of this motif and its applications on fabric reveals concepts of artistry, upcycling and the appreciation of printed pieces as heirlooms. This paper draws on historical lessons that could inform our modern approach to print design in fashion today, creating a bridge between textile artistry and fashion design while fostering deeper connections with garments through interaction with established print techniques.

Keywords: *Chintz, Motif, Textile, Print, Fashion*

INTRODUCTION

Part One, FORMER, delves into a historical analysis of the chintz phenomenon spanning the 17th to 18th centuries, uncovering its lasting allure. Chintz represents not just a design aesthetic but a collection of specific techniques developed by a collaborative community that significantly influenced the art, printing methods and the integration of textiles into fashion. Part Two, FUTURE, examines the lessons we can draw from chintz to enhance future practices, fostering a deeper appreciation, connectivity and awareness of art in garments. This study aims to forge a connection between the past and present, emphasising the importance of textile artistry and design as central elements of fashion design,

pattern cutting and manufacturing. (Fig. 01).

FORMER

“I paint with a kalam, in stillness yet creating motion, a dance of the undulating trees with a thousand little steps and details. Forever in the present yet I travel in time, paying tribute to the many unknown artisans, their heritage resonating within me” Renuka Reddy, 2024.

For centuries, chintz, the vibrantly coloured and boldly patterned prints, have been coveted as fashionable dress, luxury furnishings, gifts and sacred objects, both throughout the Indian subcontinent and around the world. The desire first to possess and then later to imitate Indian chintz



Fig. 01

transformed the arts, industries and economies on five continents (Fee, 2020). Chintz ignited global trade in fashion and prompted mass and mainstream manufacture of printed cloth. Historians considering consumption argue that the commodities imported into Europe from Asia, especially cottons (chintz), became significant in cultural terms because they shaped European innovations, imitation and taste (Riello, 2013). Today, as global trends increasingly prioritise craftsmanship and slower lifestyle choices, there is a corresponding enhancement in the recognition and appreciation of Indian culture, print variables and motif sensibilities that were part of the chintz appeal. Renuka Reddy is an example of an artisan reclaiming the manufacture of chintz in India today by re-creating the detailed account of Antoine Beaulieu to craft chintz by hand. Reddy has exhibited this process and reminds the world that this was not necessarily a design process but a set of techniques that amounted to what made historical chintz so special.

Few chintz pieces from the 17th and 18th centuries remain compared to the millions of cloth items that were exported and consumed during

that time. These garments were printed on cotton, which tends to break down. Yet, research indicates that these intricately printed textiles were so valued that they were often upcycled into smaller garments, accessories or home furnishings, being passed down through families or shared among communities. For instance, Figure 01 showcases a Coromandel Coast cotton print from 1740 that was repurposed as a lining for a straw hat created between 1750 and 1780. This hat, produced decades after the fabric was originally printed, serves as a notable example of the enduring nature of these textiles. An exploration of chintz offers insight into its unique qualities and how it has transcended the cycles of fashion.

Using a methodology based on close reading and visual analysis, this paper illustrates a list of focus areas that define the qualities of chintz art in textiles and its success. By centring on the creative collaboration of stakeholders, the study uncovers the long tradition of creative processes that enhanced the enamour, appeal and success of the printed cloth. The research focuses on printed chintz specifically from India using hand techniques of kalamkari and block printing, both which later influenced the print revolution of Europe. The following areas of collaborative artistry and processes highlight the integral contributions of each stakeholder:

FREE ARTISTIC EXPRESSION

Design ideas sent to company agents in India were frequently accompanied by instructions to create in his own manner. The textile artisans added their own distinct flair, their personal handwriting. As a result, no two pieces were exact replicas. The Hindu craftsperson rarely copied exactly. Instead referencing foreign musters after his own manner (a phrase recurring in English East India Company records). Imposing upon the borrowed subject matter, it was precisely this indigenous contribution which had individuality and distinction to the designs and supplied what to the Europeans was their exotic appeal (Irwin & Brett, 1970). This free expression is the 'design leap' or 'creative act', a process Wang & Ilhan (2009) describe as the unpredictable provenance of creative acts — the brilliance of creating freely.

Hand-rendered sensibilities were embraced in the 17th and 18th centuries. The concept of accepting the particulars of an artist's work was celebrated and textile artisans were revered for

their creative flair and differences. In the 17th and 18th centuries, we can visualise the unboxing of a shipment of chintz cloth with delight over the cloths, impressed by the genius and creative spirit of the textile artists' works. By comparison, thousands of meters of printed fabrics are rejected today often due to trivial factors.

COLOUR GENIUS

Appreciating the art — and genius — of Indian chintz thus begins with appreciating the sophisticated techniques and colour chemistry developed by the subcontinent's artisans (Fee, 2020). The fastness of colour allowed (chintz) to be washed and to resist fading when exposed to light (Riello, 2013). The application of colour was an art that took many attempts to formulate and record in the 18th century, and the craft of resist application is one that Renuka Reddy has been inspired to recreate today. Reddy traces Father Corudoux's letter on the technique of Indian cotton painting in 1742 and 1747, as well as Beaulieu's account in 1734 (Fotheringham, 2015). Reddy shares the challenges of engaging with this process hundreds of years later, highlighting the effort and time spent to achieve such outcomes. Part of the majesty of chintz colours lies in the fact that humble ingredients were indispensable for achieving the durable and bold colours, including, but not limited to, buffalo milk, sunshine and animal dung, myrobalan fruit, tree gums, beeswax and rice starch. The formula revolved around key colours, and when initial chintz with red base grounds was received as sad by the account of the East India Company, artisans adapted to white base grounds with bold motifs and outlines. This shift to a neutral base colour contrasted with bold motifs exploded the demand and popularity for chintz in Western continents. These colour arrangements remained consistent over centuries.

TREE OF LIFE SYMBOLISM

The Tree of Life is a construct deeply embedded in India's ethos. TAPI collectors Shilpa and Praful Shah put the mystery of the chintz down to embedding the Kalpavriksha, a wish-fulfilling divine tree of Hinduism, Buddhism and Jainism religions. As the 18th century progressed, the flowering tree continued to evolve, at times becoming more overtly Chinese in style; this was especially apparent from 1770 with the addition of spiky leafed bamboo twining around (tree) trunks (Crill, 2020). The tree and its growing branches

were always part of chintz design and remained a key metaphor for growth and life. Carl Jung (1934) claims that societies have always found their deepest value and sense of meaning in the realm of the mythic and transcendental. The mythic connotations of this growing tree remain part of chintz's design and storytelling, even today.

ADAPTING ARTWORK TO FOLLOW GARMENTS

As chintz made its way from home furnishings to fashion, its intricacies and layouts continued to evolve and adapt to suit fashion styles and yardages of fabric. Many archival examples demonstrate how border arrangements, motifs, repeat and overall designs were suited to fashions of the time, including the kimono-like banyan, which utilised the width of a selvedge, to full flared skirts that featured borders on the hem and sprawling tree motifs on the skirt. The repeats and artworks followed the cuts and fashions of the time and, perhaps in some cases, the opposite.

From the 1760s onwards, fabrics with vertically arranged motifs were fashionable in Europe and, consequently, chintzes were ordered with such designs. In its turn, the vertically patterned chintzes were imitated by printers across Europe (Hartkamp-Jonxis, 2023). Evidently, there was a conversation between print artwork and pattern cutting. This revered fabric was not to be wasted; many garments utilise chintz offcuts as facing and lining pieces, some with selvedge details still intact. A specific study of archival chintz garments in the future may allow for a further breakdown of analysis.

MYSTICAL EXOTICISM

Upon investigating the chintz, research showcased that reworking forms of inspiration in print textiles is not a new phenomenon and was a significant component of the chintz. Geiger (1979) describes the creation of textiles as connecting disciplines of ethnography, art history and collecting antiquities. Many printed textile artworks draw on existing motifs, references and imagery; this is a practice that is prevalent in textile inquiry and production today. McNeil & Riello (2016) describe the appeal of the ancient as sparking a fashion for the 'antique' that influenced everything from architecture to interior decoration and dress in the 18th century.

Many chintz designs feature a collective of motifs that amalgamate many references in one. The overall result was often a hybrid that included

original Indian influences, established canons in European textile design and some innovation introduced by the experienced eye of servants of the East India companies (Riello, 2013). Early chintz depicted flowering trees rooted in magnificent mounds formed by patterned shapes and often surrounded by intricate borders and vases with large bouquets. The mounds are said to look like Chinese hillocks, and could have been adapted along the way with pseudo Chinese design (Irwin & Brett, 1970). The trees, with their sinuous trunks, are said to reference 15th and 16th-century Persian and Islamic paintings and foot stones. The design(s) also resembles the rendering of trees carved in relief on a number of marble foot stones of Muslim graves in the vicinity of Pasai, in north Sumatra, Indonesia (Hartkamp-Jonxis, 2023). The flowering tree with sinuous trunks is also seen on the Sidi Saiyyed Mosque built in 1572-73 AD and is a famous mosque of Ahmedabad, a city in the state of Gujarat, India (Hartkamp-Jonxis, 2023). Several chintz designs with motifs closely referencing Japanese visual sources are preserved; these are often incorporated into fantastical scenes that become a mystical state of the imagination, not belonging purely to a single cultural origin. Once chintz had a foothold in the European market, many English and Dutch references and musters were sent to the artisans to incorporate into their designs. English flowers, distorted into something fanciful by Indian eyes to whom the plants were alien, were now welcomed in their new form as expressions of exotic fantasy (Irwin & Brett, 1970). Key chintz historians have located the exact sources referenced in chintz productions. Katherine Brett and John Irwin have made connections between 18th-century chintz and the British Publication 'Twelve Months of Flowers' by botanist Robert Furber, produced in 1730. Rosemary Crill highlights parallels to Jean Bérain's 1710 architectural illustrations. Other Western elements fed directly into chintz designs, including the often strange re-workings of narrative prints, for example, Don Quixote and Sancho Panza incorporated into a tree design (Crill, 2008). The specificity of chintz inspiration is still in need of much further research, and Metsger (2020) conjectures that the imaginary flowers of chintz draw on the artist's experience of the rich flora of the Indian subcontinent and elsewhere — both in nature and art. Textile artists created scenes of morphological structures, embellishing them to create hyper-real

imagery. Many chintz also added playful elements to otherwise formal layouts and designs; cavorting monkeys and fruit-stealing chipmunks are some of the many details incorporated. Majestic animals often took pride of place amongst the florals and scenes depicted. This playful relief allowed us a glimpse of relief from the artist's laborious work (Crill, 2020).

Overall, the fusion of fantasy and reality in delicately balanced proportions rendered the motifs and imagery included in chintz print artworks enchanting. This fantastical creativity blending references with imagination is an extension of free artistic expression, whereby the textile artists were given creative license alongside musters and references.

COTTON

Critical to chintz was the cotton it was printed on. This was finessed over the course of 5,000 years. Archaeological evidence links the domestication of one species, the so-called tree cotton (*Gossypium arboreum*), to the rise of the great Indus Valley civilisation that flourished from 3500 to 2000 BCE in the area bridging today's India and Pakistan (Fee, 2020). Reddy (2020) shares that even after approaching master weaver Jyotish Debnath, he was unable to reproduce a cotton similar to an original chintz today. Credit must lay in the majesty of the superbly weaved cotton fibre mastered in India.

UNDERSTANDING DEMAND: KNOWING THE MARKET

Indian artisans had already been dealing with customisation for centuries because they produced specific products for various Asian markets. Surviving artefacts show the flexibility of producers in adapting to the requirements of consumers from thousands of miles away (Riello, 2013). European East India companies displayed acute awareness of the importance of colours and designs, often conveying recommendations on what had to be purchased in India. Riello (2013) gives the example of the Dutch East India Company servants imparting orders that sarasa cloths had to have just one flower and a range of leaf patterns.

Irwin & Brett (1970) highlight a letter that marks the first known occasion on which directions were issued from London about adapting Indian patterns to suit Western taste. Before these sorts of instructions, the appeal had been simply that of novelty or curiosity combined with impressive qualities of cheapness and non-fugitive dyeing. In

1662, for the first time actual patterns were sent out for the Indian cotton-painters to copy:

“We now send you herewith inclosed, several patterns of Chints for your directions, and desire you to cause a considerable quantity to be made of those Workes”
India Office Records, Letter Book III p.161 (Irwin & Brett, 1970).

Raveux (2014) shares evidence of Marseilles client requests that can be found in a register of correspondence kept by the Marseilles trading house Tiran & Rampal in Smyrna between 1679 and 1683. An active relationship and consistent feedback loop continued to shape and refine chintz for the market.

CROSS CLASS DISSEMINATION

Chintz was a print motif that was adored by all and controversially disseminated class distinctions, age and gender. Its allure was so strong that consumers seemed indifferent to who else might wear the same design. In the 18th century, chintzes democratised the consumer market in Northern Europe as the upcoming middle class could afford to buy low-priced chintzes with simple, floral motifs. For the more well-to-do market, chintzes with more intricate patterns were available. Lemire (2003) has emphasised the importance of creating new distribution channels and fostering established ones (shops, second hand, peddlers etc), which allowed the new fabric to reach all consumers, rich and poor alike. These physical spaces allowed consumers to learn and discuss trends and tastes and appreciate both textile art and garments. These spaces fostered community, interests and an appreciation of the arts and fashion.

The above eight focus areas demonstrate the partnering of both artistry and design. These are not separate disciplines, but intertwined. The pairing of design strategies such as print repeat and fostering markets with free expressive artistry demonstrates an ability to create longevity. Reflections on historical chintz give way to opportunities to create and foster garments, printed textiles and stakeholder relationships in a new way in the 21st century.

FUTURE

“What is consider(ed) worthy of saving in this world and what do we let go?” Rithika Merchant, 2021

As observed in Former, chintz was not a decorative artwork sought to be applied to existing fashion, trends or garments. It was a collection of artistry, techniques and a collaborative community that worked together. This community collaborated to form the artwork, patterns, shapes, designs and market them even from a distance. This feels absent today. As McQuillan & Rissanen (2020) identify, the traditional separation of design roles in fashion, particularly in larger mass-market and ready-to-wear companies, is a key challenge for fashion design (solutions) and further distances fashion design from issues it could address. Wood (2007) further highlights that design needs to become an integration of disciplines; in this regard, meta-design is a methodology to nurture the emergence of new ways of designing that forge creative links across industries. Whilst examining historical chintz practices the forces of both artistry and design intertwine. The *je ne se quais* of printed chintz is challenging to define to one certain attribute, but perhaps the collaborative fusion of art and design aided the historical allure. A contemporary observation of design following art is pointed out by McQuillan & Rissanen (2020) in Zandra Rhodes' Silk Crepe de Chine Wrap Dress 'Chinese Squares' from the Chinese Collection Spring/Summer, 1980 (Fig. 02). This is a demonstration of print, pattern and yardage working together. In this regard, the textile leads the garment design, with the pattern cut around the hand-painted square motif to not disrupt the painted lines and form. In an industry where design and pattern cutting have often led textile design, a major opportunity is presented to work with design and pattern cutting to optimal outcomes, as was often the case with chintz. Zandra Rhodes' Chinese Square example displays this possibility, yet it is not often the case in commercial fashion. The current fashion system supports a model where artworks are often purchased from a catalogue of seasonal designs and made to work or fit within existing patterns, designs and seasonal staple garments.

Most textile designers do not have their names associated with their fashion artworks but are often recognised as artists in other practices. In today's digital economy, it should be standard



Fig. 02

to trace the origins and recognise the artisans behind fashion creations. Textile designer Zandra Rhodes stands out as a notable example, having gained decades of recognition for her collaborative designs, including recent partnerships with Celia B in 2024 and Valentino in 2016. Another example is Rithika Merchant, who collaborated with Chloe in 2018 to bring her art to life across various textile mediums and has partnered with Dior in 2025. Merchant's work invokes a mystical blend of symbolism, personal inspiration and storytelling, key components seen in use with chintz. At the recent Dior couture showcase in 2025, Dior collaborated with Merchant to bring to life the stories of her ancestors through the series 'The Flowers We Grew'. Merchant's artworks were translated into stitch by the master artisans of Chanakya and the graduate women students of the Chanakya School of Craft, Mumbai. The collaboration highlights the intertwined relationship of all stakeholders. Whilst Merchant's art was not part of the fashion garments, it was immersed into the haute couture experience, with the artworks exhibited for a period after the show had closed.

Fashion and textile hybrids Zandra Rhodes

and Rithika Merchant pave the way for respective collaborations that not only recognise their art and personal aesthetic but intertwine it with fashion design and sensibilities around cut, shape and fit. This engagement in the creative process fuels the majesty of these garments; these are pieces to be cherished by collectors in the same way chintz fashions were once upon a time.

CONCLUSION

This historical analysis of chintz presents a model that bridges the gap between fashion and textile design, emphasising a co-creation process that is intrinsically connected. This process adds value to garments and highlights the unique qualities of each fashion piece. By fostering a collaborative spirit, it contrasts with the current mechanical processes that recycle ideas, trends and patterns, leading to increased consumption.

The positive impact of transitioning to a chintz-inspired model, as illustrated in FORMER is evidenced by both Rhodes and Merchant. This shift aims to slow down the rate of discardment and foster a deeper connection between wearers and their garments. Moving away from a programmed model of fashion, which Fletcher (2014) describes as passive or closed, adds value to fashion and combats rapid consumption and waste.

In this context, a garment is less likely to be discarded thoughtlessly; its fate should not be relegated to oblivion, which, in reality, means ending up in landfills. The visual appeal of a garment should outweigh the fleeting visuals of the digital age and its permanence deserves reverence. The printed textile artworks on garments tell stories, evoke emotions, and showcase artistry that enhances their allure and significance. With greater connectivity to our clothing, there is hope that each garment will be cherished for decades and passed down through generations, much like the chintz textile highlighted in Figure 01 (Fig. 03).

CAPTIONS

[Fig. 01] Coromandal Coast Cotton (1740) made into a straw hat lining approx 1750-1780,

Dutch Republic Hartkamp-Jonxis, E. (2023).

When Indian flowers bloomed in Europe: Masterworks of Indian trade textiles, 1600-1780, in the TAPI collection.

[Fig. 02] Silk Crepe de Chine Wrap Dress 'Chinese Squares', Chinese Collection Spring/Summer, 1980, Collection of the San Diego History Center, Gift of Lucretia G. Morrow, Copyright Zandra Rhodes.

[Fig. 03] Rithika Merchant 'The Flowers We Grew'. (2025, January). <https://www.dior.com>. <https://www.dior.com/>



Fig. 03

en_au/fashion/womens-fashion/haute-couture-shows/the-flowers-we-grew

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DESIGN

UNVEILING POTENTIAL LANDSCAPES IN THE AGE OF DEMATERIALIZATION AND DIGITAL PROGRESSION

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Abstract

Fashion, as a cultural system, has reshaped individual identity and social status, often encouraging irrational and unsustainable consumption. The production of clothing and accessories, supported by a capitalistic and plutocratic system, has placed enormous pressure on the environment. This scenario has led individuals to reflect on their future and reassess their lifestyles and consumption patterns. In an attempt to safeguard their interests, fashion conglomerates are beginning to adopt more sustainable business models. In addition, a future is emerging where belonging and desire will be fulfilled through experiences and digital representations, rather than material possessions. This shift, known as “phygital,” blends physical and digital realms and signals a move toward a post-materialist society. This paper investigates the future of fashion, exploring how the industry might transition to a sustainable model through dematerialization, the fusion of physical and digital experiences, and coexistence of both animism and transhumanist principles. It analyzes the ecological impact of fashion, the rise of conscious consumerism, the integration of “phygital” experiences and the role of transhumanism. Through an exploration of these dynamics, it proposes a vision of prosperity in fashion aligned with the future of sustainability in the paradigm of efficiency and digital progression.

Keywords: *Dematerialization, Consumerism, Hyperobjects, Transhumanism, Phygital fashion*

INTRODUCTION

The Anthropocene, characterized by the significant impact of human activity on Earth's ecosystems, raises critical questions regarding humanity's sustainability practices and future. The fashion industry plays a central role in these discussions due to its environmental footprint. This industry, historically driven by rapid consumption and trend cycles, now finds itself facing a paradigm shift, with growing emphasis on sustainability, digital innovation, and redefined prosperity (Crutzen, 2002). As climate change and biodiversity loss become urgent global issues, there is a pressing need to explore how fashion can adapt in response to ecological and ethical imperatives.

Fashion, traditionally a symbol of personal

identity and social status, has often promoted materialism and waste. However, conscious consumerism, dematerialization, and transhumanist ideals offer new avenues for transforming the industry. This paper examines these interconnected elements, proposing that prosperity in fashion can be achieved through sustainable practices and digital evolution. The analysis of this phenomena follows a secondary and ethnographic research methodology structured in 5 phases:

1. The Ecological Footprint of Fashion.
2. The Rise of Conscious Consumerism.
3. Transhumanism and the Evolution of Fashion
4. Phygital Fashion and the Shift Toward Dematerialization
5. Policy, Innovation and Systemic Change.

THE ECOLOGICAL FOOTPRINT OF FASHION

The environmental ramifications of the fashion industry extend across multiple dimensions, involving not only the depletion of natural resources but also the exacerbation of pollution and greenhouse gas emissions. This industry, deeply embedded in global trade and consumer culture, represents one of the most environmentally intensive sectors of the modern economy. As reported by the United Nations Environment Programme (UNEP), fashion contributes roughly 10% of global carbon emissions, a staggering figure that surpasses the combined emissions from international aviation and maritime shipping (UNEP, 2021). This highlights fashion's disproportionate role in accelerating climate change, placing it at the center of environmental discourse.

CARBON EMISSIONS AND CLIMATE CHANGE

The energy demands of the fashion supply chain are a key driver of its carbon footprint. From the extraction of raw materials to textile production, dyeing, and global distribution, each stage of the garment lifecycle is heavily dependent on fossil fuels. For instance, coal-fired power plants often fuel textile factories in countries like China, India, and Bangladesh, exacerbating the industry's reliance on non-renewable energy. Additionally, the frequent transportation of raw materials and finished products across continents—by air, sea, and road—compounds the industry's carbon emissions.

Luxury and fast fashion brands alike are beginning to address their climate responsibilities by setting carbon neutrality targets. For example, Patagonia has invested heavily in renewable energy for its operations, while fast fashion giant H&M has pledged to achieve a climate-positive supply chain by 2040. However, critics argue that these commitments often fall short of addressing systemic overproduction and waste (Business of Fashion, 2024).

WATER USE AND POLLUTION

Water consumption represents another critical issue. Producing a single cotton T-shirt requires approximately 2,700 liters of water, equivalent to what one person drinks in over 2.5 years (WWF, 2021). This water-intensive nature of cotton cultivation exacerbates water scarcity in vulnera-

ble regions, particularly in countries like India and Uzbekistan, where rivers and aquifers have been drained to support cotton farms. Furthermore, textile dyeing, which contributes up to 20% of global industrial water pollution, releases toxic chemicals into water bodies, contaminating ecosystems and posing serious health risks to local communities.

Efforts to mitigate water consumption and pollution have led to innovative solutions, such as waterless dyeing technologies and the development of drought-resistant cotton varieties. Brands like Levi Strauss & Co. have adopted waterless techniques in their denim production, significantly reducing water use. However, widespread adoption of such practices remains limited, particularly among smaller manufacturers with constrained resources.

SYNTHETIC MATERIALS AND MICROPLASTICS

The fashion industry's increasing reliance on synthetic fibers like polyester, nylon, and acrylic has introduced another environmental challenge: microplastic pollution. Synthetic fabrics shed tiny plastic particles during washing, which make their way into rivers, oceans, and ultimately the food chain. A study by Napper and Thompson (2016) revealed that a single load of laundry can release up to 700,000 microplastic fibers, underscoring the pervasive nature of this issue.

The accumulation of microplastics in marine ecosystems exemplifies Timothy Morton's concept of "*hyperobjects*"—phenomena so vast and complex that they transcend human comprehension (Morton, 2018). The impact of microplastics extends beyond aquatic environments, as they are ingested by fish and other marine organisms, ultimately affecting human health through bioaccumulation. Efforts to combat this problem include the development of filtration devices for washing machines and the use of alternative, biodegradable fibers in clothing production.

THE ROLE OF FAST FASHION

At the heart of fashion's ecological crisis lies the fast fashion model, characterized by rapid production cycles, low-cost garments, and a culture of disposability. Brands like Zara, H&M, and Shein epitomize this model, producing new collections every few weeks to capitalize on shifting consumer trends. While this approach democratizes access to fashion, it perpetuates a throwaway culture

that results in staggering levels of textile waste. According to the Environmental Protection Agency (EPA), approximately 85% of textiles produced annually—equivalent to 21 billion pounds—end up in landfills (EPA, 2019).

This waste burden is compounded by the use of non-biodegradable synthetic fabrics, which can take hundreds of years to decompose. Moreover, the low quality of fast fashion items discourages reuse and repair, further accelerating their disposal. Addressing this issue requires a fundamental shift away from the fast fashion model toward circular fashion systems, where garments are designed for durability, recyclability, and minimal environmental impact.

MOVING TOWARD SUSTAINABLE PRACTICES

In response to mounting criticism, the fashion industry is exploring pathways to sustainability. Key strategies include adopting sustainable materials, implementing circular economy principles, and leveraging technology to minimize resource use. For example, the use of organic cotton, hemp, and recycled fibers is gaining traction as eco-friendly alternatives to conventional textiles. Meanwhile, brands like Stella McCartney and Eileen Fisher are pioneering take-back programs that encourage consumers to return old garments for recycling or resale.

Policy interventions also play a crucial role in driving industry-wide changes. The European Union's Circular Economy Action Plan, for instance, mandates extended producer responsibility (EPR) for textiles, requiring brands to finance the collection, sorting, and recycling of their products. Carbon taxes and stricter environmental regulations are further incentivizing brands to reduce their ecological footprints.

HYPEROBJECTS AND SYSTEMIC CHALLENGES

The environmental crises tied to fashion are deeply interconnected, forming a complex web of challenges that demand holistic solutions. Timothy Morton's concept of *hyperobjects*—phenomena like climate change and plastic pollution that are too vast to be fully understood or resolved by individuals—captures the systemic nature of these issues. Addressing *hyperobjects* requires collective action across industries, governments, and communities (Morton, 2018).

The transition to sustainable fashion necessitates a shift in consumer culture as well. Moving away from the disposable ethos of fast fashion toward valuing quality, longevity, and minimalism is essential. Initiatives like Fashion Revolution's #WhoMadeMyClothes campaign (2020) are empowering consumers to demand greater transparency and accountability from brands, fostering a culture of conscious consumption.

The environmental impact of fashion is a multifaceted challenge that touches on carbon emissions, water use, synthetic materials, and waste. While significant progress has been made in developing sustainable practices, systemic change is essential to address the industry's ecological footprint comprehensively. By embracing innovation, policy reform, and consumer awareness, fashion has the potential to redefine itself as a force for environmental stewardship in the Anthropocene. Only through such collective efforts can the industry reconcile its cultural significance with its responsibility to the planet.

THE RISE OF CONSCIOUS CONSUMERISM

Conscious consumerism reflects a growing desire to align consumption habits with ethical and environmental values. Yet, this shift can also be understood through the lens of animism and transhumanism—two contrasting yet complementary philosophical paradigms that offer unique perspectives on humanity's evolving relationship with technology and nature.

ANIMISM: REDEFINING CONSUMER RELATIONSHIPS WITH THE MATERIAL WORLD

Animism, as defined by Tylor (1871) and expanded upon by Edelkoort (2020, 2022), embodies a worldview where every object, living or non-living, possesses a soul or intrinsic value. This philosophy inspires a more harmonious relationship with the environment and challenges the disposability that characterizes contemporary fashion. For example, Edelkoort's advocacy for slow design underscores the potential of animist principles to revolutionize fashion production. By imbuing objects with "energy, beauty, and aura," animism encourages designers and consumers to treat clothing as meaningful artifacts rather than disposable commodities.

Animism also intersects with conscious consumerism by emphasizing emotional durability and craftsmanship in products. Gao (2021) suggests that animist societies view artifacts as extensions of the human spirit, fostering a culture of empathy and respect for materials. This outlook directly counters the wastefulness of fast fashion, urging consumers to prioritize longevity and sustainability in their purchasing decisions.

Social media campaigns such as #WhoMadeMyClothes echo animist ideals by drawing attention to the human labor and environmental resources embedded in each garment. These movements bridge ancient animist values with modern digital activism, demonstrating how the interconnectedness of humans, objects, and nature can influence consumer behavior. Animism, therefore, provides a philosophical foundation for a sustainable fashion ethos, reconnecting individuals with the material origins of their clothing (Fig. 01).

TRANSHUMANISM: REIMAGINING FASHION IN A DIGITAL AGE

While animism emphasizes a deep connection to the physical world, transhumanism offers a contrasting vision by focusing on the enhancement of human capabilities through technology. As Bostrom (2003) and Bohan (2018) articulate, transhumanism seeks to transcend biological and material limitations, suggesting new possibilities for fashion's evolution. Digital fashion, for instance, represents a transhumanist approach to sustainability. By creating virtual garments that exist solely in the digital realm, the industry can reduce its reliance on physical resources while meeting the expressive needs of consumers.

The rise of “phygital” experiences—a blend of physical and digital interactions—demonstrates how transhumanist principles are reshaping fashion. Virtual try-ons, augmented reality (AR) fashion shows, and blockchain-enabled transparency reflect a future where technology enhances consumer choices while minimizing waste. These innovations align with Bostrom's (2003) vision of “radical improvement” by enabling sustainable consumption patterns without sacrificing creativity or self-expression.

However, transhumanism's integration into fashion raises ethical considerations. Critics argue that the emphasis on digital transformation may alienate marginalized groups who lack access to technology, further entrenching inequalities. Additionally, the proliferation of virtual

fashion could perpetuate consumerism in new forms, contradicting the sustainability goals it seeks to achieve. To reconcile these tensions, the fashion industry must adopt a balanced approach that combines the human-centric values of animism with the technological aspirations of transhumanism.

BRIDGING ANIMISM AND TRANSHUMANISM: TOWARD A SYMBIOTIC FUTURE

Although animism and transhumanism appear to be opposing paradigms, they converge in their potential to redefine humanity's relationship with consumption and the environment. Animism's emphasis on respect for the material world complements transhumanism's vision of digital innovation, offering a holistic framework for sustainable fashion. For instance, combining animist-inspired slow design with transhumanist digital tools could create garments that are not only sustainable but also deeply meaningful.

Fashion brands can harness these philosophies to foster a more inclusive and ethical industry. By integrating animist values of interconnectedness with transhumanist technological advancements, the industry can move toward a post-materialist society where experiences, rather than objects, define prosperity. As Picq (2019) suggests, the convergence of human, natural, and artificial intelligences offers an opportunity to build a more equitable and sustainable future.

TRANSHUMANISM AND THE EVOLUTION OF FASHION

Transhumanism, a philosophical movement advocating for the enhancement of human abilities through technology, has profound implications for fashion. In a transhumanist context, fashion can evolve to serve functional roles that extend beyond aesthetics, incorporating technologies that enhance physical and mental capacities. Han (2022) describes transhumanist ideals as encompassing super well-being, super longevity, and super intelligence, which can be supported by clothing that monitors health metrics or responds to environmental conditions.

Wearable technology, such as fitness trackers or biosensor-equipped garments, represents a convergence of fashion and transhumanism. These innovations align with sustainability by emphasizing durability and multifunction-



Fig. 01

ality, potentially reducing the need for excessive consumption. As advancements continue, future garments might incorporate adaptive features that respond to weather changes or offer augmented strength, shifting fashion's focus from aesthetics to performance.

Transhumanism also intersects with dematerialization, as fashion may increasingly exist in virtual or augmented reality environments. This evolution raises philosophical questions about identity and authenticity in digital spaces, particularly as individuals adopt virtual avatars and digital attire. The ethical implications of transhumanist fashion are significant, as access to wearable enhancements may be limited to those who can afford them, exacerbating existing inequalities. Addressing these challenges is crucial to ensuring an inclusive and equitable future for fashion.

PHYGITAL FASHION AND THE SHIFT TOWARD DEMATERIALIZATION

The fusion of physical and digital realms in fashion, or "phygital fashion," represents a transformative development. Phygital fashion includes digital-only

garments (Fig. 02), virtual fittings, and augmented reality experiences, allowing consumers to interact with brands without generating physical waste (Morton, 2018). This shift aligns with the concept of dematerialization, where experiences replace material possessions as markers of status and identity.

After the acceleration of the digital world brought on by the pandemic, brands are currently facing numerous challenges. The main one is arguably the use of digital technology per se. Although we have always been used to a certain kind of consumption and to certain products, in the last four years these have undergone several changes fueled by the rise of digital dicit. Metaverse, through which users gain access to a virtual world, offers brands a new and vast world to explore, giving them the opportunity to present themselves in a different way and above all, the possibility to create the most diverse kinds of products in the form of NFTs. The latter are unique cryptographic tokens that exist on a blockchain and cannot be replicated. They are usually associated with visual assets such as images or videos, but they are also used to record ownership of physical assets such as real estate, artwork and, more and more often, clothing. Fashion NFTs can take many forms, including virtual clothing that customers can wear in virtual environments, digital content that owners can interact with, and useful authentication assets (Durocher, 2022). Many brands have already joined this futuristic strategy, also to capture the attention of the younger generations who play a pivotal role in the current fashion market.

This presence in the metaverse and the use of NFT's has intensified over the last three years, with the rise of the need for interaction at a distance and the somewhat unconscious dream of having access to a parallel world - also - to detach from what is happening around us, has become. Needless to say, this full immersion in the digital world is the basis for Transhumanism. Animism can also be considered a consequence of the pandemic, originating from the desire for a deeper connection with nature fueled by being in lockdown.

Digital fashion brands like The Fabricant exemplify this trend, creating virtual clothes that consumers can wear in online spaces (McDowell, 2023). The adoption of non-fungible tokens (NFTs) further enhances the digital fashion experience, enabling consumers to own exclusive digital



Fig. 02

items verified by blockchain. Gucci's 2021 launch of NFT sneakers illustrates how luxury brands are integrating digital fashion into their business models, combining exclusivity with sustainability (Nanda, 2021).

While phygital fashion has the potential to reduce resource dependency, it also introduces new sustainability challenges. Blockchain technology, which underpins NFTs, is energy-intensive and generates considerable carbon emissions. Addressing this paradox requires exploring sustainable blockchain alternatives to ensure that digital fashion remains ecologically viable. As society increasingly embraces digital experiences, the potential for dematerialized fashion to redefine consumer culture becomes evident, offering a pathway to sustainability through reduced material dependency.

POLICY, INNOVATION AND SYSTEMIC CHANGE

While consumer-driven changes and technological advancements represent significant steps forward, systemic change is necessary to address the fashion industry's environmental footprint. Policy interven-

tions, including carbon taxes, extended producer responsibility (EPR) programs, and sustainable certification standards, play a central role in this transition. The European Commission (2020) advocates for EPR as a mechanism to hold companies accountable for their products' end-of-life disposal, encouraging sustainable design practices.

Technological innovation is another pillar of systemic change. Advances in materials science, such as the development of biodegradable fabrics and lab-grown textiles, offer sustainable alternatives to traditional materials. Biotechnology firms like Bolt Threads are pioneering lab-grown silk, which reduces reliance on resource-intensive materials. Similarly, 3D printing technology allows for customized production, minimizing waste and enabling efficient resource use (European Commission, 2020).

Systemic change requires a collaborative effort among governments, brands, and consumers. By aligning regulatory frameworks, incentivizing sustainable practices, and fostering transparency, the fashion industry can transition toward a model that prioritizes ecological responsibility. Through these combined efforts, fashion can redefine prosperity, emphasizing connection, durability, and sustainability over material accumulation.

CONCLUSION

The fashion industry, emblematic of human creativity and cultural expression, stands at a pivotal crossroads in the Anthropocene era. Once a driver of materialism and rapid consumption, it now faces increasing scrutiny for its significant ecological footprint and contribution to global environmental crises. From carbon emissions and water overuse to microplastic pollution and systemic waste, the traditional model of fashion production has proven incompatible with the planet's ecological limits. However, within this crisis lies an opportunity for transformation, one that reimagines fashion as a force for sustainability, innovation, and ethical consciousness.

Central to this redefinition is the rise of conscious consumerism, which challenges the disposability culture underpinning fast fashion. Drawing on animist principles that attribute intrinsic value to objects, this movement fosters respect for the craftsmanship and resources embodied in garments. By encouraging longer product lifecycles and promoting emotional durability, animism

aligns with slow design practices that counteract the industry's relentless pace. Simultaneously, transhumanist ideals and technological advancements present opportunities to reconfigure the fashion landscape. The integration of wearable technologies and digital garments, for instance, not only reduces reliance on physical resources but also allows consumers to engage in expressive, sustainable fashion experiences within the virtual realm. This transition reflects the broader shift toward a dematerialized society where value is increasingly placed on experiences and digital assets over physical possessions.

The concept of “phygital” fashion—blending physical and digital realms—epitomizes the industry's potential for innovation. Digital-only garments, virtual try-ons, and non-fungible tokens (NFTs) are reshaping consumer interactions, offering environmentally conscious alternatives to traditional consumption patterns. Despite their promise, these advancements are not without challenges. Blockchain technology, a cornerstone of digital fashion, is energy-intensive, raising concerns about its carbon footprint. As the industry embraces digital transformation, it must balance technological progress with sustainability by exploring greener blockchain solutions and reducing the environmental cost of innovation. Policy frameworks and systemic change are essential to complement consumer-driven shifts and technological advancements. Initiatives like the European Union's Circular Economy Action Plan and extended producer responsibility (EPR) programs incentivize sustainable design, promote transparency, and hold brands accountable for their environmental impact. In parallel, innovations in materials science, such as lab-grown textiles and biodegradable fabrics, offer scalable solutions to reduce resource dependency. Collaborative efforts among governments, industries, and consumers are critical to embedding these changes within the fabric of the global fashion system.

As the fashion industry navigates this transformative period, its future will hinge on its ability to reconcile ecological responsibility with creative expression. By integrating animist respect for materiality, transhumanist aspirations for technological enhancement, and systemic policies supporting sustainability, the industry can redefine prosperity for the Anthropocene. This vision of post-materialist fashion—where identity and social status are no longer tied to material accumula-

tion—offers a path forward that is both innovative and equitable. Ultimately, the fusion of ethical values, cutting-edge technology, and collective action has the potential to position fashion as a leader in the global shift toward sustainability and environmental stewardship.

CAPTIONS

[Fig. 01] Hungarian Farmers. Stekovic, J. Retrived from <https://monovisions.com/two-identical-twin-farmers-at-the-end-of-their-lives/>

[Fig. 02] Cyber Contactless Coat. Tribute. 10 Magazine. Retrived from <https://10magazine.com/tribute-brand-contactless-digital-fashion/>

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PARASULI PROJECT

UPCYCLING OF BEACH UMBRELLAS
FOR A SUSTAINABLE AND
PROSPEROUS FASHION.
HOW PROSPERITY-ORIENTED
THINKING REDEFINES FASHION
DESIGN THROUGH UPCYCLING AND
COMMUNITY COLLABORATION

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Abstract

The PARASULI project proposes an innovative redesign of beach umbrellas, transforming them into sustainable fashion products while integrating the concept of *prosperity thinking*. This holistic approach goes beyond traditional *design thinking*, embracing economic, social, and environmental dimensions to create an inclusive and sustainable future. *Prosperity thinking* redefines prosperity not merely as economic growth but as a balance between social well-being, environmental health, and respect for ecological limits. PARASULI applies these principles by transforming waste materials into unique garments through upcycling, promoting *zero-waste practices* and *circular economy*. The project's methodology is founded on the active involvement of the local community, not only in reclaiming materials but also in fostering a shared dialogue on sustainability and the cultural significance of the territory. An artisanal design approach was adopted, with local artisans playing a pivotal role in the production process. The garments were crafted using traditional techniques, ensuring both originality and high quality while reducing environmental impact through the use of recycled materials. A zero-waste philosophy guided the design process, repurposing surplus fabric to create modular accessories, such as detachable hoods. This project demonstrates the potential of fashion to go beyond profit to promote relational prosperity, redefining the interaction between design, economics, and community.

Keywords: *Upcycling, Independent fashion design, Relational prosperity, Interconnected future, Waste materials*

BACKGROUND AND THEORY UPCYCLING AND WASTE MATERIALS IN FASHION

Upcycling, unlike *recycling*, involves the creative transformation of waste materials into high-quality products without additional industrial processes (Early, 2015). The PARASULI project adopts this approach to repurpose discarded beach umbrella fabrics, extending their lifecycle (Fig. 01). Over the past decades, the textile waste crisis has emerged as one of the most pressing global environmental challenges. The fashion industry, with its fast consumption model and accelerated production cycles, annually contributes to a significant volume of textile waste. According to the 2017 report by the *Global Fashion Agenda* and the *Boston Consulting*

Group (BCG) *Pulse of the Fashion Industry Report*, it is estimated that approximately 92 million tons of textile waste are generated annually. This figure includes waste from production processes as well as discarded garments from consumers, often thrown away after minimal use. Contemporary designers are increasingly adopting upcycling techniques to transform discarded clothing and textile waste into high-quality new products, thus promoting a circular economy. This approach not only extends the useful life of materials but also fosters a cultural shift toward more conscious and responsible consumption models (Black, 2012). *Upcycling* enables the creation of unique and innovative products, stimulating designers' creativity while offering consumers items with added value—



Fig. 01

both aesthetic and ethical. This process serves not only as a practical response to the environmental challenges of the fashion industry but also as an opportunity to redefine concepts of luxury and sustainability within the sector. Creative processes play a critical role in the success of upcycling, as they require designers to overcome the 'waste' perception of materials and identify the intrinsic potential in each resource. This approach necessitates a combination of technical skills, imagination, and innovation, demonstrating how creative and innovative processes can convert discarded textiles into high-value products. Black's work (2012) underscores the importance of design not merely as an aesthetic medium but as a tool to promote sustainability and generate a positive impact on the environment and society. In an academic context, waste materials are defined as any substance or object discarded during production, consumption, or disposal processes that may still hold economic value or potential utility. Commonly studied waste materials include glass, plastic, metals, organic waste, and industrial byproducts. Research on these materials primarily focuses on recycling, reusing, or transforming them to reduce dependency on

virgin resources and limit landfill waste accumulation (Rissanen, 2016). *Upcycling* and *downcycling* represent two distinct approaches to waste material management. *Upcycling* involves converting waste into products of superior quality or new functionality, whereas *downcycling* entails recycling materials into lower-quality items. Both methods contribute to the circular economy, yet they differ in terms of long-term sustainability and environmental impact.

METHODOLOGY COMMUNITY ENGAGEMENT AND DESIGN METHODOLOGY

The PARASULI project was launched in November 2022 with a call to action directed at the non-profit organization Team *Spiagge Pulite*¹, which is committed to protecting local beaches in Agrigento, the project's place of origin (Fig. 02). The project operates on a local territorial scale, involving a collaborative network in a Sicilian area that allows the utilization of local skills and resources. This process highlighted the importance of collaboration in fashion projects. According to Kawamura (2006), fashion as a social process is not the result of a single individual's work but rather of a collective of people involved in its production. Collaborations can take various forms, including partnerships between designers, brands, artists, and even consumers, making them a crucial means for democratizing fashion. The collaborative nature of PARASULI materialized through partnerships with local artisans who contributed to the production of some collection pieces through tailoring processes; the active participation of users via social media, offering input and feedback at various project stages; the organization of an upcycling workshop in collaboration with the cultural and social association *Brualinu*² and a partnership with *Legambiente Sicilia* for the launch of a new circular economy initiative. The project was initiated as a way to promote collective environmental responsibility while supporting material collection efforts. After collection, the umbrellas are cleaned, dismantled, and assessed for quality and upcycling potential to create a collection of unique outerwear pieces, transforming discarded objects into sustainable fashion products. The methodology underlying the project is based on the idea of engaging the local community, not only to recover materials but

¹ Team Spiagge Pulite AMAgrigento, 2022, associazione nonprofit, Agrigento.

² BRUalinu. Benessere e Rigenerazione Urbana, 2023, progetto vincitore della 5. edizione del Premio Creative Living Lab, MIC.



Fig. 02

also to stimulate a collective reflection on sustainability and the value of the territory. The call invited actions on two levels: environmental protection through the recovery of discarded materials and the designer's contribution through the creation of a fashion product. Following the call, the designer was contacted by local participants who joined the initiative by contributing in various ways. Some provided the fabric from their own umbrellas, others raised awareness by actively participating in the search for discarded materials, and still others requested the customization of an outerwear garment. This initiative fostered participatory action, engaging the community in two key roles: as custodians of an environment to be protected and as contributors providing reusable materials for the creation of new design objects. This direct exchange established an authentic connection between the designer and the community, offering an opportunity for local empowerment. The project employed an artisanal design methodology: interactions with local artisans played a crucial role in the production phase. The garments were created using traditional artisanal techniques, ensuring high quality and originality while minimizing environmental impact

through the use of *recycled materials*. The designer's approach was oriented toward a zero-waste design methodology, utilizing surplus fabric to create interchangeable accessories, such as detachable hoods. From a single umbrella, one outerwear garment is created, and in 75% of cases, the surplus fabric is used to make an interchangeable hood. The rediscovery of artisanal and local values fits into a broader context of circular fashion, where material lifecycles are extended, and environmental impact is reduced. The design phase saw the development of a prototype for a men's *workwear-style jacket* (Fig. 03; Fig. 04). This model originated from the *Final Laboratory* of Fabio Quaranta in 2018 at the IUAV University of Venice and was later adapted to meet the practical and structural needs of umbrella coverings. The pattern was designed based on the shapes, weights, and densities of the available fabrics, creating a collection that represents not just a final product but also a visual and symbolic narrative connected to summer vacations, the recovery process, and the revitalization of materials that would otherwise have been discarded. This experience demonstrated how fashion can be a collective process where designers, artisans, consumers, and communities collaborate for a common cause. The methodology adopted—combining material recovery, artisanal production, and community collaboration—holds significant symbolic and practical value, offering a tangible alternative to traditional fashion through the creation of products that adhere to the principles of circular economy and environmental sustainability.

ROLE OF THE INDEPENDENT DESIGNER

THE INDEPENDENT DESIGNER AS AN AGENT OF CHANGE

Independent designers play a crucial role in fostering sustainable change, as they can experiment extensively with alternative techniques and materials. In the context of this project, reflecting on the role of the independent fashion designer—one that departs from the traditional notion—is essential. The designer is tasked not only with creating fashion pieces but also with working closely with the community and integrating ethical values into their practice. These reflections prompted the author to reconsider their role as a fashion designer and *to question the contribution a designer can make to a community*. To better understand this question, it is useful



Fig. 03



Fig. 04

to revisit the figure of the fashion designer, which was pivotal in its historical role up to the mid-20th century. As Kawamura (2006), notes the profession of a fashion designer, while not requiring specific qualifications or licenses, is deeply influenced by processes of legitimization and recognition within the fashion world. Today, the importance of a collaborative network surrounding the designer has grown considerably. The myth of the 'genius designer' working in isolation is being challenged. Contemporary reality demonstrates that a designer's success increasingly depends on their ability to navigate and manage the dynamics of a broad and complex circuit. Defining their role as a fashion designer was the first critical and challenging step in shaping the future perspective of the PARASULI project. In the chapter '*Hyper-local, Almost Global*' from the book *What If? Prove di Futuro Moda* (Vaccari et al., 2018), the role of fashion is explored in relation to provincial marginality, regarded as a new territory for creating authentic *Made in Italy*. Italy, with its network of provinces, represents a tangible, interconnected territory closely tied to artisanal knowledge. Guditta Tanzi was among the independent designers who participated in reflections during the *Fashion Futuring project* of 2020, led by Alessandra Vaccari. In 2019, Tanzi launched *Garbage Core*, a project that evolved from her thesis and which she decided to pursue as an independent initiative. The brand's concept centers on giving new life to second-hand garments through a design process that involves sourcing vintage clothing from markets and from the closets of friends and family, with a preference for *Made in Italy* pieces. Through moulage and deconstruction, she creates unique pieces that preserve traces of their previous wearers. The PARASULI project encourages reflections on new models of consumption and production. Though developed in a provincial context, it addresses a global issue. The project's vision is rooted in four key actions: *Research*, *Reactivate*, *Deconstruct*, and *Recompose*, with the aim of restoring value to what has lost it: giving new life to waste. The project seeks to reactivate synergies within a local territory and aligns with the concept of *placemaking*, as described by Namkyu Chun in their doctoral thesis *Rediscovering Fashion Designer* (2018). This idea involves creating, redefining, or enhancing a place through design and fashion by engaging people and local communities. This reflection begins by problema-

tizing a profession often reduced to aesthetic or commercial dimensions, instead highlighting the intellectual and design complexity that characterizes the work of fashion designers. Chun argues that the social contribution of fashion designers has become less clear in a fashion system dominated by profit and commodification. They particularly criticize the idea that fashion designers are merely creators of garments for mass consumption, emphasizing instead their potential as *placemakers*, or creators of spaces through their work (Chun, 2018). This horizontal perspective defines designers not as isolated figures producing for the market but as cultural actors who actively shape social reality through their work. Ezio Manzini, a pioneer in participatory design, underscores the importance of participation as a fundamental process for sustainability and collective learning (Manzini, 2003). Fashion designers, therefore, can play a crucial role in creating spaces that respond to social needs, emphasizing their potential contribution to community cohesion and participation. In this context, Alessandra Vaccari's reflections on *self-reliant fashion* are valuable. According to the author, self-reliant fashion is not just an act of self-production but a cultural movement that places the designer at the center as the sole author of the creative and production process, without intermediaries. Self-reliant fashion thus stands out for its strong value-driven approach, reflecting a commitment to a more equitable and sustainable production system (Vaccari, 2017). According to Kawamura, the fashion designer is a key player, though not the sole protagonist, in the fashion system. Their creative work is filtered and legitimized through a series of institutions and influential figures, including fashion magazines, influencers, and creative directors. These intermediaries help determine what is considered fashionable at any given moment, influencing the designer's stylistic decisions (Kawamura, 2006). Through their work, fashion designers convey symbolic messages, representations of identity, values, and beliefs. Their role, therefore, is to create not only physical products but also narratives that intersect with the social, political, and cultural issues of their time.

ANALYSIS AND DISCUSSION OF RESULTS

PROSPERITY THINKING AND ITS CONTRIBUTION TO DESIGN SUSTAINABILITY

Prosperity Thinking emerges as an evolution of *Design Thinking*, shifting from a purely human-centered approach to one that emphasizes environmental sustainability and social well-being. Unlike *Design Thinking*, which focuses on solving specific problems through creativity and empathy for the end user, *Prosperity Thinking* considers systemic impacts, including the planet as a key beneficiary of design practices. According to Tim Brown, *Design Thinking* fosters a culture of innovation and provides solutions that satisfy both user needs and business objectives (Brown, 2009). However, as Lucy Kimbell observes (Kimbell, 2011, pp.285-306), *Design Thinking* can become a superficial formula that fails to adequately address contextual specificities, risking an oversimplification of complex problems. This methodology often emphasizes immediate and local solutions without sufficient consideration of long-term effects and the resources required for effective implementation.

In response to these limitations, *Prosperity Thinking* evolves the concept of *Design Thinking* by integrating ecological sustainability and social well-being. This approach draws inspiration from Kate Raworth's Doughnut Model (Raworth, 2017), which defines a "green zone" of prosperity between a minimum threshold of social well-being and an upper ecological ceiling (Raworth, 2017). *Prosperity Thinking* adopts this model to outline guidelines for a design process that not only addresses human needs but also respects the ecological limits of the planet, aiming for a balance between social and environmental requirements. The contribution of *Prosperity Thinking* to sustainable design is evident in its holistic approach, which involves a range of stakeholders, including local communities, businesses, and designers, to generate solutions that do not compromise long-term sustainability. This approach, rooted in systemic innovation, has been explored in participatory design contexts, as seen in projects such as the *Future Food Institute and the Doughnut Economics Workshop*³. In parallel, circular fashion is a concept that extends the lifecycle of materials, challenging the traditional 'produce-use-dispose' model. PARASULI, which repurposes discarded beach umbrellas into durable jackets,

3 International Conference on Engineering Design (ICED21).

embodies the principles of circular economy and sustainable innovation. Circular fashion is one of the most tangible examples of applying *Design for Sustainability (DfS)*, which has evolved over the years to address environmental and social challenges. Initially, sustainability in design focused on product-based solutions, thanks to the pioneering contributions of figures like Victor Papanek and Buckminster Fuller. These pioneers introduced concepts of responsible and sustainable design, which have since evolved into more complex and systemic approaches. Over time, sustainable design has moved beyond individual products to include innovations at the level of complex systems, such as Product-Service Systems (PSS), Spatial-Social Innovations, and Socio-Technical Innovations, as described by Ceschin and Gaziulusoy (Ceschin & Gaziulusoy, 2016). Ezio Manzini developed the concept of Design for Sustainability, emphasizing the importance of participatory design that involves various social and technological actors. Design for Sustainability, therefore, represents a conceptual evolution that continues to develop in response to current environmental and social needs. Within the context of Design for Sustainability, the PARASULI project is a concrete example of applying circular economy principles to the fashion industry. By repurposing discarded umbrellas into durable jackets, PARASULI challenges the linear consumption model and promotes environmental awareness. PARASULI's approach goes beyond offering aesthetic solutions, aiming instead to educate consumers about a new model of responsible consumption, emphasizing the entire lifecycle of a product and the need to reduce ecological impact. In this context, Prosperity Thinking and Design for Sustainability intersect to promote an innovation model that not only meets human needs but also respects the planet's ecological limits, fostering sustainability and prosperity on a global scale. Circular fashion, as exemplified by PARASULI, becomes a catalyst for social and environmental change, pushing toward a more sustainable future not only in terms of design but also in consumer behavior and industrial dynamics.

CONCLUSION AND FUTURE PERSPECTIVES

THE CONTRIBUTION OF THE PARASULI PROJECT AND REDEFINING PROSPERITY THINKING

The PARASULI project is an emblematic example of applying *Prosperity Thinking and Design for Sustainability (DfS)* within the circular fashion sector. Based on a systemic approach, the project transcends traditional Design Thinking to adopt a holistic perspective that integrates economic, social, and environmental needs. In this context, PARASULI has transformed an environmental issue—disposing of discarded beach umbrellas—into an opportunity to create value through *upcycling* and *zero-waste practices*. Collaboration with nonprofit organizations, local communities, and independent artisans has been central to promoting a participatory design model, where the designer's role expands to include social mediation and collaborative network building. In line with Kate Raworth's *Doughnut Model*, this approach aims not only to reduce the environmental impact of the production cycle but also to redefine the concept of economic value, shifting the focus from profit to an idea of shared well-being. This process is not merely an aesthetic exercise but a strategy to foster greater environmental awareness and cultural change in consumption patterns. The involvement of communities and nonprofit organizations has been crucial in building a participatory network that reflects the principles of responsible and inclusive design, as emphasized by Ezio Manzini in his work on *participatory design*. Transforming waste into resources highlights how upcycling can contribute to a more resilient production system capable of balancing creativity, innovation, and sustainability (Manzini, 2003). However, the project also raises critical questions about the challenges of scalability and the long-term sustainability of such initiatives. While the artisanal approach ensures uniqueness and quality, it also imposes significant limitations on large-scale responsiveness, requiring a balance between exclusivity and widespread impact. Future perspectives for PARASULI necessitate further strategic development to consolidate the model and expand its reach. Firstly, it would be essential to broaden the network of partners to include private companies and educational institutions, strengthening the collection and transformation of materials while raising awareness among new audiences about the importance of sustain-

able design. Additionally, adopting innovative technologies to optimize upcycling processes could improve both the quality of regenerated materials and productivity, opening new market possibilities. However, to ensure the model's replicability and scalability, it would be crucial to develop a systematic framework that enables the project to adapt to different geographic and industrial contexts. The ability to measure the economic, social, and environmental impact of the initiative could attract external investment and foster the dissemination of similar practices. Finally, it remains essential to keep the relational dimension at the heart of the project, ensuring that expansion does not compromise the quality of interaction between designers, artisans, and communities. In this sense, PARASULI represents a living laboratory to explore the limits and potential of design as a tool for social transformation, paving the way for a future in which fashion and design are not just profit generators but also promoters of shared and sustainable prosperity. Overall, PARASULI invites a rethinking of the designer's role as an agent of change, capable of building not only objects but also relationships and systems that contribute to collective well-being and the preservation of the planet.

CAPTIONS

[Fig. 01] CANICATTIVA; PARASULI n°10; Editing and shooting by Giacomo Arrigo, Styling by Cristina Falsone, modelling by Paola Scordato; CANICATTIVA 2024. (2020-2024).

[Fig. 02] Cristina Falsone; Call to action per Team Spiagge Pulite, AMAGRIGENTO.

[Fig. 03] Cristina Falsone; Metodologia progettuale; CANICATTIVA 2023.

[Fig. 04] CANICATTIVA; PARASULI n° 8; Editing and shooting by Giacomo Arrigo, Styling by Cristina Falsone, modelling by Paola Scordato; CANICATTIVA 2024.

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RE-FASHIONING LEATHER

A STUDY TO BRING TO THE FORE A
NEW AWARENESS OF HOW A SPECIFIC
MATERIAL (LEATHER) DOES NOT HAVE TO
BE FINITE AS NATURE

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Abstract

This research, interrogates and offers insight into the potentiality of leather, emphasizing that it is time to re-align thinking, provoke introspection and challenge existing norms. The aim is to demonstrate the value in forming a prosperity fashion philosophy centered on a specific by-product (leather), which offers a more ethical and sustainable viewpoint. Examining and promoting creative circular initiatives integral to a specific sub-group and creating an open collaborative and cumulative knowledge transfer, it is hoped that these shared ideas and practices gain strength, to create a blueprint for a prosperity fashion philosophy. To provide an actualized possibility for re-alignments and new approaches for leather production, consumption, and value as a starting point for cultural discussion. Challenging the fast fashion industry by presenting a slow, flexible future where leather fashion become investments because of their flexibility, and durability. Urging us to collectively forge new systems that disrupt and replace the current destructive cycle. Decreasing the negative impact of fashion on the environment, and people, through a focus on the ultimate circular material.

Keywords: *Leather, Nurture, Restore, Sustainable, Philosophy*

INTRODUCTION

Re-framing, leather as an ethical by-product, aims to educate a new generation to conceive a new belief system and material awareness of leather's durability, flexibility and value. The research serves to examine and highlight specific leather handcraft techniques and processes which have the potential to be disseminated at wearer/ consumer-level and shape new social and cultural models oriented towards a prosperity fashion system.

Prosperity encompasses so much more than money; it is when all people have the opportunity and freedom to thrive. Prosperity is underpinned by an inclusive society, with a strong social contract that protects the fundamental liberties and security

of every individual¹. If the notion of prosperity is considered from a fashion perspective, and the future of fashion is regarded ethically through its relationship with economy, environment and society, new approaches and design strategies can be developed which encompass this ethos. This study places education, communication, manufacturing processes, and sustainability first and foremost, offering a social model which improves individual elements – using natural and recycled material together with alternative slow methodologies, in sharp contrast to fashion brands current need for constant and exponential economic

¹ Definition. Retrieved from: <https://dictionary.cambridge.org/dictionary/english/prosperity> [Accessed 20/09/2024]

growth. As a designer and educator, we bear a responsibility to create work that serves as a catalyst for change. I believe, our creations and research should provoke introspection and challenge existing norms, urging us to collectively forge new systems that disrupt, and ultimately replace the destructive cycle of fast fashion.

This analysis contributes to and enriches a relevant debate on the role of activism in fashion, just as Fletcher (2014), champions a holistic consideration of a garment's lifecycle, promoting the concept of a circular fashion economy (Fletcher, 2014), this study looks to leather handcraft production techniques, specifically, restoration and customization, and investigates whether dissemination of knowledge and skills at wearer/ consumer-level could support a fresh belief system - quiet activism against disposable fast fashion. Challenging current industry practices to present a slow, flexible approach, where the user has an elevated sense of ownership, belongings are nurtured, and in-turn become valuable investments. If we as wearers/ consumers, begin to treat leather as an active source of design information and invite the making of tacit knowledge through direct material handling, we can then establish an intrinsic relationship between material, maker, and user (Sampson, 2020). This is one which allows a connectedness to emerge, driving new interpretations of materiality, preservation, and sustainability. Looking to other creative communities for examples of best practice is key to providing tangible models and methodologies to create potential for new ways of seeing leather garments within our wardrobes.

PERSPECTIVES ON LEATHER

Leather, man's earliest garment, has come to occupy a unique role in the history of fashion. The most extreme images are associated with leather, from the animal hides that caveman wrapped themselves in, to haute couture dresses as finely cut as gemstones. Whether sophisticated or crudely fashioned, fragile as gossamer, or tough and synonymous with power, leather shows up in every kind of wardrobe, in every kind of climate. In Greenland, clothing from the fifth century BCE has been recovered in a state of perfect preservation (Quilleriet, 2004). Proving the durability of leather as practically indestructible. Clothes made from leather and suede allow ventilation, absorption, and evaporation of moisture. In other

words, it breathes. The millions of tiny air spaces among the fibers provide insulation and ventilation for warmth in the winter and comfort in the summer (Allyne, 2016). An organic material which continues to move and change with use, exposure to the elements and age, in fact, tend to enhance it.

Every piece of leather is unique, and a well-designed leather product will make the inherent strength, grain and beauty of its raw material more apparent. No two leathers are alike, every hide has its own distinct features, depending on any number of factors - not only breed, but also age, gender, diet, and the way in which an animal has been reared. Leather is easily cleaned, comfortable to wear, and straightforward to work with, since it drapes well and is sewn like fabric (Harris & Veldmeijer, 2014). Leather items can be considered old friends, and if cared for, products last a life-time - a standard to aspire to. Leather affects us indelibly with its singular texture and feel. A living mould, sculpted by the body's habits which leave their mark in the memory of its folds and scratches. In this total fusion of body and clothing, leather should stand out in fashion. This chameleon-like material, half protection, and half ornamentation, acts as an identity-revealing second skin that defies the seasons and stays with its owner for years, until it is handed down to the next generation (Quilleriet, 2004). Leather takes on experiences, embodies memories and acts as a witness to every age and era. The true beauty of leather's durability is that it can be repaired, restored, altered, enjoyed for a lifetime, and passed down through generations. This makes it the perfect material to develop circular ways of thinking. Leather craft is the ultimate upcycling activity, turning industry's trash into treasure.

LEATHER THE MOST CIRCULAR MATERIAL

Circular design embodies an ethos of prosperity through sustainability, aiming to minimize waste and extend product life cycles (Circular Design Institute, 2024). According to the Circular Design Institute (2024), this means reimagining the traditional linear production models to create systems where resources are continually reused, recycled, or regenerated. This approach within fashion could affect real change and recenter our view of fashion. In doing so, fashion can become agents of social and environmental change, promoting ethical morality in a world shaped by

colonial legacies and capitalist exploitation (Barber, 2022).

Buying cheap items has meant not worrying if it is only worn once, or if it is not good quality, simply shop again. The environment can no longer sustain this cycle or mindset; the way we see our pre-loved fashion items must be altered to lose the ethos of the owner 'falling out of favour'. In this context leather, the most durable flexible and luxurious material, should be foremost. Restoration and customization are natural ambassadors to leather, and this study explores these processes to provide a flexibility which could garner a fresh fashion philosophy and attitude. Supporting the belief that looking to artisan crafts and heritage is vital for conservation, change, and for future concepts to emerge.

Fletcher (2014) considers that by focusing on creating circular systems of design the whole life cycle of a garment can be considered, which means that the ethical impact of garment manufacturing and the sustainability of a garment is considered from the very beginning of creation (Fletcher, 2014). The argument for a systemic shift is also central to Thomas's argument (2019) and links with Fletcher and Grose's (2012) call for a change to our approaches in design. Recognizing the claim that designers have a responsibility to create change within their work, to drive a catalyst for necessary change, this research harnesses this ethos by interrogating the relationship between material (leather), techniques, and processes (restoration and customization) in practice, and developing opportunities to breathe new life into existing leather fashion, to develop a circular system that disseminates fresh perspective, understanding and skills.

THE VALUE OF PRE-LOVED

Existing fashion, i.e. fashion we already own, pre-loved and/ or second-hand is key to this study, and altering perspective, heightening nurture and garnering desire to preserve pre-loved items is integral to the development of prosperity fashion, through ethical thinking and sustainable ways of seeing our wardrobes. Fashion produces a multi-sensory experience, which both mediate and create our experience of the world. This tactile experience of our garments binds us to them. As we use fashion items, they become records of our experiences, archives of the experience of wearing. Worn things are the outcome of our being in the

world; they are a mediating layer at the confluence of environment and bodily self. As, such our used garments hold a particular place in our networks of things, at once intimate and public, visible and on display (Sampson, 2020).

Extended tactile engagement with a garment creates imprints, both on the body and the garment itself. As established, leather already has imprints, scars and experience of the animal which initially 'wore' it. Each imprint is a record of our body-selves or the garment at a particular time and place. As consumers and wearers of clothes, we implicitly understand that people and the garments they wear are entangled, and that a garment holds meaning, and memory. This is particularly pertinent when the garment is made of leather, due to its durability, flexibility, and ability to mould itself to the wearer, forging the perfect fit. The garment is akin to a second skin: a two-sided surface, touching the body and the world. The garment is, as a substitute or second skin, the site on which multiple tactile encounters occur (Winnicott, 1971). We cannot help but engage with material culture in the context of meanings and memory that we and others have ascribed to the garments we wear (Sampson 2020). In wearing a leather garment, the boundaries between the self and the garment, blur, and we – materially and psychically – are incorporated into it. Therefore, our leather attire is intrinsic to 'ourselves' and as such, should be cherished, celebrated, nurtured and preserved.

RESTORATION & CUSTOMIZATION

By developing slow fashion practices rooted in anticapitalism and circular design aimed at pre-loved garments, this research vision is representative of an idea of prosperity fashion which could lead to a shared and widespread well-being. The philosophy advocates for a transformative shift, challenging existing power structures within consumer thinking, behaviors and the fast fashion industry. The connection we have with our clothes is described by Chapman (2015) as emotional durability, a bond between wearer/ consumer and their material things, with meaning at the center. He examines consumers' experiences within object relationships and the role of possessions in our lives. Objects relate to people and place, and witness a continuous, systematic narrative of events. They become a personal record of lived experiences and gather their own

history. They become priceless and irreplaceable, elevating them beyond monetary boundaries, disrupting the conventional hierarchy of our value systems (Chapman, 2015). This research highlights emotional durability, celebrates material durability, and provides a blueprint of knowledge and skills at wearer/ consumer-level which could improve the life cycle of leather fashion and inspire a more sustainable ethos of nurture and preserve.

In *The Craftsman* (2008), Sennett explores the 'intimate connection between hand and head' (Cooper, 2008, p. 9) examining the physical attributes of craft, such as movement and touch as well as the rhythm of concentration in a repeated task. The book seeks to better understand the making of things, that through the experience and action of craft, knowledge is gained in our hands. The craft of restoration and customization of clothes can also be considered in the context of Marx's theory of the value of labor. That the value of things should be calculated in terms of the amount of labor in production rather than its market value. Marx observes that greater value is attributed to the final product when the maker has a sense of ownership and control over the process of production (Trainer, 2017).

The craft of restoration, and customization gives fashion a new lease of life, and reason to be worn, providing flexibility to the item. These processes provide style elevation, a new sense of ownership and longevity to pre-loved fashion items, improving their life cycle. The development of a deep relationship through craft and the ability to change a garment by restoration and customization are ways in which clothes can evolve. Repeated tasks are hailed as a mindful experience, one of slowing down and reflection. Cooper (2008) asks 'what the process of making ... reveals to us about ourselves' (Cooper, 2008, p. 8) and Marx also identifies the value of making to our emotional well-being (Trainer, 2017). Through these processes, restored and/ or customized garments become so much more than the functional objects they were made to be. Instead, they become physical representations of individual ideas, theories, dreams, and accomplishments; they live on as timestamps of innovation and human achievement, elevating the object. This supports the notion of nurturing difference, as innovation is what makes things unique.

Considering that true innovation can percolate design across society, necessitates the

need to alter what people find valuable, and redefines what value looks like, within a fashion context. A person's emotional response to an object is unique, articulating a complex combination of life experiences and cultural surroundings. This makes objects critical devices in forming identity and navigating place in society, the relationship is intrinsic to who we are. Chapman (2015) theorizes that by appreciating the role of meaning, not only do consumer-product relationships endure, they 'flourish within long-lasting empathetic partnerships' (Chapman, 2015, p. 22). This research harnesses this thinking by developing plural networks where basic skills and processes of restoration and customization are disseminated at wearer/ consumer-level. With the end aim of progressing greener, adaptable, durable attire; through sustaining and nurturing pre-loved leather fashion, and developing a more ethical, and flexible connection towards existing garments.

THE POWER OF PLURAL NETWORKS

Much can be taken from the practice of sharing particularly within the new fashion landscape to nurture, wear vintage, and restore our garments, rather than throw them away and contribute to landfill. According to Hoette, R. & Stevenson, C. in their book, *Modus* (2000), Modus networks demonstrate that the need to find other ways of understanding and operating within fashion is urgent and shared. Experimental networks and spaces, which interrogate and expose tensions between theory and practice, between disciplines and individuals, are a necessary divergence within fashion. Fashion is in many ways a process rather than a thing: an activity whose outputs and products are frequently impermanent and transitory (Hoette, & Stevenson, 2000). This research seeks to evidence that this does not have to remain the case or the only way, and that by creating the network, and the mechanisms through which to adopt a skill, gain insight, or realize a new way of seeing existing fashion; that the 'knowing' increases and cultivates. These networks create and uncover spaces of overlap through forging individual connections, highlighting emotional durability and offering scope to broaden awareness between, in this case, practice (restoration & customization) and product (garment) whilst maintaining and re-framing the basic material contingency (leather). Supporting socially responsible actions and

building inclusive plural networks where communication and practice drive campaigns through social engagement will go some way to counter this. As established, true prosperity extends beyond monetary gain to encompass a rich tapestry of relationships, experiences, and personal growth. A country's future prosperity depends to an extent upon the quality of education of its people, therefore as Dudley (2010) affirms, museum exhibitions, workshops, and educational programs increase public understanding and appreciation (Dudley, 2010). Driving an open economy that harnesses ideas and talent to create sustainable pathways so that investment can grow, and supporting the economic sustainability of traditional arts, encourages younger generations to maintain these traditions and learn the art forms (Duncan, 2013). If circular systems are refined and new slow creative methodologies are presented and disseminated, at all levels, to diverse communities and industry, then fashion could move beyond its singular profit-driven vision to develop the idea of multi-faceted shared well-being, one which could offer a blueprint to redirect other knowledge and disciplines. Challenging the fashion industry in terms of ethical, environmental, and social aspects, by highlighting the positives of coveting, adapting, and self-creating our fashion. By making the collaborative and cumulative nature of a specific material, and fashion knowledge explicit and open, via accessible networks, it is hoped that these shared ideas and practices gain strength, and culture can be preserved, through plural networks which trigger more opportunity, and greater platforms.

METHOD

As the research aims to establish if a new way of seeing leather may contribute to the construction of plural networks who challenge the current fast fashion landscape and consumer behaviors - examination of a specific sub-group of artisans from the sneaker community who embrace and celebrate the craft of restoration and customization was an integral source of data.

To bridge theory and practice the aim was to provide rich perspectives by mixing ethnographic methodological approaches, including object research and participant observation via action research. Ethnography is a qualitative research method in which a researcher studies a particular social/ cultural group with the aim to better

understand it (Kramer & Adams, 2017). Professor Gary Alan Fine's 2003 article 'Towards a Peopled Ethnography: Developing Theory from Group Life' argues for a distinctive form of participant observation- 'peopled ethnography'- and suggests that ethnographic research is most effectively carried out when one observes the group being studied in settings that enable him/ her to 'explore the organized routines of behavior' (Fine, 2003:41). Thus, by entering a group of people with a shared identity at sneaker festivals, workshops, and retail outlets, allowed specific materials, techniques, and processes of leather handcraft, to be explored, experienced, and recorded. Observation of sub-group members, and artisans during restoration and customization workshops opened natural dialogue and allowed conversational data to be gathered. This method was a successful and authentic tool for collecting data about people, process, and culture, which in-turn immersed the researcher into sneaker subculture.

Participant observation encouraged two-way communication between the researcher and artisan, providing high validity as the researcher could gather first-hand detailed accounts of perceptions, actions, and roles among the practitioners. The qualitative and 'conversational' data derived effectively collated and recorded to form a new strand of research - Sole-Zine (Fig. 01), a research output dedicated to archiving and recording British Trainer Culture. Engaging with process, learning through investigation and taking an empirical approach by occupying global sneaker specific events, such as Sneakerness², Sneaker Con³, Crep City⁴ the U.K.'s original sneaker and streetwear event, SOLE BLOC⁵ and Laces Out Fest⁶, it was possible to observe subscribers and shoe fanatics coming together to celebrate their passion. These events were an opportunity to gather local and global insights of perspectives on the sneaker scene, and engage with specific materials, techniques, and processes via workshop participation.

The craft of customization was explored in practice at Laces Out sneaker festival (2023), specifically the use of embossing to alter and elevate a worn shoe.

2 Sneakerness: Sneaker Festival, Global (<https://sneakerness.com/events/london-2023>)

3 Sneaker Con: Sneaker Convention, Global (<https://sneaker-con.com>)

4 Crepe City: Sneaker Festival, Global (<https://www.crepe-city.com>)

5 Sole Bloc: Sneaker and Lifestyle Festival, Scotland (<https://www.crepe-city.com>)

6 LacesOut: Sneaker Festival, Liverpool, U.K. (<https://lacesout.co.uk>)

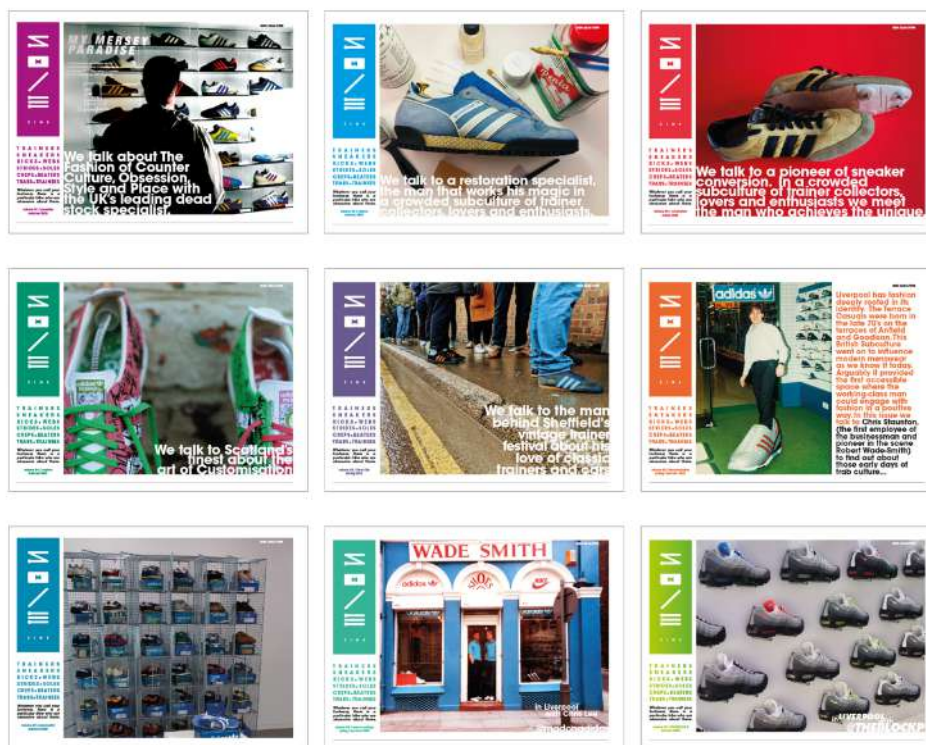


Fig. 01

The workshop consisted of a small group of seven sneaker enthusiasts and run by Benji Blunt Shank⁷ a well-known U.K. customizer and shoemaker. Other workshops attended were concerned with traditional leather hand techniques, including sneaker making, bag making and leather engraving. All of which were attended by small groups of approximately three people and run by Jason Stocks-Young of Diamond Awl⁸. Workshop participation was key to embed skills and knowledge, drive discussion and observational data collection which enabled the analysis of practical research to support the understanding of concepts, opinions, and experiences integral to this sub-group. 'Making' gives the researcher the ability to alter or enhance their experience of the research subject in a manner that would not be possible through observation alone (Sampson, 2020).

Using action research, participatory observation, and object research, through studying a specific creative subcultural group has impacted value systems to the point of re-alignment and

the transferring of skills and knowledge from one leather object (sneakers) to another (garment).

Substantiating that the wearer/ consumer can become the creator of the object of enquiry and making this an important methodology within a fashion context. Reinforcing the actualized possibility of an alternative sustainable wearer/ consumer-product relationship.

CONCLUSION

The planet cannot sustain current customary fashion consumption, and this gives rise to an urgent and necessary cultural shift in mindset toward leather, pre-loved fashion, meaningful purchases, and preserving items we already own. This study seeks to redefine the concept of prosperity, through cultivating the craft of restoration and customization via plural networks, to offer a more ethical and sustainable philosophy and attitude to leather garments. These principles offer a unique opportunity to work towards a more sustainable and fairer fashion ecosystem. Creating a blueprint which encourages flexible ways of seeing pre-loved leather fashion and supporting the cause for less

⁷ Benji Blunt Shank: Bespoke maker, designer, restorer and customiser of sneakers, U.K. (<https://bluntshank.com>)

⁸ Diamond Awl: Leather workshop, U.K. (<https://bluntshank.com>)

damage to an already fragile environment (Fletcher, 2014).

The best solution arises out of users and designers working together, Government, civil society and artisans. So, by designing innovative systems of plural networks which promote restoration and customization, nurture and preserve, circularity can be achieved, and the wearer/ consumer can take ownership, and maintain an ethical responsibility.

Centering the research on leather, the most durable and flexible of materials and drawing attention to specific techniques and processes, provides significant grounding for new ways for individuals to transform leather surface into artistic canvas, telling stories through fashion. Developing plural networks, sharing skills and putting fresh perspective on pre-loved leather fashion opens dialogue and has the potential to build cumulative creative spaces for providers who nurture and preserve existing garbs. This practical and problem-solving approach aids the findings to an effective solution, generating useful knowledge that can be applied to real-world situations. This challenges the fashion industry and presents a new slow, and creative way of using leather, one where the user has an elevated sense of ownership and in turn, belongings are nurtured and become investments due to their flexibility. These processes re-frame leather, push ethical boundaries, and blur the relationship between wearer/ consumer and attire, presenting a prosperity fashion philosophy which additionally could be used to enrich theories of fashion and material culture, influence wearer/ consumer-product relationships, and create an alternative solution which withstands pressure from capitalist industry to buy new and therefore reduce consumption. If the wearer/ consumer can become a 'leather fashion activist' then this blueprint and plural network will serve as a powerful tool.

CAPTIONS

[Fig. 01] Sole-Zine (Volumes 01-09) A Poster-Zine Dedicated to Recording and Archiving British Trainer Culture (2020-2024).

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STRATEGIC DESIGN APPROACH INTO FASHION SYSTEM

DESIGNING FOR LOCAL CRAFTSMANSHIP DEVELOPMENTS

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Abstract

As world grapples with the consequences of unsustainable fast fashion system, it is necessary to act to overtake its design, productive and distribution models, while keeping fashion items as affordable as possible. Within this scenario, craftsmanship seems to be the most effective pattern in meeting the current design scenario and consumer needs. In fact, local fashion practices offer countless of benefits: they incorporate cultural sustainability, preserving both material and immaterial craftsmanship heritage (Brown & Vacca, 2022); they focus on a small-scale production, counteracting a pleonastic overproduction of goods; they deliver a higher quality goods, being the craftsman able to manage the entire production process (Sennet; 2009). It is all about evolving that production model based on local economies (Livesey, 2010) to limit the impact on the environment and enhance the human resources of communities, while preserving their cultural heritage. To this purpose, since 2019 the authors have carried out a didactic experimentation within a Fashion Studies master. This paper describes and illustrates the results of this activity, which has involved about 150 international students – mainly from BRIC countries – with various bachelor's degree, not only belonging to fashion field.

Keywords: *Local artisanship, Environmental impact, Cultural sustainability, Fashion education, Strategic design*

INTRODUCTION

Fast fashion system, because of its persistent speed of production and consumption, has led to unprecedented environmental and ethical challenges (Fletcher, 2014). Although traditionally associated with well-known fast fashion brands, these issues are currently related to luxury sector as well. Common perceptions tend to frame fast fashion as an issue exclusively linked to low-cost brands, largely because they engage in excessive overproduction. However, luxury brands are not exempt from employing fast-fashion-like strategies: though they produce high-quality items, the signs of overproduction and the drive toward overconsumption are becoming increasingly evident (Cachon & Swinney, 2011). Indeed,

in the contemporary fashion industry, the concept of luxury is evolving into a sort of “ready-to-consume” culture. In fact, many high-end and ready-to-wear brands now adopt production and sales strategies similar to fast fashion, even though they offer higher-quality items (McNeill & Moore, 2015). This shift aims to meet – and often create – an immediate demand for an ever-expanding array of both products and styles, encouraging rapid consumption even within the luxury segment (Kapferer & Bastien, 2012).

As the world struggles with the consequences of this unsustainable model, a contrasting narrative is emerging, rooted in the revival of local craftsmanship and conscious design practices. These trends reflect two divergent yet interconnect-

ed currents in the industry: on one side, globalization continues to expand; on the other, there is a growing recognition among markets and enterprises that local and sustainable production models will be key for future resilience (Livesey, 2017). This shift towards localism is driven by a desire to address the specific needs, values, and cultural tones of local communities, thanks to its self-sufficient structures capable of meeting clients demand (Sennett, 2008).

In this context, the current paper aims to explore how these trends are integrated into educational systems, particularly within the framework of a master's degree in Fashion Studies. Since 2019, the authors have conducted a didactic experiment within this program, which emphasizes the cultural and strategic dimensions of fashion. The course prepares students to approach the fashion industry from both a global and market-oriented perspective, using the principles of "Strategic Design" as a tool for innovation and sustainability (Manzini & Vezzoli, 2003). As defined by Manzini & Vezzoli (2003), it is a method for designing complex solutions that integrate sustainability and innovation. In the fashion system, it helps rethink production models to incorporate local craftsmanship while maintaining market viability. This approach was chosen over others due to its ability to structure creative processes toward sustainable and culturally relevant design solutions (Holland & Lam, 2014).

The structure of the course is divided into theoretical lessons, which establish both general and specific frameworks for understanding the fashion landscape, and practical design tasks, which encourage students to identify and explore new business opportunities within the fashion system. Through these tasks, students are invited to investigate sustainable processes and consumption habits, while designing fashion products. The aim is to foster a deeper awareness of how fashion can evolve to meet both market demands and ethical imperatives (Martinez, 2019).

This educational experiment wants to prepare students to develop the tools to critically analyze current industry practices, and to encourage them to find and build alternative paths for the future of fashion. By engaging with concepts like local craftsmanship and strategic design, students are better prepared to address the complex challenges facing today's fashion industry, contrib-

uting to a more balanced and sustainable fashion system.

BACKGROUND AND CONTEXT: (FAST) FASHION AGAINST (SLOW) FASHION

Fast Fashion is both one of the biggest market sectors for global economy and the second most polluting industry in the world (Abrahamson, 2011). This fact presents many issues related to sustainability, that can be found at the level of environment, workers' conditions, local economies and cultural habits, for which it is necessary to open a proper discussion.

Although the impact of fast fashion producers into the environment is very well known, consumers are mainly attentive to overproduction of cheap fashion items. Indeed, overproduction is the iceberg tip of environmental issues, which includes a lot of harmful elements, such as water consumption, carbon dioxide emissions, textile waste and use of chemicals as well, which consumers are not very conscious about (Niinimäki et al., 2020).

Regarding social sustainability, this issue has gained much attention over the past decade, particularly following the Rana Plaza disaster on April 24, 2013, which claimed the lives of 1,134 people. This tragedy had a profound impact on consumers, raising awareness about working conditions, gender equality, and the need for modern infrastructure. As such, it can be considered the turning point for a new consciousness, leading to the founding of the "Fashion Revolution," established by Carry Somers and Orsola de Castro. Its mission is to conserve and restore the environment while valuing people over growth and profit (Ciuni & Spadafora, 2020).

The rise of fast fashion has also had significant consequences for local economies. Particularly, the aggressive undercutting of prices is one of the ways fast fashion sales harm local businesses. Capitalizing on economies of scale, mass production, and outsourcing permit to produce garments at remarkably low costs. This puts immense pressure on local businesses that are unable to reduce costs and prices to the same extent (Schwenke, 2023).

However, in contrast to the mass production model of fast fashion, artisanal production and slow fashion are emerging as more sustainable alternatives. These practices emphasize

cultural sustainability, quality, and positive impacts on local communities. These products, often rooted in cultural heritage and artisanal craftsmanship, are becoming increasingly popular with consumers. Artisanal goods offer uniqueness, cultural significance, and a deeper connection to heritage, making them a preferred choice for those who seek to support sustainable and ethical fashion (Brown & Vacca, 2022), while highlighting the importance of cultural narratives in building a socially responsible and inclusive fashion industry (Fletcher, 2008).

In this context, local practices and businesses are revitalizing through craftsmanship and culturally inspired designs that reflect a conscious lifestyle, producing a conscious lifestyle rooted in both cultural heritage and artisanal strength. Artisanal products are becoming a preferred choice by consumers, as they offer uniqueness, cultural significance, and a connection to heritage (Villarreal, 2021). Finally, local businesses that apply artisanal processes tend to manage economic and environmental optimization more effectively, especially in terms of materials and production methods (Aakko, 2016). This is because artisans have greater control over each stage of the process, ensuring that human resources, local economies, and cultural values are respected throughout.

A DIDACTIC EXPERIMENTATION: STRATEGIC DESIGN FOR A SLOW-FASHION EDUCATION

The considerations underlined above highlight a stratification of elements linked to sustainability, which can be addressed through a strategic approach that lies between design and craftsmanship. In this context, it is essential to work from the basics: to provide future designers with the appropriate training to operate effectively in this direction. It is about applying the fundamental concepts of the Slow Fashion movement from the early educational stages, challenging the global fashion system and embracing the principles of “less is more” and “quality over quantity” (Clark, 2008).

To this end, a course in fashion design has been developed since 2019, conceived by the curators, which invites students to identify sustainable fashion solutions, based on the repositioning of design, production, consumption and use strategies. Authors settled a didactic experimentation starting from the Kolb's (1983) experiential learning model. It supports hands-on education

where students learn through iterative feedback and application. The course was conducted in-person, on a weekly basis, combining theoretical lectures on sustainability, fashion strategies, and craftsmanship with biweekly reviews and project submissions. Including this methodological structure would help clarify the educational approach.

To achieve the aim described above, the course has been developed using the “Strategic Design” methodology. Applying this methodology to the fashion system helps create a framework that integrates sustainability and local issues. Thus, the focus is not simply on designing fashion items using traditional fashion design methods, but rather on creating solutions that challenge the “big picture.”

The innovative aspect of the course lies specifically in this approach, as “Strategic Design” is typically used to address and identify opportunities for action within organizations (Holland & Lam, 2014).

DIDACTIC PROJECT OBJECTIVES

Before going into the specifics of the course objectives and structure, it is important to highlight some general information about the degree program in which this course is offered. This will help provide a clearer understanding of some of the educational choices and the results that will be discussed later.

The course is part of the master's program in Fashion Studies within Sapienza University of Rome, and it aims to develop interdisciplinary skills in the fashion field, combining history, anthropology, and art with the knowledge provided by the SARAS Department to which the course belongs. The program's objectives include a deep exploration of the multifaceted aspects of the fashion world as both a cultural and economic feature of the Italian system, preparing students for roles in academia, creative industries, and communication.

The course discussed in this paper, titled “Fashion Design Practice | Fashion against Fashion”, has been attended by approximately 150 students since 2019. The largest group consisted of Italian students (32%), followed by Russians (10%), Middle Eastern students (11%), Iranians (10%), and Kazakh students (8.5%). Other represented nationalities included Chinese (6%), Western Europeans (4.5%), Ukrainians (4%), Brazilians/Portuguese (3.5%), Lebanese (2.5%), Bangladeshis (2%), Vietnamese (2%), Indians (2%), and Uzbeks

(2%). These students hold various bachelor's degrees – not limited to the fashion design field – and come from diverse cultural backgrounds, as they are international students. In terms of academic backgrounds, 55% of the students had a bachelor's degree in Fashion Cultures or Fashion Design, while 28% came from Textile studies. A smaller percentage had backgrounds in Arts (5%), while the remaining students were distributed across Communication, Design, and other disciplines.

Now, focusing on the specifics, the course has three main objectives for students:

- Understanding the current state of fast fashion.
- Analyzing the issue of overproduction in the industry.
- Examining the harmful practices associated with fast fashion.
- Detecting best practices of local crafts, chosen from the student nationality, close to a specific target consumer, picked from the ones elaborated by sociologist Francesco Morace.
- Proposing and designing a fashion item, coherent to the topic and the analysis, which satisfy the “ConsumAuthor” habits.

To effectively get these goals, a “learning by doing” approach has been applied (Kolb, 1983), and students were asked to build the course project through the following three main steps.

- 1st Step & Delivery “Local Artisanry”: choice and analysis about a craft, typical of the student Country, to be applied into the final item.
- 2nd Step & Delivery “ConsumAuthor”: choice and analysis about a “ConsumAuthor” category, from the ones developed by Morace, to be their final consumer.
- 3rd Step & Delivery “Design Proposal”: proposing and designing a fashion item, coherent to the previous analysis.

Each step was organized with an introduction lecture, to describe methodology and tools, and a “show & tell” session during which students must present the required delivery.

After each presentation, the students receive critical feedback about the delivery in order to improve it for the Final Work.

REQUIREMENTS AND DELIVERIES STRUCTURES

As mentioned in the previous paragraph, the course is aimed at international students of different nationalities, with various technical and cultural

skills. For this reason, before starting the project work, each student is asked to carry out a preparatory exercise. This consists of the research and analysis of two brand categories: one linked to fast-fashion and the other to sustainability. In this way, students begin to familiarize with the two main themes of the course, and at the same time it allows us to evaluate their knowledge, their way of thinking and their analytical skills.

Through this exercise, students begin to delve into issues such as overproduction and the ethical and environmental impacts of the fashion system, thus understanding the limits of the current production and consumption system. On the other hand, by analyzing best practices in terms of sustainability, they begin to explore the concept of innovation linked to values, aesthetics and products in the fashion sector, and explain why they consider that brand an exemplary case of sustainability.

LOCAL ARTISANSHIP

In this first step, each student explores the cultural context of his or her home country, starting with a local craft technique they choose and integrated into the final project. This step aims to make a connection between individual cultural identity and design, encouraging a deeper and more authentic connection with their work. Specifically, students are invited to examine and describe this craft technique from the following different perspectives, through pictures and keywords (Fig. 01).

- Authenticity refers to the quality possessed by a technique or product that allows us to tell how much that technique represents the cultural world in which it was born (Fry et al., 2016); whether the materials and methods used are traditional or modernized; and to what extent the technique has evolved from its initial form.
- Identity concerns how the craft expresses a specific cultural, regional, or individual character through that technique or product. Identity is thus related to the representation of who or what the craft represents (Gherardi, 2012).
- Uniqueness focuses on what makes the craft technique, or product, distinct from other similar forms of craftsmanship. In essence, a “unique” technique possesses a whole range of both material and intangible values that can manifest its distinctiveness and distinction (Cristallo, 2014).

LOCAL ITEM Name Country Item Date

TECHNIQUE PICTURE MAP OF THE PLACE

LOCAL ITEM Name Country Item Date

IDENTITY AUTHENTICITY VALUABLE

TECHNIQUE UNIQUENESS QUALITY

Fig. 01

- Value is connected to the cultural and economic importance of the technique or artifact. A valuable craft may be significant because of its rarity, historical or cultural significance, or the high level of skill required to make it. Students may ask what makes this artifact valuable to the community, culture, or fashion world, and whether it possesses symbolic or economic value (Marchetti, 2011).
- Quality is related to both the level of skill and attention to detail in the making of the craft, and the quality of the materials and techniques used. From the perspective of the local, it is based on the use of the specializations, workmanship and components expressly linked to the territory of origin, and which are based on values and production techniques proper to a high level of historicized craftsmanship (De Fusco 2009).

APPLICATION OF THE “CONSUMAUTHOR” CONCEPT

In the current context, the socio-demographic dimension assumes strategic importance in both cultural and business terms within the fashion

system. The increasingly articulated and changing generational categorization makes it essential to have an accurate understanding that overrides generalizations and identifies the real characteristics. Therefore, in this second step, students were asked to work with the concept of “ConsumAuthor.” Developed by Italian sociologist Francesco Morace, this concept marks the new centrality of people in purchasing dynamics and frees consumer activity from the supposed demons of consumerism (Morace, 2017). Starting with the main generations of contemporary society, Morace defines 16 “ConsumAuthors,” four for each of the four generations, who present different attitudes, aesthetics and preferences: for clothing, objects, places, movies, books, music, social and political ideas. Morace redefines consumer roles by integrating individual lifestyle, cultural engagement, and purchasing behavior.

Initially, students must choose a specific “ConsumAuthor” who will become the target consumers for their product. In this way, they will be pushed to design products that are not only aesthetically appealing, but also target a specific audience with a specific lifestyle. The students’ application of this model allowed them to design for specific consumer archetypes, tailoring their craft-based fashion items to meet the expectations of contemporary sustainable markets. Including case examples of how students mapped these consumer behaviors would add depth to the analysis.

The work of this step is mainly analytical and consists of the following four tasks (Fig. 02):

- 1st: To find among the fictional characters, normal people and VIP, the chosen “ConsumAuthor” to start approaching the concept from something students already know.
- 2nd: To observe the chosen category in real life and take pictures of it, impersonating a “cool hunter.”
- 3rd: To analyze for the specific “ConsumAuthor”, through nine photos taken by students and keywords, the three levels of description defined by Morace: consumption, communication, distribution.
- 4th: To synthesize all the peculiar aspects of “ConsumAuthor” in a single slide through pictures.

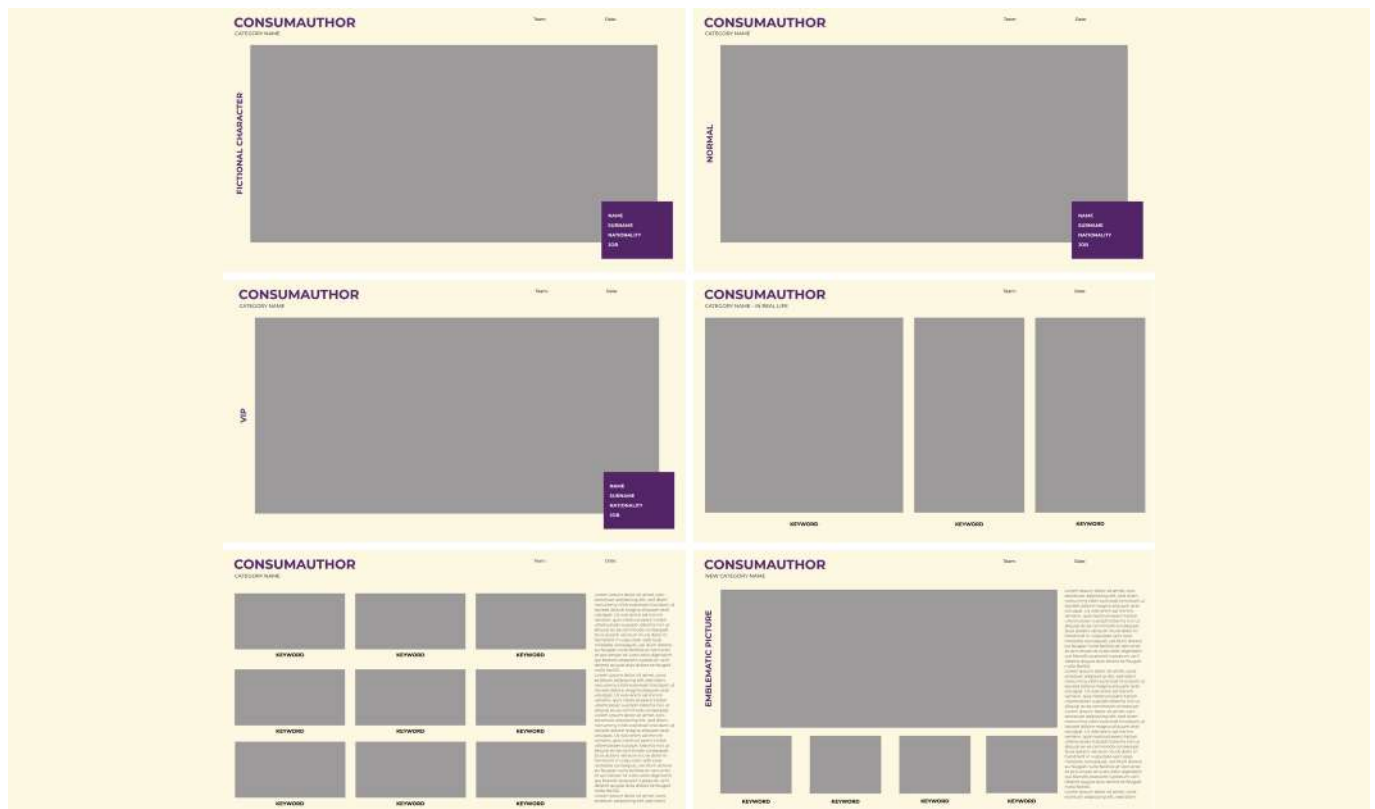


Fig. 02

DESIGNING A FASHION ITEM

Based on the previous analyses, the goal of the third step is to imagine and develop a new design concept for fashion items, or accessories, integrating the chosen loca technique, the consumption habits of the chosen “ConsumAuthor” and the concept of Slow Fashion.

The aim of this first part is to propose a design concept of the item through two distinctive parts: the first one related to how students intend to apply the previous findings (Design Proposal Part I); the second one containing the results (Design Proposal Part II) (Fig. 03).

The first part consists of target audience, local opportunities, product application, object type and sketches.

- **Target:** section dedicated to describing the main characteristics of the target consumer, identified in the previous step.
- **Local Opportunities (Country):** in this part it is necessary to select the technique, object or cultural/identity aspect to be applied to the accessory, again using information from the previous delivery.
- **Productive Application:** taking advantage of a productive opportunity involves understand-

ing how the material is used and transformed to achieve a specific form, style, or function. If the productive opportunity is part of a cultural heritage, using it to develop a new product idea means enhancing and “regenerating” traditional value in a new way, according to consumer needs/desires.

- **Item Typology:** describing to which type the product belongs.
- **Concept Sketches:** dedicated to the sketches of the object idea.

The second part (Design Proposal Part II), on the other hand, is devoted to the final design.

- **Consumption:** through images and keywords, define the new consumption behaviors, showing how the design idea will change the actions/habits of the target consumer.
- **Final Design:** dedicated to mock-ups, illustrating all relevant aspects of the object (shapes, textures, materials, aesthetics, etc.).

In the end, looking at these steps and tasks, it is possible to see how this instructional project moves slightly away from what are typical fashion design activities. Therefore, the course doesn’t address to the simple expression of a personal “fancy design skill,” but it clearly wants to provide

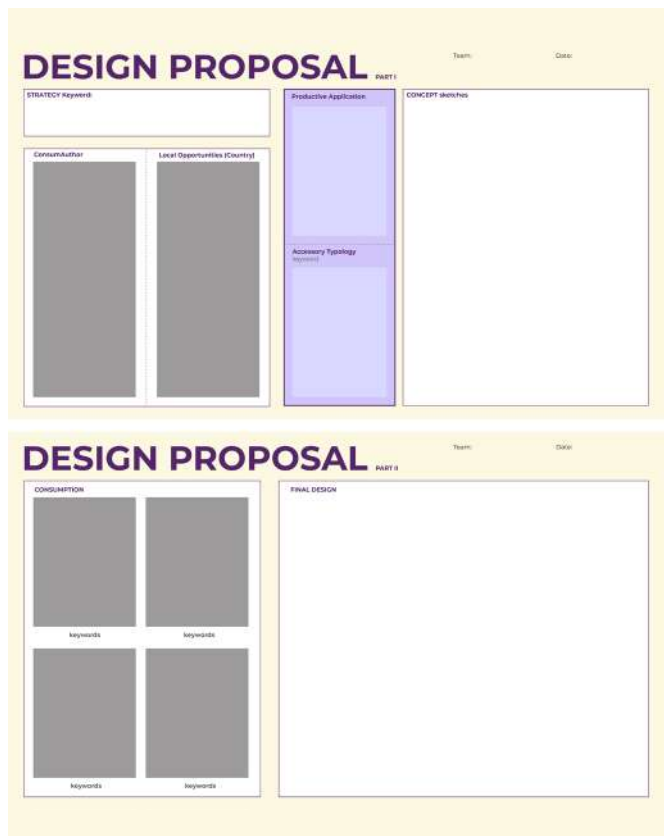


Fig. 03

students with the tools to understand and critically respond to fashion industry issues, encouraging them to explore sustainable alternatives. And this is where students' creativity materializes.

CONCLUSIONS: RESULTS AND OBSTACLES

Considering the considerations that emerged, this didactic project reveals to be quite experimental, since it aimed to explore the trends of local and sustainability in fashion through a strategic approach, that can incentivize a successful generation of fashion designers to propose innovative solutions for a more sustainable and future-oriented fashion system.

The results were found, not so much in the technical skills for developing a fashion product, but in the students' change of perspective in looking at fashion design.

In terms of outputs, most of the projects consisted of fashion accessories, due to their suitability for integrating artisanal techniques. A smaller portion (32.5%) consisted of garments, where students focused primarily on applying traditional craftsmanship techniques rather than

fully reinterpreting them. This pattern suggests that accessories provided a more flexible medium for experimentation, while garment projects leaned toward direct applications rather than conceptual innovation.

Specifically, the project proved to be effective in raising students' awareness of a critical view of fast fashion, highlighting its impacts on daily life and consumption, and of their responsibility as future fashion professionals.

Through a step-by-step structured training course, it was also possible to broaden their understanding of the concept of sustainability in the fashion world, a sustainability that goes beyond the purely environmental dimension, and thus also embraces the cultural and social implications of the industry. This approach allowed them to develop a more comprehensive and profound perspective of sustainable fashion, going beyond the traditional view focused exclusively on ecological impact, and opening new reflections on how cultural values can and should influence design, production and consumption choices.

One of the most significant achievements was the development of the ability to approach fashion projects with a strategic vision, and not look solely and exclusively at the beauty of the fashion object. Students learned that fashion is not limited to creating aesthetically pleasing products, but requires strategic planning that considers market dynamics, consumer expectations and brand identity. This new awareness enables the construction of fashion proposals that are more conscious and in tune with contemporary market trends, without sacrificing the integrity of cultural and sustainable values.

An additional valuable aspect has been the ability to understand how to renew a traditional craft technique to make it exploitable in today's market context. This implies both a reflection on the peculiarities of this technique and an assessment of its yet unexplored potential to reach contemporary consumers. Thanks, in fact, to the discovery of the concept of "ConsumAuthor," students have thus learned to see tradition as an element of added value that, if reinterpreted in a modern key, can become a strong point to attract a clientele increasingly attentive to the quality, originality and authenticity of the product.

Despite these important achievements, however, the training course presented several challenges, which have proved to be the same over

the course of these five years of activity.

Generally speaking, through hands-on experimentation, participants developed an awareness of fashion's impact on daily life and consumption, recognizing how industry choices affect both society and the environment. Moreover, the course emphasized that sustainability extends beyond the environmental dimension, incorporating cultural and social aspects into design decisions. One of the key achievements was the shift toward a strategic vision, moving beyond aesthetics to consider market dynamics, consumer expectations, and brand identity. By integrating artisanal techniques into their work, students demonstrated an ability to connect tradition with contemporary design challenges, reinforcing the potential of craftsmanship in sustainable fashion.

One of the main difficulties encountered by the students was identifying and analyzing lesser-known brands that are not part of the immediately recognizable mainstream luxury landscape. Although this was a preliminary activity, which did not have substantial bearing on the final project, it in fact requires a critical and in-depth approach that is often unfamiliar to students, who are accustomed to more mainstream fashion references. This difficulty thus underscores the need to build an education around fashion that will allow them to further develop their skills in researching and critically analyzing the market and the contemporary world.

In addition, students found it difficult to understand the specifics of their chosen craft techniques and to distinguish them from other similar techniques. Although they had total freedom to choose among techniques from their country of origin, they found it difficult to grasp the symbolic and cultural value of the technique and how it became representative of their context of origin. Such understanding, however, is crucial for an authentic and respectful appreciation of tradition, avoiding cultural simplification or appropriation.

The level at which the most difficulties were encountered was related to the analysis of "ConsumAuthors." Indeed, during this phase of analysis, students focused almost exclusively on fashion-related buying behaviors, neglecting the broader understanding of individuals' lifestyle and how it influences their consumption choices. This limitation has prevented an integrated view of the consumer, which is necessary to build more

effective design strategies in line with their needs. But understanding how lifestyle affects purchase choices is a key aspect for those working in the sustainable fashion industry, where the value and cultural dimension plays a key role.

Integrating luxury craft techniques into affordable fashion proved challenging due to their strong association with exclusivity. This required deeper reflection on how to communicate their value without reinforcing a luxury-only perception. Despite these challenges, the educational experiment successfully fostered critical and strategic thinking about sustainability, often lacking in traditional fashion education. By strengthening students' research and consumer analysis skills, the course prepares future professionals to merge environmental and cultural sustainability with the evolving demands of the market.

CAPTIONS

[Fig. 01] Layout for the "Local Artisanship" analysis.

[Fig. 02] Layout of the 4 steps for the "ConsumAuthor" analysis.

[Fig. 03] Layout for the final design project.

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INVISIBLE FASHION

REIMAGINING FASHION DESIGN AND EXPERIENCE BEYOND VISUAL APPEARANCE

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Abstract

As fashion and design researchers, we have embraced a human-centered design approach that emphasizes the relationship between people and objects as functional tools. Yet, fashion goes beyond utility; it embodies frivolity, playfulness, and social communication, often conveyed implicitly through garments. This article envisions a future where our engagement with fashion transcends mere appearance, highlighting research involving fashion designers collaborating with blind individuals to understand their relationship with clothing. Using ethnographic studies and qualitative interviews, the research examined how non-visual senses influence garment selection and wear. Designers emphasized tactile, auditory, and olfactory experiences to create “invisible” textiles and garments, challenging the conventional emphasis on visual aesthetics in fashion. This initiative encouraged designers to move beyond functional or trendy solutions toward meaningful interactions embracing diversity. Findings revealed that fashion enjoyment, decision-making, and emotional connections can be redefined beyond aesthetics to promote sustainability, shareability, engagement, and equality. Invisible fashion is designed for those often excluded from traditional human-centered design. While not fully realized as post-humanism or more-than-humanism, this approach suggests a new fashion paradigm valuing all senses equally and fostering positive experiences for humans and nonhumans alike.

Keywords: *Human-centered design, Invisible fashion, Five senses, Design for human and nonhuman*

“SEEING” THE NEW PARADIGMS OF FASHION

The field of fashion and design research has long been anchored in the principles of human-centered design, which emphasizes the relationship between people and objects as functional tools. This approach, as highlighted by Giaccardi & Redström (2020) and Norman (2013), prioritizes usability and the practical interaction between humans and their environment. Human-centered design is fundamentally about creating solutions that are tailored to the needs and behaviors of users, ensuring that products are not only functional but also intuitive and accessible.

However, fashion as a discipline extends beyond mere utility. It embodies elements of

frivolousness, evanescence, and playfulness, as noted by Fletcher (2015). These characteristics highlight fashion’s role in expressing creativity and individuality. Unlike purely functional objects, fashion items, alongside their function of protection and comfort, often serve as a medium for personal expression and social commentary. Clothes can convey messages about the wearer’s social status, affiliations with particular social groups or desire to stand out from the crowd, adherence to certain values, and personal beliefs (Manzini, 2022; Vaccaro et al., 2016).

Such a communicative aspect is often implicit, but even if the messages may not be overtly stated, they are embedded in the visual language of clothing, like the choice of fabric, color,

and style. Sight is the sense we use and prioritize to evaluate, transmit, and experience fashion. This makes the visual elements powerful and critical to fashion's significance, as they serve as the primary medium through which designers communicate their creative visions and people interpret and engage with clothing.

Color, texture, silhouette, and pattern impact consumer behavior and preferences so much that many brands prioritize a merchandiser's approach in building collections, based on which visual features data reveal as the most appreciated by the public.

Moreover, the concept of "visual" does not only concern the product. Still, it concerns communication: the visual representation of fashion is integral to branding strategies, as the effective use of visual elements can enhance brand recognition and loyalty by establishing a distinctive identity that resonates with target audiences (Kumar & Singh, 2020). This is particularly relevant in the digital age, where visual content dominates social media platforms and influences purchasing decisions. Studies have shown that consumers are more likely to engage with brands that utilize compelling visual narratives in their marketing efforts (Eckman, Damhorst, & Kadolph, 1990).

We see visual elements today serving a market-oriented approach to the fashion system, nurturing the sector's inherent focus on economic growth, which necessitates continuous expansion as a structural requirement. This growth increases resource depletion, waste generation, pollution, and social inequalities. It means, as Fletcher (2022) states, that ironically, as the sector improves its performance in some areas, its negative consequences on people and the planet often intensify.

Samuel Alexander's (2016) and Tim Jackson's (2009) perspectives explain how the future well-being of both people and the planet hinges on the design of a post-growth economy, as a means to achieve sustainability and prosper "as human beings within the ecological limits of a finite planet" (Jackson 2009, p. 1). In relation to fashion, Fletcher (2018) highlights the need for a new set of values, a purposeful distribution of power and existence, new economic models, and shifts in fashion culture. In their writings, Fletcher and Tham (Fletcher, 2022; Fletcher & Tham, 2019) envision a redefined purpose for the fashion system where the industry will "occupy a less dominant role in our textile and

clothing lives and livelihoods" (Fletcher, 2022, p. 130).

With the above-stated premises, the possible actions to pursue the intended change are broad and not easy to define. Moving from the current relevance of the visual element as the first focus of the article, the research presented questions if a different hierarchy may be possible: when we approach a future of new paradigms and new ways of acting, can we overturn the "supremacy of sight"? Or, rather, can we envision a condition in which fashion is experienced in new ways? Is there a future where our interaction with fashion is defined by values and meanings beyond appearance?

To start to argue in this direction, the article explores research in which fashion designers collaborated with blind people to understand their relationship with fashion. Using ethnography and qualitative interviews, fashion has been studied from the perspective of people who perceive, select, and wear their clothes in any way other than seeing them. Before an audience that values more than just shapes and colors, designers prioritized other senses to design textiles and garments conceived as "invisible", challenging the traditional reliance on vision to convey fashion's messages.

The research, started as an investigation of an existing situation – even though not extensively explored before – generated findings that have the potential to be transferred in a different, future, imagined context, to suggest solutions for the new paradigms of fashion.

METHODOLOGY

PHASE ONE

The research in its first stage combined an ethnographic approach with surveys and semi-structured qualitative interviews.

Researchers worked with a group of 48 students attending the Final Synthesis Studio in Knitwear Design and the Fondazione Istituto dei Ciechi (the Milanese Foundation and Institute of blind people) to relate with 15 blind and visually impaired people.

Designers and researchers have been observing blind people living in their clothes in real-life situations to understand their behaviors, needs, interactions with clothes, and potential challenges. Most important was for designers to be exposed to a new perspective and think outside traditional frameworks, to generate solutions that

would be relevant and respectful to such a user group.

The focus was on lived experiences of fashion as opposed to industry narratives, with the aim to identify meaningful acts of engagement and connection of individuals with their fashion choices.

To collect data on the observed group, a survey was prepared and sent to 45 blind and visually impaired people in contact with Fondazione Istituto dei Ciechi. The survey contained quantitative questions to frame the composition of the observed cluster and qualitative questions to investigate themes like color perception, other senses, material perception, drivers in fashion choices, self-esteem, personal taste, comfort, and aesthetic perception.

Here is the list of the qualitative questions, prepared by researchers with designers:

- How do you perceive colors, and how much does color influence your choice of a garment? Do you think of colors with emotional significance?
- To what extent and in what way do other senses, apart from sight, come into play when choosing garments to purchase?
- What characteristics do you always consider when selecting a piece of clothing?
- In what ways and to what extent do clothes play a role in building your self-esteem and self-perception?
- What is your favorite garment and why?
- What value does aesthetic beauty have, if any, and how do you perceive it?
- What influences your personal taste in fashion choices? (For example, music, art, advertising, the people around you, etc.)
- When choosing a piece of clothing, is it more important how it is presented by a brand (storytelling) or its level of comfort and functionality?
- Which accessories do you avoid in order not to complicate your daily activities?
- Do you find that certain materials, sounds, or smells produced by a garment or accessory are a positive stimulating element or do they cause discomfort? If possible, try to describe them.
- How important is the structural simplicity of a garment to you?
- How important is the stylistic originality of a garment to you?
- To what extent does the physical sensation

you perceive in a garment transform into an emotional one, and how much do you seek this type of stimulation in clothing?

Among the 45 surveyed people, 3 were then interviewed by the class with semi-structured questions, to deepen the results of the survey.

PHASE TWO

The second stage started from the methods in use at the School of Design of Politecnico di Milano to develop a design process for knitwear, where the 48 students, working in teams of 4 to 5 people, learned the theoretical and technical notions of knitting and the design process by doing them.

The codified process, made of three pillars (Theoretical Knowledge, Practical Activities, and Design Process) (Motta, 2019), was hacked in some parts to make designers privilege other senses rather than sight. Here is a list of the research actions put in place to guide students along the journey:

- *Materials* (Pillar 1 - Theoretical Knowledge): one of the classes was delivered with the eyes closed, just listening to the voice of the teacher and touching samples of materials. Only at the end of the class were students allowed to look at the materials, to add information to what they first perceived with touch and hearing.
- *Hand Knitting* (Pillar 2: Practical Activities): once students had learnt the basics, they were encouraged to practice with eyes closed, to better perceive the movement of yarn and needles, to improve the rhythm, and to work on the evenness of the stitches to anticipate the final regularity of the fabric.
- *Finishings* (Pillar 2: Practical Activities): washing and final treatments on knitted textiles were experimented and results were checked with hands rather than with the eyes.
- *Target Profiling* (Pillar 3 - Design Process): this module coincided with Phase One of the research, useful for researchers to set up the project and for designers to frame their public and its needs.
- *Mood and Concept* (Pillar 3 - Design Process): inspiration was found with closed eyes. Some groups visited museums, and experienced art with no eyes; some went for a walk in the woods, listening to the sounds and the smells, and some focused on dreams, questioning our subconsciousness.

- *Research on Yarns, Textures, and Colors* (Pillar 3 - Design Process) and *Stitches and Structure Development* (Pillar 3 - Design Process): designers were encouraged to feel materials, structures, and stitches with other senses. Touch, sound, and smell were privileged during project reviews, with the samples examined by researchers with closed eyes at first. Colors were still considered, due to their importance underlined in some answers received by both blind and visually impaired people.

The results of such process were nine capsule collections of knitted fabrics and garments, all designed in detail and prototyped.

PHASE THREE

The third stage was the final evaluation with blind and visually impaired people. At the completion of the project, researchers and designers presented their collections to the involved people at Fondazione Istituto dei Ciechi. People were invited to touch the fabric collections, to wear garments and interact with them, and to give their feedback.

INVISIBLE FASHION: RESEARCH DEVELOPMENT AND RESULTS

PERCEIVING THROUGH THE BODY: RESEARCH FOR THE PROJECT

We are surrounded by images, sounds, smells, and messages of all kinds that impact our sensory perception. To perceive, or better yet, to *wahrnehmen*, implies taking something as true, or more precisely, *für wahr nehmen*: and to put it in the words of Merleau-Ponty, it means “to believe in a world” (Pinotti, 2022, p. 12). We know the world and space through our bodies in the interplay of our senses (Fiorani, 2021): sight, touch, hearing, and smell; thus, it is not only what we see but also what we touch; it is a world of sounds, fragrances, and odors.

The experience with the Fondazione Istituto dei Ciechi has highlighted how the ability to perceive and recognize a product is completely different when one or more senses other than sight are activated.

The preliminary research activity (Phase One) for the project involved meetings with some patients from the Fondazione Istituto dei Ciechi who were observed in their daily environment and responded to interviews and questionnaires. The aim was to understand their purchasing

motivations, as well as to bring out the qualitative aspects of the interviewees’ choices in fashion and their interests about a fabric or a garment through their experiences. Aesthetics, beauty, self-esteem, as well as colors, sensations, and recognizability, have been the keywords upon which the questions were based to understand the most intimate motivations and to approach a perceptual reality in which memory and the recollection of visual sensations are integral parts of product choices. “*Aesthetic beauty has its value even if I do not perceive it with sight; I can always have it described to me, and whether I like it or not, this description evokes images in my mind. These images are then associated with emotions. Thus, it is an important value because when something is beautiful, people often stop to compliment it, which boosts one’s self-esteem and self-perception.*”¹

From the questionnaires shared with some visually impaired people, it emerges that the quality of a fabric is perceived by them in a completely different way than by those who see normally: “*The smell of the fabric and the noise produced when touching or moving it are important, but not as much as the tactile sensation—what my hands perceive when touching the garment or what sensation it transmits to my skin when I wear it.*”²

This aspect of effective multisensory experience applied to a project has led to a design approach that starts from elements beyond just aesthetic-visual qualities. The perception of images reverberates on the perception of the real world; touch, defined by Diderot as “the most philosophical of the senses” (Pinotti, 2022, p.8), has been the sense most explored by students so that end-users could perceive what had been designed. For this shift in design methodology, interactions with visually impaired people were fundamental, and their insights ensured that the design was guided by novel aspects: garments are often said to be interpreted from a broader observational perspective, and, especially from a distance, observers can perceive visual sensations from what they see. In this case, however, only through close contact with the product can users understand what sensations

¹ Interview conducted on February 16, 2024, with a male patient aged between 25 and 35 years, residing in Reggio Emilia, who lost his sight in 2014 at the age of 21 due to complications from a rare autoimmune disease.

² Interview conducted on December 10, 2023, with a female patient aged between 35 and 50 years, residing in Busto Arsizio (VA), affected by congenital blindness.

are being conveyed:

“Touch plays a crucial role because it gives me a sense of the quality of the fabric and also the type of visual effect it might have since touching it creates a mental image.”³

In this context, designing a fabric that must be recognized by all its other characteristics except for sight presents an intriguing challenge for the designer. The body that will wear it is placed at the center of reflection; indeed, the body is the cognitive instrument of reality in all its articulations. The skin has eyes; it is the boundary line or the first interface of our body with the world and space; it is the place of exchanges and contact (Fiorani, 2020).

Furthermore, during interviews conducted by students directly with some people from the Fondazione Istituto dei Ciechi, it emerges that everything normally avoided—such as rustling sounds, noises, and friction—is actually a way to perceive but even more so to make oneself present to others.

“If they are pleasant, they are a positive stimulus; otherwise, they are a nuisance. For example, I like the rustling sound of a dress, but not if it is too loud. Similarly, I enjoy the smell of skin, but not if it is too strong.”

The goal of the interviews was to try to immerse oneself in a distant reality, to modify one’s way of experiencing a project, where feeling is that necessary condition defined by the imaginary (Fiorani, 2020) that determines the relationship with reality by symbolizing it and giving it content.

DESIGNING WITH OTHER SENSES: DEVELOPMENT AND PRODUCT

The project in collaboration with the Fondazione Istituto dei Ciechi was carried out in partnership with Arman Avetikyan, a designer from Froy, who trained at the Politecnico di Milano and is now the Creative Director of the SCA Group. Together with the faculty of the Final Synthesis Laboratory in Knit Design, he led the development of the project based on the stimuli and results obtained

³ Interview conducted on February 16, 2024, with a male patient aged between 25 and 35 years, residing in Reggio Emilia, who lost his sight in 2014 at the age of 21 due to complications from a rare autoimmune disease.

⁴ Interview conducted on December 10, 2023, with a female patient aged between 35 and 50 years, residing in Busto Arsizio (VA), affected by congenital blindness.

through observation and interviews. The attention of the researchers/teachers and designers/students focused on responses that addressed comfort and functionality but, above all, novel aspects that were distant from visual concerns: *“For me, beauty is harmony, something that makes me feel good. What is beautiful is what feels pleasant to touch, hear, and smell.”⁵*

It was a different way of seeing problems that led to the ability and willingness to imagine a new human, ethical, and social dimension of the project, much more interesting and relevant compared to the usual way of designing fashion. Three-dimensionality and sound as tools for recognition, yarns and colors visible only up close and not to everyone, and smell as an element of memory and recollection represented a mix of innovative design tools in the research for the project that primarily focused on the surface of the product. Additionally, an interesting aspect of the research was the generation of initial mood images using Artificial Intelligence; some student groups used AI to generate images that could then determine three-dimensional surfaces to be recreated later during knitting with knitting machines. The yarns represented the keystone of the project: a search for yarns that included both natural and synthetic fibers so that the surfaces and structures of the knit could enhance, through touch, the sensations intended to be conveyed. Small accessories like sequins or metal studs, as well as a simple carding of natural yarn, further characterized the fabrics, making them rough, metallic, sonorous, and padded (Fig. 01).

If for Merleau-Ponty, through vision we touch the sun and the stars (Fiorani, 2020), for this project it is the hand that allows us to “make visible” a surface, activating two different levels of knowledge in visually impaired users: memory, for those who retain a recollection of fabrics and colors before losing their sight; and imagination, for those who have been blind since birth and have experienced colors and textile surfaces through others and their narratives, yet pay great attention to them.

“I cannot see myself, but I can intuit from those I meet whether I have dressed well or not. The eye wants its share; I take it into account when matching garments as much as possible.”

⁵ Ibid.

⁶ Ibid.



Fig. 01

At the end of the design process, 9 knitwear collections composed of knitted textiles and prototyped garments were presented at the Fondazione Istituto dei Ciechi, allowing students to interact with their target audience. Touching and trying on the garments to understand what they were “seeing” was a very emotional moment and, at the same time, one of great reflection; if it is true that creative processes (Fiorani, 2021) are characterized by flexibility, which involves considering multiple solutions to a problem, then, in this case, we can affirm that the developed fabrics belong more to that category of formlessness to be manipulated, while fashion, an infinite flow of change socially determined (Molotch, 2003), remains in the background (Fig. 02, Fig.03, Fig. 04).

TOWARDS FUTURE RECONSIDERATIONS OF FASHION

The findings revealed that the pleasure of fashion, the reasons for our choices, and the emotional bond we create with garments can be reinterpreted beyond aesthetics to seek new values that promote sustainability, shareability, engagement, and equality.

This experiment prompted designers to consider a future where they are not just tasked with providing useful, technical solutions or in-trend styles for an overcrowded market but also with fostering meaningful interactions that embrace diversity (Giaccardi & Redström, 2020). Starting from the focus on blind and visually impaired people, the experiment stimulates the exploration of design and fashion as a process where the whole research and the outcomes depend on how designers deal with the diversity that always arises from the complex situations and interactions we are increasingly facing in current times. The opportunity for designers is to overcome the mere creation of a garment and start a redefinition of the interaction with fashion values and significance, questioning also who the subject of such interaction is, when we start to consider non-human, post-human, more than human creatures in our future landscape.

Invisible fashion is designed with and for humans who have been frequently excluded from the very center of human-centered design. While not yet an act of post-humanism or more-than-humanism (Latour, 1991; Haraway, 2016; Forlano, 2017), this represents a rare reconsideration of



Fig. 02



Fig. 03



Fig. 04

fashion, for once experienced through taste, smell, touch, and sound—an approach unfamiliar to many humans but magnificently mastered by other creatures, such as plants and animals.

Putting attention to such experiments before broadening perspectives is a crucial step to ensure emerging design practices, including those that may eventually decenter the human, support equality and justice for both humans and nonhumans (Forlano, 2017). Even more so, it is a way to explore a new kind of fashion that, designed for a context where all senses are equally important, could prosper and be experienced in an unprecedented, positive way by any human or nonhuman entity.

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Martina Motta wrote the Abstract and the paragraphs “*Seeing*” the new paradigms of fashion, *Methodology*, and *Towards future reconsiderations of fashion*. Giovanni Maria Conti wrote *Invisible Fashion: research development and results*.

CAPTIONS

[Fig. 01] Students presenting their moodboards, material boards and fabrics at Fondazione Istituto dei Ciechi. Picture from the authors.

[Fig. 02] Blind and visually impaired people are trying on some garments and giving their feedback to designers. Picture from the authors.

[Fig. 03] Blind and visually impaired people are trying on some garments and giving their feedback to designers. Picture from the authors.

[Fig. 04] Blind and visually impaired people are trying on some garments and giving their feedback to designers. Picture from the authors.

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LOCAL AND GLOBAL

PROSPERITY FASHION IN PALESTINE

EXPERIENCES BETWEEN THE PAST AND THE FUTURE

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Abstract

This paper investigates the production of Palestinian textile and clothes before and after the 1948 Israeli occupation and the shift to fast fashion as a consequence. It also foregrounds how contemporary efforts in sustainable fashion production are hindered by the ongoing occupation of Palestine. Through a chronological analysis, the article highlights revived Indigenous sartorial and social practices. It examines their role in facilitating connections between producers and consumers—extending the life cycle of clothing (whether acquired or gifted) while also enhancing the prosperity of collective creators. The case studies presented demonstrate how Palestine's partially forced, extra-slow fashion production is positively influencing international consumers to reconsider their consumption habits, particularly in terms of production pace.

Keywords: *Indigenous practices, De/humanizing fashion, Storytelling*

INTRODUCTION

Palestine may not be among the world's fashion capitals. In fact, only a handful of small-scale fashion shows have been held there over the years. Yet, an often-overlooked fact is that clothing is a pivotal component of Palestinian identity. Long before the global frenzy over fashion weeks, Palestinian attire served as a profound cultural marker, reflecting the lives of individuals and communities, as well as the region's natural and historical landscapes. The art of embroidery, practices, skills, knowledge and rituals in Palestine have been inscribed by the UNESCO¹ in 2021 on

the Representative List of the Intangible Cultural Heritage of Humanity (UNESCO, 2022). The world reduces Palestinians to either victims or aggressors, submerging the rest of their lived reality, including their deep-rooted sartorial heritage. For over a century, this tradition has sustained eco-conscious, culturally rooted production, defiantly maintaining locally handmade garments over fleeting trends. Yet colonial occupation violently disrupts this: while displacement forces families to desperately recycle clothing, economic hardships push others toward cheap, polluting fast fashion—a double erosion of autonomy and sustainability.

¹ UNESCO: The United Nations Educational, Scientific and Cultural Organization.

METHODOLOGY AND THEORETICAL FRAMEWORK

This study employs a decolonial qualitative approach to analyze prosperous Palestinian sartorial practices across historical and contemporary contexts. Combining historical documentary research (books, articles, lectures, and archival materials) with case studies of three contemporary designers, the methodology centers Palestinian narratives while critically engaging with cultural preservation as an indirect agent of prosperous fashion practices. Secondary data traces sartorial techniques, materials, and socio-economic influences, supplemented by analysis of publicly available designer interviews (from documentaries, podcasts, and publications).

As an insider researcher, I draw on my lived experiences and cultural understanding to enrich my study. I balance this insider perspective by cross-checking data with multiple sources (triangulation) and reflecting on my own biases (personal reflexivity). Ethical practices guided how I used public interviews and ensured findings aligned with my community's values.

PROSPERITY LED BY INDIGENOUS PRACTICES: HISTORICAL PRACTICES AND FABRICS

During the Ottoman rule², urban people in the Middle East copied clothing styles of the ruling class and became increasingly Westernized in the 19th century. However, traditional Palestinian clothing in towns and villages remained largely unchanged, featuring linen fabrics and silk embroidery with centuries-old patterns (Karaman Munayyer, 2011). Palestinian women wore hand-embroidered dresses (thobes) paired with head shawls. The thobes were as treasures, the wearer being aware of the effort and time invested by neighbours and family members in creating the bespoke pieces.

In the nineteenth century, Palestine was known for its rich and flourishing textile culture. Many Fabrics were woven locally while others were imported from neighbouring countries such as Egypt and Syria. These fabrics included cotton, wool, goat and camel hair, flax, and silk before European fabrics flooded the Palestinian market towards the end of the century. Dyes were extract-

ed from local plants such as madder, cochineal cactus, saffron, indigo, and insects such as kermes. Fabrics imported from Syria- another textile centre in the region- were created especially for the needs of Palestinian women who made their own dresses and headwear (Weir, 1970). The use of natural materials and dyes for creating Palestinian clothes is a testament to the sustainable practices that were embedded in the region's textile production. According to dress historian, Wafa Ghnaim, Palestinian embroidery (tatreez³), not only added to the aesthetic value of the garments but also ensured durability. Tatreez made clothes resistant to wear and tear without the need for additional linings by keeping the garment intact from the inside as well as the outside (The Jerusalem Fund and Palestine Center, 2019). These garments were slowly made to last for decades, unlike fast fashion, where clothes are produced for short-term use and are considered by some consumers and producers as disposable.

During the British mandate, multiple Palestinian towns were known for their weaving workshops, such as Safad, Nazareth, Nablus, Beit Jala, Hebron, Gaza, and Majdal. By the end of the 19th century, Nazareth had 300 looms, and in Majdal, almost every family owned a loom, with a total of 500 looms. Beit Jala, too, was known for its weaving expertise (Weir). Majdal, a town in southern Palestine, had "even special factories to weave the specific material needed for the Malak⁴." (Kawar & Nasir, 1980, p. 125). Many thobes worn in numerous Palestinian towns and villages are known as *majdalawi*, after the town Majdal where the fabrics of these thobes were woven.

William Arnold Stewart was an English craftsman who has been sent on a mission after the First World War to Mandatory Palestine to advise on re-establishing crafts and industries affected by the war. According to Stewart, in the beginning of the 1940s, "The town of Majdal which, before the war, had 600 narrow width hand- looms, now has 1,000 looms including at least 60 wide width fly-shuttle looms. [Palestinians] are very conservative and would not change their methods before the

3 Tatreez: an ancient embroidery technique mostly associated with cross-stitch, dating back to the Canaanite era around 3,000 years ago (Palestinian Ministry of Culture, 2020).

4 Malak was the dress worn by Palestinian women in Bethlehem and neighbouring areas starting in the early twentieth century. "It is made of a blend of silk and linen, woven in bright multi-coloured stripes. Over the dress comes a short-sleeved jacket that glistens with embroidery. With this costume, women wear high, fez-like headdresses bearing the glinting coins of their dowry, crowned by a sheer shawl." (Kawar, 2011, p.136-137).

2 The Ottoman Turks occupied Palestine between 1516 and 1918, when the Ottoman Empire lost the war against the Allies.

war” (Stewart, 1944, p.265). Despite maintaining the indigenous practices, Stewart claims that there was “a demand for every meter of cloth and the weavers [were then] prosperous” (Stewart, p.266).

CHANGES BROUGHT BY THE BRITISH MANDATE AND 1948 NAKBA

During the British Mandate of Palestine, local head shawls, especially in coastal cities, were replaced by imported ones from Spain and Japan. These imported shawls became so popular that they were required as part of bridal attire. Palestinian workshops with the indigenous know-how in textile production eventually started producing these shawls locally to meet the demand, showing ability to compete with the quality standards of imported shawls. However, after the Nakba⁵ in 1948, which saw the expulsion of Palestinians and the destruction of many villages, economic hardship led to the replacement of high-quality hand-embroidered dresses with cheaper machine-embroidered alternatives (Kawar & Nasir).

It is worth noting that the afore mentioned Majdal, which was a coastal town in the south of Palestine, and its centre of weaving textiles has been wiped of the map entirely in 1948 by Zionist militias, and on its lands, the Israeli city of Ashkelon was built.

After the Nakba, a few weavers in Gaza whose ancestors were forced out of Majdal in 1948 strived to preserve the art of weaving Majdalawi fabric, especially under threat from ongoing violence and displacement. After October 2023, none of the looms in Gaza survived the Israeli attacks.

One family of weavers has been evacuated to Egypt, where they rebuilt a replica of the manual loom they owned. They are now proceeding to produce and pass the production methods of the majdalawi fabric to others in hopes of redeeming this craft and fabric from extinction (Abdel-Razzaq, 2024).

With its deep-rooted craftsmanship and cultural significance, clothes production in Palestine would have had the potential of becoming a hub for fashion production, perhaps similar to its neighbouring Lebanon. Lebanon, which prior to the British Mandate formed one political unit called

the Levant alongside Palestine, Syria, and Jordan, has long been recognized as the Arab world’s fashion capital. Its vibrant arts scene, featuring singers, actors, and socialites, fostered a culture of extravagance, paving the way for designers like Elie Saab and Zuhair Murad to gain global acclaim. In contrast, Palestine, under Israeli occupation since 1948, faces significant barriers to artistic and creative production, including fashion. Due to these challenges, Palestinian artists, politicians, diplomats and other public figures often wear garments adorned with traditional embroidery during public appearances, using fashion to assert their identity. Unlike celebrities all over the world who follow global fashion trends, Palestinian figures prioritize showcasing local and indigenous practices.

This is especially crucial as cultural symbols, including traditional dress, remain under constant threat of erasure. For instance, during Israel’s ongoing war on Gaza-described by Israel as a war against terrorist organizations-, key cultural institutions were among the first targets of the Israeli airstrikes. Almathaf Museum, which housed a collection of traditional Palestinian thobes, was destroyed by Israeli airstrikes on October 10, 2023, already (Sahweel, 2024).

The harsh economic reality imposed by the ongoing occupation of Palestine since 1948, not only eliminated the opportunity of local fashion production, but also made Palestine among the major victims of imported fast fashion. These fast, cheap and polluting trends, although low quality, are threatening the possibility of reviving Palestinian textile and fashion production. Hence, the once prosperous textile towns and weavers in Palestine are a victim to fast fashion more than any other country.

COMMUNITY AND STORYTELLING IN DRESSMAKING

Clothes tell the story of the Palestinian people. The rich cultural heritage embedded in Palestinian dressmaking is not just about fabric and technique but about community and storytelling. Each hand-embroidered piece tells a story, whether it’s about the local flora and fauna, cultural traditions, or the personal history of the wearer. The various colours, stitches and shapes on the Palestinian thobe are indicators of their wearer’s origin, and their social and marital status. Fashion, in this sense, is a way of telling one’s personal and collective story. As Palestinian artisans and designers work to preserve

⁵ Nakba: (catastrophe in Arabic) refers to the mass displacement and massacre of Palestinian people, the destruction of their towns and villages and the theft of their homes by Zionist militias in 1948.

their craft, they are also constantly building the connection to their cultural history, ensuring that each garment has meaning and resonance.

Art historian Rachel Dedman who was invited to curate three exhibitions on Palestinian embroidered thobes in Lebanon, Palestine, and the UK, emphasizes this connection. According to Dedman, “Each dress tells a story of the woman who made it, carrying her memories and personality. By examining it closely, we can uncover insights about her life and the era she lived in.” She describes Palestinian embroidery as “the most important, rich, and fascinating living tradition of the country—perhaps its most iconic cultural material.” (Kettle’s Yard, 2023, 2:40).

One such garment, was a linen dress, showcased in the Labour of Love exhibition held at the Palestinian Museum (2018–2019). The dress, originally owned by a woman from Ramallah⁶ was donated to another woman taking refuge in the city after being forced out of her home in 1948. The new owner expanded the dress using flour sacks provided by UNRWA⁷, identifiable by the blue lettering characteristic of these sacks (Kettle’s Yard). This garment, like many others, tells a poignant story of displacement and resilience. It embodies the harsh realities of its wearers and offers a tangible link to Palestine’s past and present. It shows how Palestinians over the years had to recycle their belongings, including clothes, although forcedly. Although 76 years have passed since that incident, these very unfortunate circumstances are still relevant today. Currently, around two million displaced people in Gaza are forced to apply a zero-waste policy. Countless videos are being circulated on social media platforms showing Palestinian men and women creating clothes out of old duvets, and shoes out of wood logs collected from the ruins of destroyed buildings and structures.

Before 1948, Tatreez worked in circles of people often talking and singing while each piece could take up to six months to make. The resulting garments survive decades or even generations, passing from mother to daughter, according to Palestinian fashion designer and researcher Yasmin

⁶ Ramallah: a city around 10 kilometers to the north of Jerusalem.

⁷ UNRWA: The United Nations Relief and Works Agency for Palestine Refugees. “Following the 1948 War, UNRWA was established by United Nations General Assembly Resolution 302 (IV) of 8 December 1949 to carry out direct relief and works programmes for Palestine refugees. The Agency began operations on 1 May 1950.” (The United Nations Relief and Works Agency for Palestine Refugees, 2024).

Mjalli, creative director behind the brand Nol Collective (TEDx Talks, 2021). This sort of labour was not done for money, rather, it was part of social life in which dress-making gatherings were an integral part of the preparation for any occasion. The slow production practice testifies the immense emphasis placed both on creativity and quality.

Palestinian women treat their hand-embroidered thobes, with deep emotional attachment. These clothes are not just items of clothing but are cherished as symbols of creativity, identity, heritage, and family pride. Embroidery is seen as an act of preserving history and culture. As these garments are passed down through generations, they retain their emotional value, forming a tangible connection to the past. This personal connection to fashion and dressmaking is a crucial element of sustainable fashion, as it encourages longevity and care for the garments.

It is unsurprising, how difficult it is for one let go of a dress which consumed months of hard labour, created by loving family members and friends in joyful gatherings. While visiting a family friend residing in Ramallah a few months ago, she expressed her sadness when her siblings got rid of their late mother’s thobes that were not wearable anymore. She on the other hand, framed the embroidered parts of her mother’s thobe after it had so much wear and tear. These thobes, even after being cut are recycled and made into ornamentation pieces that decorate her house as well as many other houses and institutions all over Palestine, and wherever Palestinians reside (see Fig. 01). Thobes that maintained their good shape are kept in her closet, and she makes use of them on several occasions and even lends them to friends and family members to adorn. These timeless pieces created decades ago transcend any fashion trend and gain more and more emotional and monetary value over the years.

In a sense, the above-described scene of women gathering, chatting and singing while creating each other’s thobes is contradictory to sweatshop workers in poor countries forced to work long hours in inhumane conditions, being paid wages that in no way contribute to a dignified life. Palestine’s clothes making in the past fostered social prosperity as it enforced friendly relationships within local communities. It also fostered the perfect environment for creativity, as it is very rare to see two identical thobes. Each thobe carries with it long hours of creatively creating customized

scenes on fabric which the wearer will not hesitate to boast.

PERSONAL AND EMOTIONAL CONNECTIONS

Industrialization, even more so fast fashion, has doubtlessly played a significant role in forcing a separation between us and our acquired things, clothes included. We have no emotional connection to our belongings anymore. The most expected outcome of buying a cheap piece of clothing from a fast fashion retailer nowadays is tossing it away after a single wear, or in some cases without even wearing it.

Mjalli, who strives to recreate indigenous Palestinian practices of clothes making and dying using sustainable and natural materials, tells a story about a dress she designed in which five different embroiderers were assigned five different designs. The client would get their dress based on the pace and life circumstances of the designer. Clients who ordered the red version of the dress received their order last because the embroiderer lost her daughter (TEDx Talks). Apart from reviving traditional manufacturing materials and practices, Mjalli aims to bring back the human aspect of fashion. As the name of her brand Nol Collective suggests, the work is done by several artisans, and to her every artisan counts as a crucial link in the process of delivering the final product to the client. In fact, a certain connection is formed between the client and the creators of their clothes (TEDx Talks). This line of slow production also provides a stable and adequate income for artisans in refugee camps and villages, usually being women.

Her brand emphasizes empathy and humanity in fashion. “We’ve dehumanized clothing,” she says. “We view workers as machines. Conscious fashion is about reintroducing empathy and allowing for slow production, storytelling, and human connection.” (TEDx Talks, 09:28). This philosophy extends to moments of collective grief. After the death of a producer’s nephew, Nol Collective paused production, an incident Mjalli is not apologetic for as she sees the necessity of halting the expectation of inhuman speed in fashion. She advocates for patience and understanding in the production process, and is proud of fostering a community of people engaging in a unique experience of consumerism they are not accustomed to. This experience projects clients to ethical and slow fashion, but also to the realities

of life in occupied Palestine (TEDx Talks).

This community is both global and local as Mjalli’s orders are placed by clients in Palestine, Arab countries, the United States and Europe. Their common interest is not fast fashion trends, rather something much more prosperous for less fortunate craftspeople rather than fast fashion capitalists.

Just like thobes took months to create before 1948, so does Mjalli’s slow fashion initiative handle production. Unlike fast fashion conglomerates taking advantage of the bad circumstances of workers in poor countries, Mjalli, among other contemporary Palestinian designers insist on employing artisans from marginalized communities to make their life conditions better.

SUSTAINABILITY AND SLOW FASHION

Apart from their focus on community, Nol Collective revive the indigenous Palestinian practices of using natural materials -including Majdalawi fabric- and dyes, focusing on hand labour and tatreez, and using dead-stock materials (Nol Collective, n.d.).

Similarly, Saudi Arabia based Palestinian fashion designer Reema Dahbour, renowned for recreating Palestinian tatreez motifs on fashionable evening and wedding dresses is an advocate of slow fashion. Tatreez motifs were historically related to geographical origins, varying from North to South of Palestine and from one city or village to another. To maintain this identity marking aspect of tatreez, Dahbour works closely with her clients, focusing on each of them individually as each client becomes the muse behind the design of her bespoke piece. She draws inspiration from her client’s personal background and family roots, combining regional motifs to craft garments that tell unique stories. The resulting masterpiece is a one-of-a-kind dress that carries memories of an entire nation deprived of its ancestral land. Like Mjalli, Reema Dahbour describes her slow fashion process as a collaboration between her, the client, and the women who embroider it, working together for months, and forming a bond that brings pride to everyone involved in the production of the customized garment (Dahbour, 2022).

Palestinian brand HINDHILAL directed by its namesake architect turned fashion designer, was initially founded out of her love for fashion. Nowadays, Hilal (n.d.) has a different mindset, stressing in her biography that:

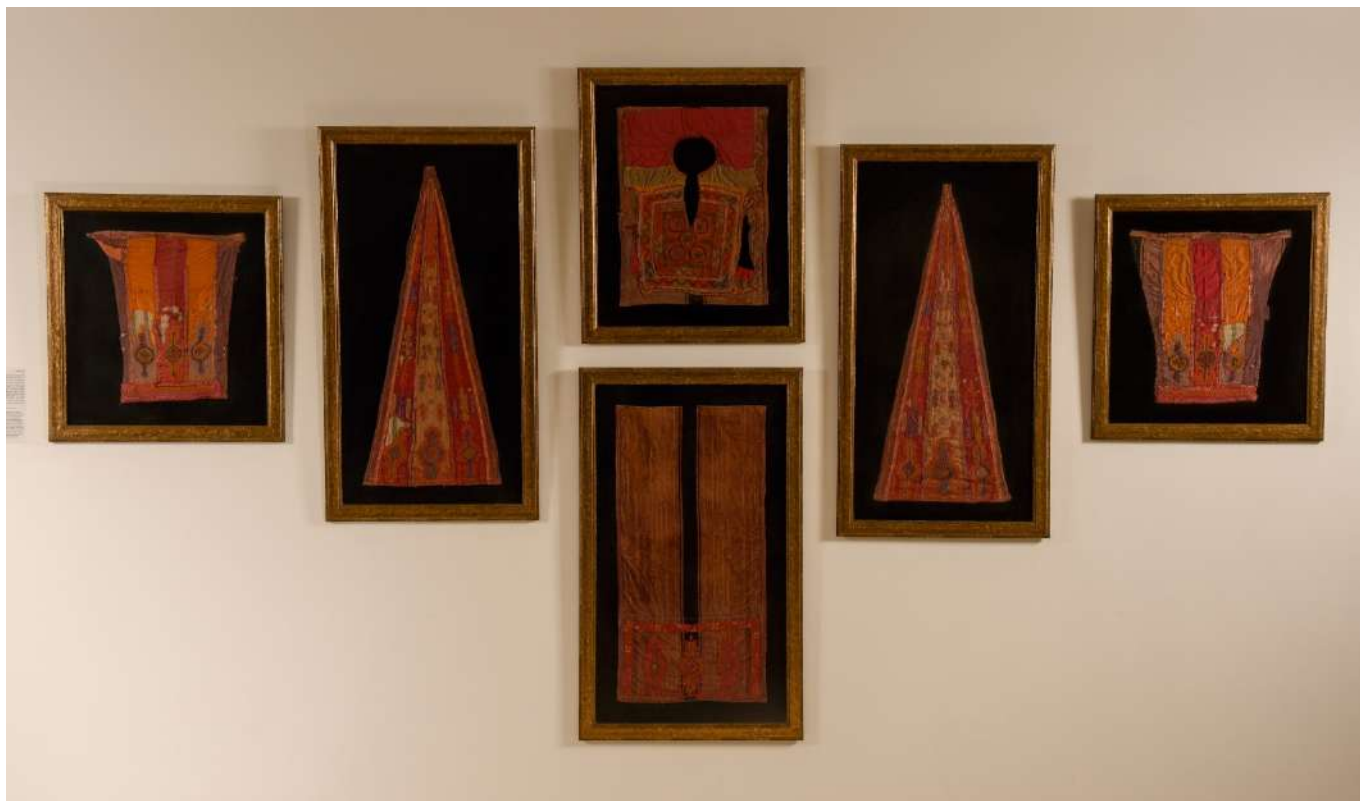


Fig. 01

Fashion is no longer the way to follow... [she believes] fashion transcends what it has become; it should embody authenticity and integrity—an expression of [people's] origins, identities, and true selves, stripped of pretence and noise; a way of living, not consuming. [She is] committed to defining fashion as a narrative of self-discovery and connection to [Palestinian] cultural heritage. (about us).

Hind Hilal's atelier, located in Bethlehem, takes pride in producing handcrafted, exclusive garments that showcase the region's rich cultural heritage. Each piece reflects exceptional artisanal craftsmanship, combining skill and precision to create timeless designs meant to be cherished for generations. The brand carefully selects high-quality, durable materials and subjects every item to rigorous quality control to ensure superior standards of style and longevity.

In line with its commitment to sustainability, Hind Hilal thoughtfully sources long-lasting fabrics and repurposes fine-quality dead stock materials from local and international resellers. This approach not only reduces waste but also

allows for the creation of distinctive and exclusive apparel.

The brand's philosophy of responsible fashion prioritizes small-scale, mindful production. Hind Hilal emphasizes quality over quantity, producing limited, made-to-order pieces for each collection. This ensures minimal waste while offering customers unique garments designed to stand the test of time (Hind Hilal, n.d.).

MODERN CHALLENGES AND THE FUTURE OF FASHION

Today, Palestine faces significant challenges in preserving its fashion and clothes making heritage. The Palestinian fashion industry is heavily impacted by the Israeli occupation, which has destroyed much of its infrastructure and disrupted its economy.

The Palestinian garment and textile industry thrived before 2000, with around 900 factories employing 36,000 workers, mostly subcontracting for Israeli companies. Between 2000 and 2006, the sector declined sharply due to Israel's shift toward high-tech industries and the QIZ

agreement, reducing factories to 400–450 and jobs to 20,000.

After Israel's 2007 blockade on Gaza, the industry nearly collapsed, with only 50–100 factories remaining (employing 2,000–2,500 workers) and shifting to local markets. Partial recovery began in 2014 when Israel eased restrictions, allowing exports to the West Bank and Israel. By 2017, factories increased to 137, employing 2,500–3,000 workers.

As of 2023, the sector showed modest growth, with around 300 factories and 8,000–9,000 workers, though challenges like political instability, material shortages, and import competition persist (The Apparel and Textile Industry Federation, n.d.). The federation's website lacks updates after October 2023, when Gaza's infrastructure and economy faced total destruction.

Furthermore, the global dominance of fast fashion, has made it difficult for local artisans to compete in Gaza and all over Palestine. Since the Israeli control over Palestinian borders occupied in the year 1967, makes online shopping from other countries almost impossible for Palestinians residing in the West Bank and Gaza Strip, a phenomenon of Palestinian intermediaries of retailers like Shein and others has recently surfaced. These intermediaries, live in cities and towns considered part of Israeli territory to which merchandise can be shipped. They place mass orders for clients; hence get items for reduced prices.

In addition, local markets are flooded with fashionable items usually imported from Turkey and sold for very low prices. For these competitive prices, quality is much compromised. Therefore, durability is not guaranteed when making such purchases. These trendy and cheap choices are extremely popular, which is not surprising, given that the average daily income for males in Palestine is \$30.67 and that of females is \$29.29 (Palestinian Bureau of Statistics, n.d.). From an economic perspective, a change towards more expensive but durable and sustainable fashion choices is not expected soon. This is a result of thousands of Palestinian workers, who previously worked for Israeli employers losing their jobs after October 2023. Unfortunately, the major, or maybe the only deciding factor for fashion consumption in Palestine currently seems to be low cost.

Despite the above-mentioned challenges, there is a growing movement toward ethical,

sustainable fashion. Brands like Hind Hilal, Reema Dahbour and Nol Collective strive to create contemporary designs that honour Palestinian heritage while focusing on sustainability and slow fashion. By embracing a mindful production system, these small businesses are helping to revive the Palestinian fashion industry and promote a future where fashion is seen as a tool for cultural expression, community, and sustainability.

In addition, Generation Z Palestinians are developing an affection for vintage and second-hand clothing, a phenomenon which was not common one decade ago. Vintage clothing stores are present in major cities like Ramallah, Bethlehem and Nablus. Furthermore, clothes swapping or second-hand clothing events are timidly finding their way to the Palestinian fashion consumption arena.

CONCLUSION

Palestinian fashion historically embodied sustainability, prosperity, and cultural identity through indigenous practices like embroidery and use of indigenous plants for dyes.

Colonial practices enforced by the British Mandate and the ongoing Israeli occupation dismantled Palestinian textile economies multiple times and imposed fast-fashion dependencies.

Fast fashion's dominance, aggravated by geopolitical constraints places a huge obstacle in the face of creatives and artisans in the Palestinian fashion arena.

Despite these challenges, contemporary designers are reviving prosperous indigenous techniques, centering slow fashion, ethical labor, and storytelling. Their modern fashion designs have the agency for cultural preservation and political assertion, in addition to its more traditional functions.

The future of prosperity fashion in Palestine hinges not only on reviving the past but on stitching it into a tapestry of local and global ethical consciousness, by including customers into the identities and living circumstances of their fashion creators.

CAPTIONS

[Fig. 01] Chest, back panel, side panels and sleeves of a Malak thobe dating back to the early twentieth century. These frames are part of a huge collection of thobes transformed into art pieces by artist Vivi Siniora, generously gifted to Dar al-Kalima University in Bethlehem, Palestine.

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BIODESIGN IN COLOMBIA

TURNING FASHION ADVERSITY INTO INNOVATION AMIDST SOCIOECONOMIC CHALLENGES

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Abstract

Under the British dictionary and ChatGPT, **Prosperity** is defined in the context of today and the future in multiple dimensions, reflecting economic well-being and broader aspects of human development and societal health (OpenAI, 2024). As defined in contemporary and future contexts, prosperity encompasses sustainable growth, social equity, environmental stewardship, and adaptability to evolving global dynamics. This paper investigates how Colombia can navigate a prosperous fashion future amidst economic stagnation and the historical dominance of the Global North. By leveraging Colombia's rich biodiversity, this research illustrates how biodesign can transform challenges into opportunities, reshaping the fashion industry through innovative practices and ethical considerations. Through qualitative analyses of perspectives from Colombian biodesigners and fashion designers, the study examines the potential of local resources, ancestral knowledge, and emerging technologies to redefine sustainability. The findings highlight biodesign as a transformative tool that bridges social equity, environmental sustainability, and economic viability, showcasing a roadmap for a regenerative and inclusive fashion ecosystem. This exploration underscores Colombia's role as a model for integrating cultural heritage, biodiversity, and cutting-edge innovation into the global fashion narrative.

Keywords: *Biodesign, Colombian fashion, Sustainability; Prosperity, Biodiversity*

INTRODUCTION

The Colombian fashion industry plays a crucial role in the nation's economy. In 2025, the apparel market is projected to reach approximately US\$10.82 billion, with an annual growth rate of 2.92% through 2029 (Apparel - Colombia | Statista Market Forecast, 2024). In the first quarter of 2024, the fashion market expanded by 6.3% compared to 2023, generating 10.52 trillion pesos in revenue, driven by global price increases (Viana, 2024). The industry is composed mainly of small and medium-sized enterprises (SMEs), with labor costs remaining among the lowest in Latin America, which enhances its competitiveness (FASHION INDUSTRY| Invest in Colombia, 2024). However, the industry's environmental footprint is concern-

ing, with fast fashion contributing significantly to waste. For instance, 92 million tonnes of textiles are discarded globally every year, and fashion waste continues to pollute Colombia's beaches, especially along the central Caribbean coast, where discarded items like shoes and sandals have been found in large quantities (Rangel-Buitrago & Gracia C., 2024). These challenges highlight the urgent need for sustainable practices in Colombia's growing fashion sector.

Colombia, known for its rich culture and biodiversity, faces profound socioeconomic challenges. Historically seen as a resource-rich nation supplying low-cost labor and materials to the Global North (Otero-Cleves, 2010), Colombia can potentially redefine its role in the global fashion

system. A shift from traditional paradigms could foster a fashion system prioritizing social and environmental dimensions alongside economic metrics. Biodesign, which merges biology and design for sustainability and innovation, exemplifies this shift by utilizing DNA, enzymes, bacteria, and raw fibers to reshape the industry.

Colombia is undergoing a renaissance, leveraging its biodiversity to redefine prosperity in fashion. This approach moves beyond imitating the Global North, focusing on regeneration rather than extraction. Through a biological design lens, new possibilities emerge, reconfiguring human and non-human relationships and emphasizing each component's potential to contribute to prosperity while minimizing environmental and human impacts. Biodesign enables innovation, fostering ethical reflection and creating opportunities (Myers, 2015). In Colombia, this approach aligns with a growing innovation sector, bridging traditional fashion design with biodesign.

Despite its progress, Colombia grapples with significant inequalities. Prosperity remains elusive for much of the population, with access to quality of life heavily influenced by social and economic status (Meisel, 2014). Income inequality is among the highest in Latin America, with the wealthiest 20% controlling 60% of the nation's wealth (El País, 2024). Poverty affects 39.3% of Colombians, and 44.2% live on less than \$6.85 daily (The World Bank, 2021; The World Bank, 2021). Structural barriers, such as geographic fragmentation and unequal education systems, perpetuate disparities, with 44% of income inequality tied to circumstances at birth (El País, 2024). Violence remains a systemic issue, with a homicide rate of 23.7 per 100,000 in 2023, disproportionately affecting Afro-Colombian and Indigenous populations, who face poverty rates of 50% and 63%, respectively (DANE, 2023; Insight Crime, 2024).

In response to these challenges, Colombian designers are increasingly moving away from the aspirational norms of the Global North's fashion systems and, instead, are forging a unique path by leveraging local resources and ancestral knowledge. This shift is evident in integrating scientific advancements, such as biodesign and sustainable materials, reshaping the industry's trajectory in the Global South. For instance, designers use the country's rich biodiversity to develop bio-based materials, including bacterial dyes, mycelium

textiles, and plant-based fibers. Initiatives like Universidad de los Andes' Biodesign Challenge and collaborations with artisans highlight how Colombia combines ancestral knowledge with cutting-edge innovation to create sustainable, inclusive, and culturally significant fashion. Examples include efforts to incorporate waste into production, such as *Woocoa*, which transformed local agricultural byproducts into viable textiles. This contributes to fashion's environmental sustainability and supports economic empowerment by involving artisanal communities in the production chain. Regional brands like Baobab and Laura Laurens emphasize circular economy principles and ethical production, redefining prosperity through inclusivity and ecological stewardship.

This paper explores Colombia's transformation, highlighting the interplay between scientific research, localized knowledge, and sustainable design. By embracing local resources and innovative practices, Colombian fashion is carving a distinct path that addresses global and regional challenges. This redefinition of prosperity demonstrates how an industry shaped by inequality can evolve into a model of innovation and regeneration.

METHODOLOGY

This study adopted a qualitative research approach to explore the evolving role of biodesign within the Colombian fashion industry and its potential to redefine prosperity. By examining the practices of biodesigners and fashion designers, the research aimed to uncover how biodesign is reshaping the industry. Qualitative methods were selected to better understand the contextual, cultural, and socio-economic factors influencing these practices. The methodology combined two key components: case studies of biodesign projects and semi-structured interviews with Colombian biodesigners and fashion designers collaborating with local communities to promote sustainability.

The interviews involved Cristina Cruz (*Micelva*), Diego Arango (*Sauria*), Diego Hernandez (*E.biodye*), Matilde Orduz (*Filling Green*), Nicole Hakim (*LOOP*), Julieta Gaitan (*Wasi*), Moises Hernandez (*Woocoa*), Juanita Salgado (*Biodesign*), Sofia Moncayo (*Brideology*), Danielle Lafourrie (*Olga Piedrahita*), Isabella Espinosa (*Baobab*), and Laura Laurens (*Laura Laurens*). Thematic analysis was employed to identify recurring patterns and key insights related

to sustainability, community engagement, and innovation in the industry.

CASE STUDIES

The first component of the methodology involved analyzing biodesign projects from Universidad de los Andes in Bogotá, a leading institution in fostering innovation and sustainability in the design and fashion sectors. Projects selected for case studies included those that had received significant recognition, such as being finalists in the Biodesign Challenge competition held once a year at Parsons School of Design and MoMA in New York City, and those that excelled in the classroom, demonstrating innovative thinking and impactful design solutions. These case studies detailed how biodesign principles were applied, including the materials and methods used and collaborations with artisans or communities. A systems thinking perspective was used to develop the projects by ensuring and visualizing the environmental and social impacts of the projects. Specific questions guided the exploration, such as: How do these initiatives integrate biodesign principles into fashion? What are the measurable environmental and social impacts of these projects? What barriers exist to scalability, and how are they addressed within the Colombian context?

SEMI-STRUCTURED INTERVIEWS

The second component comprised semi-structured interviews with team members from the selected biodesign projects and other local fashion designers. This method was chosen for its flexibility, enabling participants to provide in-depth responses while allowing the interviewer to explore unanticipated topics that emerged during the written questionnaire. The interviews focused on the designers' backgrounds, motivations, and definitions of sustainability and their experiences integrating biodesign principles into their work from their perspective as Colombian designers.

The semi-structured interviews also aimed to uncover the challenges faced in implementing biodesign practices, such as limited access to advanced biotechnologies, financial constraints, and consumer education gaps. Participants were asked to provide insights into their engagement with local communities and resources, emphasizing how these collaborations influenced their designs and contributed to social and environmental sustainability. Additionally, they shared their perspectives on emerging trends in Colombian

fashion, recommendations for fostering sustainable practices within the industry, and the comparison with the Global North.

ETHICAL CONSIDERATIONS

The study adhered to ethical research standards by obtaining informed consent from all interview participants and ensuring the confidentiality of sensitive information. Participants were informed about the purpose of the study and their right to withdraw at any stage without any repercussions. By combining case studies and semi-structured interviews with rigorous analysis and ethical practices, this methodology provided a holistic understanding of the transformative potential of biodesign and fashion in Colombia. The approach allowed for exploring both practical and theoretical dimensions of biodesign, situating it within the broader discourse of sustainability and innovation in fashion. This multifaceted methodology underscores the importance of contextual and localized approaches in fostering sustainable development and redefining prosperity in creative industries.

RESULTS

CASE STUDIES ANALYZED

Case studies were analyzed to provide insight into the application of biodesign principles, the environmental and social impacts of these projects, and the challenges they face in scaling within the Colombian context. The projects examined include *Sauria*, *E.biodye*, *Bridelogy*, *Filling Green*, *Woocoa*, and *LOOP*, each offering innovative solutions to various environmental and ethical challenges in the fashion industry.

Sauria: Ethical Alternatives in the Reptile Skin Industry

Sauria represents a pioneering approach to addressing ethical and environmental issues within Colombia's reptile skin trade, a sector linked to illegal hunting and habitat destruction. The project's innovative use of in vitro reptile skin production significantly reduces the need for animal exploitation by replacing traditional skin sourcing with lab-grown materials. This biodesign process involves biopsy collection, tissue culture, and harvesting, minimizing reptile harm and mitigating the environmental damage caused by the conventional reptile skin industry. The project aligns with Colombia's conservation goals by

supporting endangered species protection, fostering ethical luxury markets, and offering an alternative to practices that harm biodiversity. Despite its promise, *Sauria* faces scalability challenges due to high production costs and the need for regulatory frameworks that support lab-grown alternatives. However, it represents a key step in redefining the luxury goods market with sustainability at its core (Fig. 01).

***E.biodye*: Revolutionizing Dyeing Practices**

E.biodye introduces a groundbreaking solution to dyeing, one of the fashion industry's most polluting processes. Traditional dyeing methods consume vast quantities of water and produce toxic runoff, contributing significantly to environmental degradation. *E.biodye* employs engineered microorganisms to produce eco-friendly dyes, significantly reducing water usage and pollution. This innovation provides a sustainable alternative to conventional dyeing methods and aligns with Colombia's broader environmental conservation efforts. Using local microbial resources, *E.biodye* creates economic opportunities within the biotechnology sector, supporting green technologies and fostering a culture of innovation. Despite these benefits, the scalability of the technology depends on the further development of local infrastructure and market acceptance of biotechnological solutions in fashion.

While the *E.biodye* team has yet to fully quantify the reduction in greenhouse gas (GHG) emissions, their process has shown substantial potential for mitigating environmental impacts. The fixation process operates at lower temperatures (50-70°C), reducing GHG emissions by approximately 45-55%, while dye production occurs at 37°C, cutting emissions by about 41-47% compared to conventional methods. Additionally, *E.biodye* uses simple sugars instead of fossil fuel-based intermediates, eliminating the carbon emissions typically associated with chemical dye production.

E.biodye's process is also highly efficient in water use, allowing for water reuse throughout the dye production cycle, thus minimizing waste. They also eliminate the generation of toxic waste by ensuring that no effluents containing heavy metals or harmful byproducts are produced. Furthermore, the dyes are fully biodegradable, preventing water bodies and soil contamination. Last, a key feature of the *E.biodye* production process is the transformation of bacterial cells without using antibiotics to

select successfully transformed cells. This approach minimizes the environmental and health concerns often associated with antibiotic use in industrial processes. *E.biodye* exemplifies how biodesign can address key ecological issues while fostering economic growth (Fig. 02).

***Brideology*: Redefining Traditional Fashion Concepts**

The *Brideology* project challenges traditional notions of wedding attire by creating a biodegradable wedding dress made from corn starch, gelatin, and dandelion fibers. This project embodies the principles of circularity and biodegradability, aiming to reduce the fashion industry's environmental footprint by rethinking the garments' life cycle. While the biodress offers an innovative solution to waste generated by the fashion industry, it requires specific preservation conditions, such as avoiding high temperatures. The project's challenges lie in scaling its production while ensuring its performance and durability under different environmental conditions. Despite these obstacles, *Brideology* offers an inspiring example of how fashion can achieve greater sustainability by embracing alternative, biodegradable materials (Fig. 03).

***Filling Green*: Sustainable Alternatives to Down and Polyester**

The *Filling Green* project addresses the ethical and environmental concerns surrounding down feathers and polyester by proposing plant-based alternatives. Utilizing corn silk, pineapple leaves, and tururi sacs from the Amazon's Jagua tree, *Filling Green* offers materials that are renewable, biodegradable, and free from the cruelty often associated with traditional down. These materials reduce waste—corn silk is frequently discarded as a byproduct of corn farming—and offer functional benefits comparable to animal-derived and synthetic alternatives. This biodesign solution promotes environmental sustainability and supports ethical practices in the fashion industry. However, scalability is limited by the availability and harvesting of these materials, particularly the tururi fiber, which is native to specific regions in Colombia. Addressing logistical and supply chain challenges will be critical for the widespread adoption of these materials in fashion.



Fig. 01



Fig. 02



Fig. 03

Woocoa: Harnessing Colombia's Biodiversity for Sustainable Fashion

Woocoa, an innovative vegan wool alternative made from a blend of *Cannabis sativa* and coconut fibers, exemplifies the potential of biodesign to transform waste into sustainable, eco-friendly materials. By addressing fiber roughness with a Lacasse enzyme derived from oyster mushrooms, *Woocoa* mimics the softness and qualities of traditional wool, providing a cruelty-free, environmentally conscious option.

The project also highlights Colombia's rich biodiversity, repurposing cannabis industry waste and creating economic opportunities in rural areas that have historically relied on illicit marijuana cultivation. However, *Woocoa*'s scalability faces challenges, including the need to expand local cannabis fiber processing infrastructure and overcoming market resistance to new, non-traditional fibers. Despite these hurdles, *Woocoa* offers a promising solution to reduce the environmental impact of wool production while fostering local economies.

When compared to conventional cotton, *Woocoa* significantly outperforms in sustainability. The current garment industry's demand for hemp, a variety of *Cannabis*, can be met by using only one-third of the land required for cotton to produce the same amount of fiber. Regarding water consumption, cotton demands 2.5 times more water per hectare than hemp. Additionally, cotton is among the highest consumers of pesticides and insecticides in the world, whereas hemp, thanks to its resilience and rapid growth, requires no pesticides or insecticides (Duque Schumacher et al., 2020) (Fig. 04).

LOOP: Circular Fashion with Biomaterials

LOOP, a sustainable fashion brand, exemplifies the power of circular design in fashion, promoting a manifesto of sustainability through biomaterials and circular processes. By embracing sustainable materials and production methods, *Loop* aims to redefine the fashion industry's approach to resource consumption. The brand's focus on craftsmanship, innovation, and the use of renewable resources resonates with the principles of biodesign and circularity. *LOOP*'s commitment to creating a closed-loop system ensures that products are designed with end-of-life considerations, allowing them to be returned to the cycle responsibly. While *LOOP*'s approach to circular fashion is innovative, its scalability is hindered by the complexities of



Fig. 04

consumer behavior and the widespread adoption of circular fashion models. Despite these challenges, *Loop*'s success in merging craftsmanship with sustainability offers a pathway for the fashion industry to transition toward more conscious consumption.

SEMI-STRUCTURED INTERVIEWS

Recurring patterns and key insights from the alumni and sustainable fashion designers' responses were extracted using a thematic analysis approach. The process involved coding the qualitative data, identifying significant themes, and drawing conclusions on their relevance to the broader context of fashion. Each response was reviewed to highlight central ideas, unique experiences, and commonalities among the alumni and fashion designers, respectively.

Qualitative Analysis of Biodesign Alumni Responses

This analysis delves into the experiences, challenges, and perspectives of biodesign alumni, focusing on the intersection of biofashion and sustainability. Using a thematic approach, we identified key

insights, recurring patterns, and alumni contributions to fashion. The analysis is structured around five core dimensions: Background and Motivation, Biodesign Integration, Challenges and Opportunities, Community Engagement, and Future Perspectives.

BACKGROUND AND MOTIVATION: BRIDGING DESIGN AND NATURE

Biodesign alumni exhibited a strong alignment between their academic backgrounds and professional motivations. Many cited diverse influences—from microbiology to local artisan traditions—propelled them toward sustainable design alternatives. A common theme was to bridge scientific knowledge and creative processes to challenge the extractive, profit-driven fashion industry, including i) personal and academic influence, ii) connection to biodiversity and local contexts, and iii) a personal mission to drive systemic change.

Alumni often attributed their inspiration to pursue biodesign to academic courses on biomaterials, sustainability, and microbial experimentation. Professors specializing in biodesign played pivotal roles in guiding students toward biofashion. The influence of Colombia's biodiversity and artisanal heritage was frequently mentioned as a motivating force, with students exploring local resources such as fungi, natural fibers, and cultural techniques to create sustainable materials. Alumni exhibited a clear sense of personal mission to create systemic change in the fashion industry by addressing environmental challenges and rethinking waste as a resource.

A key quote encapsulates this ethos: 'Biofashion is not just a trend but a movement toward a symbiotic relationship between humanity and the environment, where creativity evolves hand in hand with nature's intelligence.' This statement reflects the transformative role of biodesign education, emphasizing a holistic integration of environmental stewardship and creative innovation.

BIODESIGN INTEGRATION: FROM CONCEPT TO CO-CREATION

For alumni, biodesign extends sustainability beyond harm reduction to embrace regeneration, circular economies, and cultural preservation. Merging biology and design, biodesign involves living organisms as co-creators. Key themes include its definition, innovative techniques, and experimental design processes.

Biodesign transcends functionality by embedding ecological thinking and closed-loop systems. Methods such as bacterial and fungi-based dyes, bioplastics, and natural fibers like Iraca, Cumare, and silk exemplify its approach. Experimentation through trial and error—developing microbial dyes, mycelium-based materials, and cornstarch bioplastics—was central, emphasizing iteration and nature collaboration.

An alumnus shared: 'Biodesign shifts focus from human-centered solutions to co-creating with nature, reimagining design to align with ecological principles.' Alumni projects like mycelium textiles and bioplastics showcase this paradigm shift, replacing traditional methodologies with holistic, nature-inclusive approaches.

The emphasis on ecological principles redefines material sourcing, manufacturing, and waste transformation, illustrating the interconnectedness of natural, social, and industrial systems. This regenerative philosophy models prosperity in fashion, demonstrating that biodesign is not merely a set of tools but a holistic approach prioritizing sustainability and the health of all systems.

CHALLENGES AND OPPORTUNITIES: SCALING INNOVATION WHILE PRESERVING INTEGRITY

Biodesign's promise is tempered by challenges like scaling production, cost constraints, market barriers, consumer perception, and infrastructural gaps. Innovations such as microbial dyes and fungi-based textiles face hurdles in replicability, cost, and process optimization when moving to industrial scales. High material costs and slow production processes make products less competitive in fast-fashion markets, and consumer education on the value of handmade, slow fashion remains a challenge. Limited access to biotechnological resources, such as sterile labs, and a lack of localized infrastructure for testing and scaling further hinder progress.

Alumni emphasize the potential of cross-disciplinary collaboration among designers, engineers, and scientists to create circular models and reimagine production systems. Consumer education is vital, as sustainable fashion is often undervalued compared to mass-produced alternatives. One alumnus stated, 'Biodesign introduces inherently sustainable systems, creating decentralized models that empower communities and reduce dependency on global industries.' This reflects biodesign's shift from linear, extractive systems to

regenerative practices rooted in circular economies and ecological balance.

Decentralization is pivotal, as localized production reduces carbon footprints and bolsters regional economies. Projects in Colombia, leveraging native biodiversity like bacterial strains and agricultural by-products, exemplify this approach.

COMMUNITY ENGAGEMENT: LOCAL KNOWLEDGE AND RESOURCES

Themes of community engagement were prominent, with many alumni recognizing the importance of involving local communities in production. Key themes included: i) local community, ii) role of local resources, and iii) knowledge sharing.

The collaborative proposals tend to vary depending on the artisans or designers involved. The designer's role often involves understanding the artisans' local processes, timing, and working methods. In this way, the designer essentially acts as an interpreter, navigating what the artisan can produce while guiding the project along that path. These collaborations can be profoundly enriching for the artisans as they introduce new ways of thinking and perspectives on their craft.

These collaborations offer designers invaluable access to materials and processes deeply rooted in the land, providing a unique and authentic experience. However, as stated by Olga Piedrahita's Creative Director, Danielle Lafourrie, one of the main challenges of these collaborations is the difference in work rhythms. For instance, in regions like Guajira, in the north of Colombia, when there is a death in the community, rituals can take up to a month and a half, during which production completely halts. Additionally, maintaining consistency in materials over time can also be challenging. A simple example is when artisans order materials today, and then the next day, they purchase the same materials but may not always be aware that color consistency or material quality needs to be maintained throughout production, which can lead to variations in the final products.

In terms of the impact on the craft, these collaborations offer new perspectives on traditional techniques, one of the most valuable outcomes for the artisans involved. The exchange of knowledge and ideas can deeply influence both the artisans' work and the designers' approach, resulting in a dynamic and mutually beneficial relationship.

Alumni underscored the importance of

working with local artisans, co-developing new techniques, and incorporating traditional crafts into sustainable design. This collaborative approach ensures the fashion process remains contextually relevant while honoring local heritage. One alumna stated: 'Collaboration with local communities is central to my design process. I work closely with artisans, blending tradition with contemporary design for the global luxury market.'

A key quote from the alumna highlights her approach: 'Collaboration with local communities is central to my design process. From the start, I worked closely with artisans, learning their techniques and co-creating designs that blended tradition with contemporary expressions for the global luxury market.' Projects incorporating Colombian traditional weaving techniques or local plant fibers illustrate this model, where artisans are not just labor providers but active co-creators, ensuring cultural respect and shared ownership.

FUTURE PERSPECTIVES: BIODESIGN AS A CATALYST FOR SYSTEMIC CHANGE

Alumni envision biodesign as a catalyst for broader systemic change in the fashion industry. They identified emerging trends, such as increased use of bio-based materials, circular economy practices, and integrating traditional crafts with biotechnological innovations. Key themes included: i) emerging trends, ii) policy and regulation, iii) consumer education, and iv) hope for the future of biofashion.

Several alumni expressed optimism about the growing visibility of biodesign, particularly in Colombia, where the rich biodiversity and cultural heritage offer unique opportunities for sustainable fashion. They called for policy changes to incentivize sustainable practices, such as carbon taxes and support for circular production. Recommendations included government support for bio-labs, funding for research, and decentralized production infrastructure. Alumni also emphasized a cultural shift toward valuing quality, slow fashion, and transparency. Many highlighted increased student and community interest and the inclusion of biodesign courses in academic programs.

A key quote highlights Colombia's potential in biofashion: 'By leveraging its biodiversity and cultural heritage, Colombia has the potential to lead in biofashion, showcasing how natural resources can inspire world-class, sustainable design.' As the second-most biodiverse country, Colombia is well-positioned to lead sustainably by creating

bio-based materials that are both innovative and rooted in its unique ecosystems. This recognition positions Colombia as more than just a supplier of raw materials. Instead, it frames the country as a hub for biodesign-driven innovation, where biodiversity is not only preserved but also as a unique inspirational framework fostering creative and sustainable applications.

Qualitative Analysis of Colombian Sustainable Fashion Designers

Interviews with Colombian designers from diverse backgrounds—from fine arts to industrial design and law—revealed a complex and evolving landscape for sustainability in fashion, emphasizing the importance of localized, innovative approaches that respect cultural and ecological values. The designers highlighted the potential for Colombian fashion to redefine prosperity through sustainability, addressing environmental and social equity concerns.

SOCIOECONOMIC CONTEXT

Designers acknowledge the socioeconomic challenges that hinder sustainable innovation in Colombia, such as inequality, limited access to education, and the dominance of informal labor markets. Furthermore, there is a lack of local fabric suppliers' reliance on imports, restricted access to artisanal training due to economic constraints, and greenwashing practices by more prominent manufacturers. However, these challenges also foster resilience and creativity. Designers see opportunities to empower local artisans by providing education and fair wages and promoting local supply chains to reduce dependence on imported materials.

LEVERAGING BIODIVERSITY

Colombia's exceptional biodiversity is a key resource for sustainable fashion innovation, inspiring materials, and techniques rooted in its ecosystems. Designers highlight the potential for integrating local ecosystems into fashion products and point to the social and environmental challenges in regions rich in biodiversity. Collaboration between large companies and small-scale sustainable initiatives is crucial for harnessing this potential.

INNOVATION AND ETHICAL CONSIDERATIONS

Colombian designers are exploring innovative ways to combine environmental sustainability with social equity, but ethical concerns persist. Transparency in supply chains and the unintended environmental impacts of set practices, like plastic recycling, were noted. However, many designers are developing circular models that transform waste into new opportunities for innovation and community empowerment.

INSIGHTS FROM THE GLOBAL SOUTH AND GLOBAL NORTH

The decline of Latin American textile markets, driven by the influx of products from Asian countries, has put significant pressure on local industries to improve product quality and adopt more sustainable practices to offer better value to consumers (Jarpa & Halog, 2021). In response, designers in the region have increasingly moved beyond Global North influences, embracing local materials and techniques to create distinctive, sustainable products. For example, in Colombia, designers have adopted slower production methods that align with the country's natural rhythms while utilizing local biodiversity to shape a unique identity for sustainable luxury fashion. In Brazil, designers and artisans have similarly embraced sustainability by tapping into the country's rich biodiversity for eco-friendly textile production. One example is using plant-based dyes derived from native plants, which exemplifies efforts to create a more sustainable and culturally significant local fashion industry (Marocco, n.d.). One example is Maibe Marocco, founder of Matricaria, who integrates traditional eco-printing techniques and natural inks using Brazil's diverse dye plants (Marocco, n.d.). Although these initiatives are small, they foster awareness under Brazil's biodiversity umbrella and help to reduce the environmental impact of the dyeing processes, which are water-intensive and involve toxic chemicals (Calgaro, 2018). Brazil and Colombia's approaches highlight the relevance of biodesign in fostering sustainability and providing a culturally resonant alternative to conventional fashion practices.

In comparison, the Global North, particularly the Netherlands, has been at the forefront of sustainable fashion innovation. Companies like MUD Jeans have pioneered the use of recycled denim and introduced programs where customers

can lease jeans instead of purchasing them, aiming to reduce overall textile consumption (Lease Jeans Made with Recycled Denim, 2019; MUD Jeans | Circular Denim, n.d.). Dutch Design Week has also featured cutting-edge sustainable fashion innovations such as mycelium leather and bio-fabricated textiles (Dutch Design Week 2024, 19-27 October, n.d.).

Scandinavia, particularly Sweden, has also made strides in circular fashion models. Swedish brand Filippa K has implemented a recycling program encouraging customers to return old garments for reuse or upcycling (Filippa K, 2023). Additionally, Sweden has established national policies promoting the repair and reuse of textiles, contributing to a reduction in textile waste. While Sweden's sustainability efforts are largely policy-driven, contrasting with Colombia's grassroots-driven initiatives, both aim to foster systems prioritizing regeneration over extraction. These examples highlight the diverse approaches to sustainability in fashion, demonstrating the potential for both the Global South and North to learn from each other in the quest for a more sustainable, equitable industry.

DISCUSSION

Biodesign projects in Colombian fashion showcase innovative responses to environmental and ethical challenges, leveraging local resources, biotechnology, and circular design principles. While scalability remains challenging due to production costs, infrastructure limitations, and market acceptance, these initiatives highlight biodesign's potential to create sustainable materials, support local economies, and address environmental issues.

Through interviews with biodesign alumni and local designers, prosperity in Colombian fashion is redefined as a balance of environmental stewardship, social equity, and cultural preservation. Biodesign emerges as a philosophical and practical tool, fostering collaboration, innovation, and regeneration within an inclusive, circular fashion system.

Alumni emphasize the importance of sustainable practices, local resource utilization, and community engagement in driving innovation. By leveraging Colombia's biodiversity and artisanal traditions, designers promote ethical fashion while advancing social and environmental equity. They call for industry and policy support to scale biodesign, stressing the need to shift from linear,

extractive models toward systemic change.

Integrating local materials like Indigenous fibers, fungi, and agricultural by-products showcases biodesign's capacity for sustainable innovation. Innovative design practices and traditional knowledge contribute to a global movement toward environmentally conscious fashion. Education in biodesign and systems thinking empowers students to see fashion as a tool for ecological and social regeneration.

However, to realize this potential, a concerted effort is required from multiple stakeholders. Biodesign cannot thrive in isolation—it needs systemic support through infrastructure, policy incentives, and consumer education. Colombian designers, positioned at the forefront of the biofashion movement, exemplify how traditional knowledge and cutting-edge biotechnological innovations can create a sustainable fashion model that aligns with global sustainability goals.

In conclusion, biodesign offers a pathway to prosperity that prioritizes shared well-being, inclusivity, and ecological balance, transforming the fashion industry into a sustainable, regenerative, and equitable global model.

CAPTIONS

[Fig. 01] Diego Arango; Sauria; Bio-leather prototypes; Courtesy: Sauria.

[Fig. 02] Diego Hernández; E.biodye; Bacterial dye; Courtesy: E.biodye.

[Fig. 03] Sofia Moncado; Brideology; Bioplastic wedding dress; Courtesy: Brideology.

[Fig. 04] Moises Hernández; Woocoa; Vegan wool fiber development; Courtesy: Woocoa.

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EXPLORING THE ROLE OF LOCAL FASHION MICRO AND SMALL ENTERPRISES (MSES) IN VIETNAM'S CREATIVE ECONOMY

OPPORTUNITIES AND CHALLENGE

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Abstract

This study examines the opportunities and challenges that local fashion Micro and Small Enterprises (MSEs) face as they contribute to Vietnam's creative economy. A key strength of these enterprises is their commitment to sustainability, reflected in their localised production processes and strong community engagement. This approach sets them apart from international competitors and provides a model for how fashion can foster a broader, more holistic notion of prosperity, one that goes beyond economic growth to encompass social and environmental well-being. The research is grounded in semi-structured interviews with local designers and an observational analysis of these MSEs' digital presence. Through this exploration, the paper contributes to the discourse on "Prosperity Fashion", demonstrating how localised, sustainable fashion practices can support a more inclusive and culturally rich economy.

Keywords: *Creative Economy, MSEs, Sustainable Fashion, Vietnam, Local Design*

INTRODUCTION

Vietnam's creative economy is increasingly contributing to the nation's economic growth, with the fashion sector playing a pivotal role in this transformation (Vietnam News, 2024). As the demand for unique, culturally resonant fashion grows, local Micro and Small Enterprises (MSEs) in the industry have found innovative ways to distinguish themselves. These MSEs have leveraged the rise of digital platforms, using the internet and social media to establish a niche through unique designs that reflect Vietnamese cultural nuances and consumer preferences. This approach allows them to compete effectively with international fast fashion brands, which typically dominate the market through extensive product ranges and

substantial marketing budgets.

Despite these successes, local fashion MSEs face a complex set of challenges. As they strive to balance growth with sustainable practices, these enterprises encounter obstacles related to limited resources, scalability, and competition with larger brands. However, their commitment to sustainability, seen in their localised production processes and deep-rooted community engagement, demonstrates a unique model of prosperity fashion. This model extends beyond economic metrics to encompass social and environmental well-being, suggesting a broader, more holistic understanding of prosperity. This research examines the specific strengths and limitations of local fashion MSEs, with a focus on how they maintain cultural relevance while

adopting practices that align with global environmental standards. By analysing these enterprises through semi-structured interviews with local designers and an observational study of their digital presence, this study sheds light on how Vietnam's fashion MSEs are navigating the evolving fashion landscape. The findings will highlight the role of these enterprises in contributing to Vietnam's creative economy and their potential as agents of sustainable, culturally rich fashion practices in the region.

LITERATURE REVIEW

The concept of a creative economy is closely linked to the creative industry, which was first introduced in Australia's 'Creative Nation' report in 1994 and gained popularity with the establishment of the Creative Industries Task Force in the UK in 1997 (Arshad & Irijanto, 2023). This framework suggests that creative industry stems from the creativity, skills and talents of individuals, generating wealth and employment through intellectual and cultural assets. These qualities are often concentrated within MSEs, defined by the European Commission and the Office of National Statistics as enterprises with 0-9 employees (micro) and up to 49 employees (small) (Williams et al., 2021). A recent guide on sustainable prosperity proposes that UK fashion MSEs measure success in broader terms than financial profit alone, emphasising culture, society, and the environment as sources of wealth. In Vietnam, MSEs are often grouped within the broader SME category (Small and Medium-sized Enterprises), comprising approximately 80% of the textile and apparel industry and employing over three million people (VNEconomy, 2023).

In August 2024, Vietnamese Prime Minister Phạm Minh Chính signed Act No. 30/CT-TT, prioritising investments in technology and human resources for the cultural industries, with a focus on handicrafts, fashion and design (VOV, 2024). Historically, Vietnam's cultural industry served as a vehicle for national diplomatic initiatives. However, in the last decade, the government has opened this sector to private enterprises and individual creators (Vietnamese Sport & Culture News, 2023). Interestingly, the term '*Cultural* (văn hóa) Industry' is more commonly used in Vietnamese media compared to '*Creative* (sáng tạo) Industry', even though *Creative Economy* (kinh tế sáng tạo) has gained traction. This distinction highlights potential nuances in Vietnam's cultural and economic policies, which

will be further discussed in the "Discussion & Implication" section.

Over the past decade, private entities in Vietnam have launched numerous fashion and design initiatives to bolster the local creative industry. For example, *Vietnam International Fashion Week* (VIFW), produced by Multimedia JSC and sponsored by Aquafina, celebrated its tenth anniversary in 2024 (VietnamPlus, 2024). Although VIFW is recognised as one of Asia's leading fashion events, it lacks the strategic support that government-backed events receive in other countries. For instance, *Seoul Fashion Week* (founded in 2000) is hosted by Seoul government and includes *Seoul Collection*, *Generation Next*, and the *Seoul Fashion Fair*, initiatives designed to connect local brands to the global market (Seoul Fashion Week, n.d.). Similarly, *Shanghai Fashion Week*, part of the Shanghai International Fashion Culture Festival since 2001, benefits from support by the Ministry of Commerce (DeMode Magazine, 2020). While VIFW serves as an important branding opportunity for local MSEs, it remains largely commercial without substantial government support. Many Vietnamese designers aspire to participate in the "big four" global fashion weeks, even though this requires significant investment. *Vietnam Design Week* (VDW) is another private sector initiative, intended to showcase exceptional Vietnamese products and designers. Now in its fourth year, VDW is organized by the Vietnam Design Group and various cultural organizations (Hanoi Grapevine, 2023). The event fosters a vision for the next generation of Vietnamese designers to create a future reflective of their aspirations (Channel News Asia, 2022). However, VDW was postponed in 2024 due to economic challenges and limited brand sponsorship.

Hartono & Prihawantoro (2018a) emphasize that the creative industry contributes to value-added employment, and an improved quality of life. Over the past decade, Vietnamese MSEs have contributed to these outcomes, particularly through unique designs and services that enable them to compete with fast fashion. However, despite these contributions, there is limited academic and media coverage on the specific roles of local MSEs in job creation and quality-of-life improvements within the creative economy.

This study addresses this gap by examining how sustainable fashion MSEs contribute to Vietnam's creative economy. The principal research

questions guiding this study are:

1. What opportunities can local sustainable fashion MSEs create in contributing to Vietnam's creative economy?
2. What challenges do they face?

METHODOLOGY

This study employs a dual-method approach, combining semi-structured interviews and observational analysis to investigate the practices of local fashion MSEs in Vietnam. Semi-structured interviews (n=5) were conducted with designers and founders based in Ho Chi Minh City and Hanoi, who are recognised for their sustainable practices and their ability to integrate cultural elements into their designs (Lam & Watkins, 2022). These interviews provided in-depth insights into how these MSEs connect with their target audiences and navigate the competitive market through unique, culturally resonant products.

In addition to the interviews, the study includes an observational analysis of the digital presence of these enterprises. This analysis examines how MSEs leverage social media platforms to promote their collections and engage with consumers, offering a broader view of their digital marketing strategies and brand positioning within the globalised fashion landscape (McRobbie, 2016).

To assess and measure the success of these sustainable practices, the UK Sustainable Prosperity Guide is utilised as a benchmark, enabling a structured evaluation of the contributions of these MSEs to the concept of "Prosperity Fashion" (Williams et al., 2021). This methodology allows for an understanding of the strategies that local fashion MSEs employ to thrive sustainably within the creative economy.

RESULTS

This section presents detailed case studies of five Vietnamese fashion MSEs exemplifying sustainable practices and cultural integration. Each case study provides an in-depth look at the founder's background, design approach, sustainability practices, and unique challenges. By highlighting these stories, this research illustrates how MSEs contribute to Vietnam's creative economy and align with the concept of "Prosperity Fashion".

CASE STUDIES

LINH PHAM

Background

Linh Pham (Fig. 01), a graphic design graduate from Hue University of Arts, followed her passion for painting and natural-dyed fabrics to Sapa. There, she became captivated by the traditional fabrics of local ethnic groups and co-founded *Linht Handicraft* (2016), a brand specialising in women's clothing and accessories that draw on natural dyes and traditional weaving.

Sustainability Practices

Linh sources natural-dyed and woven fabrics directly from ethnic communities, ensuring each piece reflects traditional artistry. While she handles design, her partner oversees merchandising in their Sapa store and manages online sales, largely through Facebook. For social media posts, they use photos of real customers in their products, bypassing influencers to maintain authenticity within budget constraints.

Community Impact

Linht Handicraft employs three to four full-time young ethnic women, along with a dozen freelancers, many of whom are family members or senior artisans from local ethnic groups. These artisans have grown up with weaving and dyeing traditions but prioritise their households and other commitments. Their work relationship is based on mutual respect and a sense of 'sisterhood,' with Linh emphasising a flexible, enjoyable environment. This collaboration allows Linh to create products that fuse traditional craft with contemporary appeal, helping keep these cultural practices alive.

Challenges

Financial limitations prevent Linh from expanding the brand beyond its current scope, and although government initiatives support the creative economy, she remains cautious about receiving direct assistance. For now, Linh's goal of scaling up to Hanoi or HCMC remains a distant dream due to limited resources.



Fig. 01

Key Insights:

- Authentic customer engagement and community-centered branding.
- Strong preservation of local cultural practices through artisanal collaboration.
- Financial constraints limit potential for expansion.

THAO VU

Background

Thao Vu (Fig. 02) founded Kilomet109 with a philosophy of being “sustainable from the ground up.” Her brand is dedicated to preserving ethnic textile craftsmanship by integrating traditional techniques into contemporary designs. For Thao, the process of making is about more than just producing durable, eco-friendly fabrics, it’s about fostering deep connections between people and nature.

Sustainability Practices

Thao collaborates closely with artisans during the weaving and dyeing stages to ensure her designs can be realistically executed while maintaining their cultural authenticity. This co-design process,

built on mutual respect and trust, allows both parties to share creative input. Known in Vietnamese as “quan hệ song phương” (mutual relationship), this partnership ensures that artisans are active contributors rather than passive labourers.

Building trust with artisans is a gradual process. Thao invests time in understanding their personal strengths and weaknesses, which helps establish a shared creative language. She also takes on financial risks to encourage artisans to experiment with new techniques. Once financial security is established, artisans feel more confident in innovating within their traditional craft.

Community Impact

Over the past decade, Thao has partnered with seven artisan communities across remote regions of Vietnam, including the Northwest, South-Central Highlands, and the Mekong Delta. These collaborations have widened her material palette, enabling her to develop unique designs while fostering sustainable economic opportunities for rural communities.

Thao actively works to connect these artisan communities, encouraging knowledge exchange to



Fig. 02

enhance their techniques. This networking not only preserves traditional handicrafts but also ensures their evolution and relevance in modern contexts. By creating locally sourced and produced textiles, Kilomet109 contributes to strong community development rooted in sustainable practices.

Challenges

Scaling Kilomet109 requires significant financial and personal investment. Establishing relationships with new artisan communities takes time and expanding production capacity to accommodate larger orders is resource-intensive. However, once artisans recognize the added value Thao brings, transforming their textiles from souvenir items into high-end fashion, they often approach her with innovative ideas for natural dyeing and weaving.

Thao's commitment to sustainability and cultural preservation has earned her media recognition and support from cultural venues, which frequently sponsor her exhibitions and installations. However, balancing these opportunities with the operational demands of a growing business remains a constant challenge.

Key Insights:

- Strong mutual partnerships with artisans foster trust and innovation.
- Extensive investment in community development and knowledge sharing preserves and modernizes traditional crafts.
- Media and cultural support enhance brand visibility, but scaling sustainably requires significant resources.

TOM TRANDT

Background

Tom Trandt (Fig. 03), a Parsons School of Design graduate, returned to Vietnam to launch Moi Dien, a brand renowned for its “zero waste” initiative and unique designs. His work resonates with individuals seeking creative, affordable fashion infused with local cultural elements. Moi Dien's designs stand out for their bold aesthetics and sustainable ethos, offering a fresh take on contemporary Vietnamese fashion.

Business Model and Adaptation Post-COVID

In the wake of COVID-19, Tom restructured Moi Dien's operations, transitioning from a “small” to a “micro-small” business model. This shift involved reducing the human resource footprint and integrating advanced technologies such as AI and



Fig. 03

ChatGPT to streamline operations. Outsourcing non-core activities has also positioned the brand for future scalability.

Production Model

Tom's production process is split among three distinct sources, each catering to different design complexities:

- **Retired Seamstresses (Aged 50-60):** This group specializes in intricate, technically challenging designs. Work with them operates on a flexible, non-deadline basis, as their involvement is driven by nostalgia rather than necessity. The relationship is collaborative (đồng lòng), with seamstresses often introducing skilled friends or suggesting practical design modifications.
- **Micro-Factories (3-5 Workers):** These factories handle less detailed designs.
- **Small-Medium Factories:** These facilities manage simpler designs requiring basic techniques.

While the latter two relationships are transactional (“order” versus “delivery”), the retired seamstresses provide a more dynamic and culturally rooted partnership.

Challenges

Tom faces significant regulatory hurdles, particularly regarding Vietnam's unclear tax policies for MSEs. The lack of VAT exemptions for retired workers complicates financial management, potentially forcing the brand to simplify its designs to cut costs. This simplification risks undermining Moi Dien's unique value proposition, which distinguishes it from international fast fashion competitors.

Tom also envisions the establishment of a government-supported physical marketplace for MSEs, similar to the organized food markets in Vietnam. Such a platform would provide much-needed visibility and engagement opportunities for local fashion brands, further strengthening their competitive edge.

Key Insights:

- A flexible, diversified production model allows for high-quality, zero-waste designs.
- Collaborative relationships with retired artisans preserve cultural craftsmanship.
- Regulatory challenges and limited public marketplaces restrict Moi Dien's scalability and market visibility.

KHA NGO

Background

Kha Ngo (Fig. 04), a fashion design graduate from the University of Architecture in Ho Chi Minh City, combines his creative background with technical expertise gained as a 3D technician in the fashion industry. He founded KHAAR, a brand that stands for both "Augmented Reality" and "And Recycling," reflecting its dual focus on technology and sustainability. Kha's innovative approach leverages digital tools to redefine sustainable fashion.

Digital Innovation and Zero-Waste Practices

KHAAR integrates advanced technology into every stage of its production process. Using AI, Kha optimizes the use of leftover fabrics by generating various pattern combinations, creating unique designs that align with zero-waste principles. This digitalization not only enhances the efficiency of design and sample production but also supports scalability. Kha's approach exemplifies how technology can be harnessed to minimize waste and maximize creative output.



Fig. 04

Market Engagement and Brand Exposure

To build brand recognition, Kha actively participates in prestigious fashion events, such as Vietnam Design Week in 2021, Elle Vietnam Fashion Shows in 2023, and Vogue Singapore in 2024. These platforms have significantly increased KHAAR's visibility, positioning it as a leading example of sustainable innovation in both local and international markets.

Scalability and Collaborative Potential

Kha's current MSE model operates with fewer than 10 employees. However, the technology-driven processes he has developed are scalable and could be adopted by other brands seeking to implement similar zero-waste practices. By offering these processes as a service, Kha envisions contributing to broader industry sustainability while expanding KHAAR's impact.

Challenges and Future Aspirations

Kha's primary challenge lies in the lack of government-supported marketplaces for sustainable brands. He hopes for initiatives similar to Singapore's Orchard Road, where young,

eco-conscious brands are given prime space to showcase their products. Such support would provide crucial visibility and engagement opportunities, helping KHAAR and other brands thrive in a competitive market.

Key Insights:

- AI-driven processes optimize fabric use and enhance scalability.
- Participation in high-profile fashion events boosts brand visibility.
- Lack of local marketplaces limits public access and growth opportunities.

ANH TRAN

Background

Anh Tran (Fig. 05), a graphic design graduate from the University of Architecture in Ho Chi Minh City, furthered her education with a master's degree in Edinburgh and gained ten years of professional experience in London. Seeking a more meaningful and unpredictable creative pursuit, she returned to Vietnam to launch *Dong Dong*. The brand name reflects Southern slang for “going around to relax” and also symbolizes the “recycling circle,” aligning with its focus on sustainability.



Fig. 05

Design Philosophy and Sustainability Practices

Dong Dong specializes in crafting unique design bags made from recycled materials, often incorporating prints inspired by Vietnamese culture. Anh thrives on the creative challenge of working with a limited range of colours and materials, which results in distinctive products. Her designs appeal to a diverse customer base, with a roughly equal split between locals and tourists, many of whom purchase the bags as gifts for friends and family abroad.

Dong Dong sources approximately 20% of its materials from event companies that produce banners, standees, and backdrops. These companies, recognizing the benefits of recycling, often deliver the used materials to *Dong Dong*'s warehouse voluntarily and without seeking recognition. The remaining 80% comes from supermarkets and seafood farming companies in the Mekong Delta. However, these suppliers provide no logistical or cleaning support, which adds to the brand's internal workload.

Operational Challenges

With a team of 12 people, cleaning and processing recycled materials is one of the most labour-intensive aspects of *Dong Dong*'s operations. The physically demanding nature of this task is compounded by several external challenges:

- **Limited Material Sources:** A lack of widespread awareness and education about sustainability restricts the supply of recyclable materials.
- **Unrealistic Consumer Expectations:** Some customers undervalue the creative process behind recycled products, assuming lower prices due to the “free” nature of the materials.
- **Short-Notice Corporate Orders:** Corporations often place large orders on tight deadlines for their “sustainable” PR campaigns, making it difficult for *Dong Dong* to plan production effectively.

Future Aspirations and Policy Needs

Anh's long-term goal is to scale her business while maintaining its core values and brand identity. However, she faces regulatory obstacles, particularly regarding tax policies. Current regulations do not provide tax reductions for individual suppliers who cannot issue VAT invoices, which complicates financial planning. Anh is currently paying fines as a workaround but hopes for government reforms to

better support sustainable businesses like hers.

Key Insights:

- Unique designs leveraging recycled materials appeal to both local and international markets.
- Lack of public education on sustainability affects material sourcing and consumer perceptions.
- Regulatory and logistical challenges hinder growth, highlighting the need for policy changes.

DISCUSSIONS AND IMPLICATIONS

Williams et al., 2021 propose that sustainable prosperity encompasses long-term quality of life for both people and nature. While economic prosperity is essential, it should not be the sole measure of well-being. True prosperity includes sufficient time, energy and opportunities for personal development and participation in culture and community activities, fostering meaning, satisfaction and fulfillment in life. Aligning with these principles, the interviewed fashion founders do not solely measure success by profit. For them, the creative process and continuous learning are the key drivers of their work.

CONTRIBUTION TO A SUSTAINABLE ECONOMY AND CULTURAL HERITAGE

The interviewed MSEs localise their production by involving women, including ethnic groups and senior seamstresses, aiming to preserve traditional handicrafts for future generations. This approach contributes to an inclusive economy, empowering women and youth. These enterprises also impact the raw material industry, particularly in textile weaving and natural dying, as these are integral to creative production (Hartono & Prihawantoro, 2018b).

Through these practices, young designers embrace Vietnam's cultural heritage, modernising ancient techniques while valuing the ecological significance of fabric production. This not only sustains traditional craftsmanship but also fosters environmental stewardship.

THE CIRCLE OF PROSPERITY FASHION

The concept of Prosperity Fashion represents a sustainable connection among four key elements: economy, culture, environment, and society (see chart below). These elements are intricately linked, creating a holistic framework that drives sustainable growth.

From an economic perspective, the interviewed MSEs sustain their business by creating jobs for local women and youth, which in turn supports the local economy. In terms of culture, they enhance the value of traditional textiles by embedding creative and cultural significance into their designs. This not only elevates the artisans' work but also preserves and passes down these cultural practices to future generations. Environmentally, young designers leverage technology to optimise zero-waste practices, maximising the utility of leftover fabric while promoting eco-friendly products. This commitment to environmental stewardship ensures that resources are used efficiently and sustainably. Finally, in the societal domain, practical education initiatives foster a deeper appreciation for sustainability among consumers and future designers. This education effort creates a ripple effect, inspiring others to adopt sustainable practices and reinforcing the interconnected prosperity of the system.

This dynamic and interconnected framework benefits all stakeholders. As businesses thrive, cultural heritage is preserved, environmental impact is minimised, and society becomes more sustainability conscious. In this way, the 'circle of prosperity fashion' continues to grow, fostering sustainable development across multiple domains (Fig. 06).

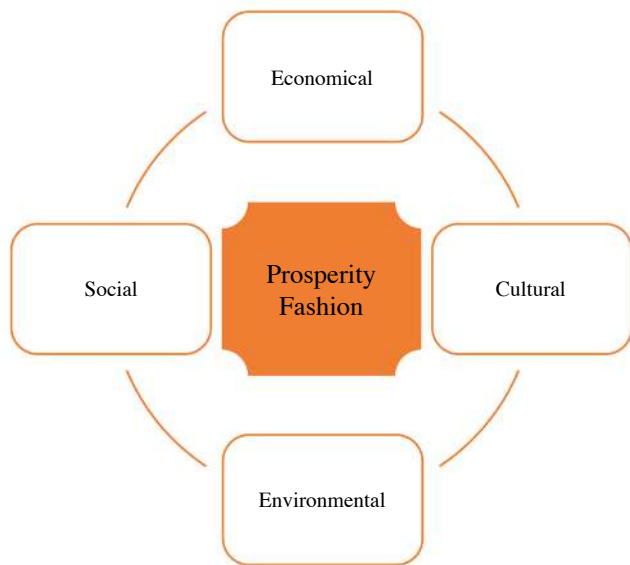


Fig. 06

TERMINOLOGIES IN CREATIVE INDUSTRY AND CO-DESIGN

The term co-design, sustainability, creative industry, and creative economy are rooted in Western academic discourse. Since the interviews were conducted in Vietnamese, it is crucial to explore how these concepts are understood and applied in local design practices.

During a workshop on proposed government policies to support cultural and creative enterprises, the terms “cultural” (văn hóa) and “creative” (sáng tạo) were used interchangeably. Specifically, “cultural industry” and “creative industry” appeared in discussions during Vietnam Design Week 2023. Local media frequently used “Cultural (văn hóa) industry” in their coverage of the Prime Minister’s announcement, whereas “Creative (sáng tạo) industry” is more commonly referenced in the literature. However, over the past five years “creative economy” (kinh tế sáng tạo) has consistently been used, rather than cultural economy (kinh tế văn hóa). This linguistic inconsistency could lead to confusion, much like the evolving ways sustainable fashion has been communicated in Vietnamese media over the past decade.

CO-DESIGN AS A CORE PRACTICE

According to the interviewed MSE founders, co-design (*hợp tác or đồng thiết kế*) has been an inherent aspect of their working processes since their businesses began. While not always explicitly labelled as co-design in daily conversation, it is deeply embedded in their collaborative practices. This approach emphasises mutual support and shared goals, reflected in expressions such as “sisterhood” (*chị em giúp nhau*), “co-support” (*đồng lòng*), and “win-win relationships” (*quan hệ song phương*).

Co-design fosters personal relationships and collective creativity, ensuring a mutually beneficial process for all stakeholders. It not only enhances the quality and uniqueness of the products but also strengthens the social fabric of the communities involved.

CONCLUSION

This research contributes to the global discourse on redefining prosperity in fashion by advocating for models that prioritise environmental stewardship, cultural integrity, and community well-being over traditional profit-driven approaches. By aligning with these broader goals, Vietnam’s fashion MSEs have the potential to enhance their domestic impact and influence global fashion practices, setting a valuable precedent for other emerging markets.

STRATEGIC IMPLICATIONS

The Vietnamese government’s recent support for the creative industry presents a unique opportunity for MSEs. This study provides useful insights for policymakers on how effectively support sustainable fashion enterprises while establishing a long-term national framework for the fashion industry. Drawing inspiration from the successes of Korea and China, Vietnam could foster its creative economy through strategic interventions.

One critical area is education. Sustainability principles should be introduced at the high-school level and incorporated as core courses in textile, design, and fashion-related programs across colleges and universities. This would help raise awareness of the Sustainable Development Goals (SDGs) and cultivate a new generation of sustainability-minded professionals.

Additionally, providing public spaces to showcase sustainable fashion, particularly from MSEs, could serve as a powerful government endorsement and an educational tool for the public.

Finally, simplifying and clarifying tax procedures would offer relief to MSEs in the creative industry, enabling them to spend less time on administrative tasks and more on innovation, ultimately adding greater value to their designs.

LIMITATIONS AND FUTURE RESEARCH

This study is limited by its relatively small sample size, focusing on a few MSEs within the sustainable fashion sector in Vietnam. Future research should aim to include a larger and more geographically diverse group of MSEs, exploring various sustainable business models. This broader scope would provide a more comprehensive understanding of how MSEs can contribute to both the local and regional creative economies.

CAPTIONS

[Fig. 01] Linht Handicraft (2024). Linh Pham (white top) and ethnic artisans in Sapa, Vietnam. <https://www.facebook.com/linht.handicraft>

[Fig. 02] KILOMET109 (2024). Thao Vu (second from the left) and the ethnic artisans in Northern Vietnam. <https://www.facebook.com/kilomet109>

[Fig. 03] MOI DIEN (2024). Tom Trandt models his product. <https://www.facebook.com/moidienstudio>

[Fig. 04] KHAAR (2024). Kha Ngo and his work at SUSTASIA FASHION PRIZE in Shanghai 2025. <https://www.facebook.com/khaar.vietnam>

[Fig. 05] Dong Dong (2024). Anh Tran models her product. <https://www.facebook.com/dongdongsg>

[Fig. 06] Circle of prosperity fashion of interviewed local MSEs. Created by authors.

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EMBODYING PROSPERITY

HOW HANDSPUN AND HANDWOVEN PATTU TEXTILES REFLECT SUSTAINABLE FASHION AND COMMUNITY RESILIENCE IN WESTERN RAJASTHAN

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Abstract

This paper explores India's agropastoral desi oon (wool) textile traditions and their significance in embodying prosperity, focusing on hand-spun and handwoven Pattu textiles. Pattu is a multifunctional textile—used as a shawl, skirt, blanket, mat, or rain cover—valued for its durability and warmth in desert climates. The word “Pattu” derives from patti, meaning narrow-width fabric, woven on pit treadle looms (Khaddi) (Rustagi, 2021). Two narrow strips (pattis) are stitched together to form a blanket or shawl (Munshi et al., 1992). Grounded in Indigenous and Local Ecological Knowledge (ILEK), Pattu's making involves intergenerational hand-spinning, weaving, and embroidery practices. These textiles not only reflect the ecological rhythms of desert life but also sustain a meaningful relationship between communities and their environment. Crafted from locally sourced desi oon, Pattu embodies both ecological sustainability and cultural identity (Jaitly, 1990). By exploring embedded skills, seasonal rhythms, and collaborative production, this paper highlights how Pattu supports rural livelihoods, preserves intangible cultural heritage, and fosters community resilience. In an era of climate crisis and industrialized fashion, Pattu offers a culturally rooted, sustainable alternative that reconnects people, place, and practice.

Keywords: *Embodied knowledge, Indigenous and Local Ecological Knowledge (ILEK), Desi Oon (wool), Community resilience, Ethical and local production*

INTRODUCTION

Desert Textile Culture, Village, Craft, and Ecological Practices The unstitched, off-the-loom desi oon textiles known as Pattu are a traditional craft deeply embedded in the village social and ecological systems of Western Rajasthan, India. These textiles exemplify environmental sustainability, community resilience, and economic viability within rural/village economies. Crafted from indigenous wool, Pattu represents “prosperity fashion” by connecting clothing to nature, community, and ethical production practices (Latouche, 2012). The production of Pattu reflects the interdependence of communities, emphasizing collective labor, ecological stewardship, and the preservation of generational knowledge—elements crucial for sustaining both

cultural heritage and local ecosystems. As Edward Cooke notes, the term “village,” when associated with craft, evokes connotations of cohesion, cooperative labor, and collective production, distinct from industrial systems. Dating back to the late nineteenth century, this association underscores the localized, small-scale production methods that define traditional crafts. Within this global framework, craftwork occupies a niche as a place-specific commodity, produced outside urban centres by identifiable makers who rely on skill and dexterity rather than industrial machinery. (Helland;2014, p.2)

Pattu exemplifies this framework by embodying knowledge that seamlessly integrates Indigenous and Local Ecological Knowledge

(ILEK) with traditional crafting practices. Rooted in community-based agricultural systems, Pattu production reflects a profound understanding of the land, livestock, and farming practices. Skilled craftsmanship transforms raw wool into versatile, handwoven fabric, showcasing the interconnectedness of ecological systems and human effort. This knowledge, sustained through intergenerational collaboration, positions Pattu as both a functional textile and a symbolic representation of community resilience and ecological harmony.

Historically, in the seventeenth and eighteenth centuries, decentralized manufacturing systems in India, China, and Japan dominated global textile and ceramic markets, relying on skilled labor and well-established technologies. However, during the colonial period, British manufacturers marginalized these systems, promoting a false narrative of inefficiency to celebrate industrialized production. This erasure, as Prasannan Parthasarathi explains through the concept of “the great divergence,” elevated Western technology while devaluing Asian/South Asian craftsmanship. In the context of today’s global climate crisis—marked by rapid industrialization, fast fashion, and accumulating textile waste—revisiting ILEK and sustainable craft practices has become increasingly urgent. This paper uses Pattu textiles as a case study to explore the significance of embodied knowledge and sustainable craft traditions, demonstrating their relevance in addressing contemporary environmental and social challenges.

CRAFTED HISTORIES: COTTON AND WOOL (DESI OON) IN INDIAN TEXTILES

Indian textiles, such as Khadi and Chintz, represent India’s rich legacy in cotton craftsmanship, offering a striking contrast to the localized resilience of wool-based traditions like Pattu Textiles. Khadi, a handspun and handwoven fabric championed by Mahatma Gandhi during the independence movement, became a symbol of self-reliance and sustainability. It empowered rural/village communities while standing in opposition to British industrialized textiles (Gandhi, 1927). On the other hand, Chintz—originally a hand-drawn and dyed fabric from India—has evolved over the past century to denote floral-printed, glazed cotton furnishing fabrics. During the 17th and 18th centuries, Chintz dominated global markets,

showcasing India’s exceptional innovation and craftsmanship in cotton textiles (Riello & Roy, 2009). These cotton traditions underscore India’s dual legacy of resistance and artistry, while contrasting with the equally vital, localized practices embodied by woolen textiles like Pattu.

In the early 20th century, Gandhi mobilized the cotton industry as a political tool against colonial exploitation. He encouraged Indians to produce and wear Khadi as a boycott of British goods and a symbol of unity and independence (Bayly, 1986). However, the plain, coarse fabric often overlooked the intricate artistry and decorative traditions that had once made Indian textiles globally celebrated (Parthasarathi, 2011).

The fascination with Indian textiles is not new. Fourteenth-century English writer and traveler Sir John Mandeville, known more for his imaginative storytelling than reliable observations, described a “wonderful tree which bore tiny lambs on the ends of its branches.” This depiction of the cotton plant, fantastical as it was, reflected Europe’s fascination with Indian cotton, which was often seen as one of the marvels of the Orient. Such narratives, while mythical, underscore the allure and global significance of Indian textiles throughout history. (Riello & Roy, 2009).

While cotton has historically represented India’s role in global trade and colonial resistance, wool-based textiles like Pattu offer a localized counterpoint. Rooted in Indigenous and Local Ecological Knowledge (ILEK), Pattu integrates land, livestock, and skilled craftsmanship, emphasizing community-driven, sustainable practices (Latouche, 2012). Together, these textiles highlight India’s dual legacy: cotton as a symbol of global influence and resistance, and wool as an emblem of place-based production and ecological harmony. Both traditions offer critical insights for sustainable fashion and cultural preservation in contemporary times (Parthasarathi, 2011).

TEXTILE CRAFT AS A LIVING ARCHIVE: MEMORY, MATERIALITY, AND SUSTAINABILITY

Culturally, Indian states with arid or semi-arid geographies are deeply interconnected through their agropastoral knowledge and wool textile traditions, firmly rooted in Indigenous and Local Ecological Knowledge (ILEK). These traditions are vital to the livelihoods of pastoral communities, illustrating a symbiotic relationship between

craft and ecology. In the west, the Thar Desert in Rajasthan and the Rann of Kutch in Gujarat are renowned for their distinctive wool crafts, which play a crucial role in sustaining pastoralist economies (CFP Report, 2022). In the north, Himachal Pradesh, Uttarakhand, and Ladakh preserve wool weaving traditions closely tied to mountain pastoralism and transhumance practices (Ladon, 2023). Similarly, in southern India, the Deccan Plateau, spanning Maharashtra, Karnataka, Telangana, and Andhra Pradesh, integrates pastoralist wool production with a rich and diverse textile heritage (Mehta, 2023).

Textiles occupy a central place among Indian arts and crafts, as highlighted by the establishment of a dedicated Ministry of Textiles. This underscores the importance of textiles in Indian society and their recognition at the governmental level. Despite challenges from industrial mass production and competition with emerging textile-producing nations, Indian handmade textiles have preserved their unique beauty and cultural significance. India's textile industry remains one of the largest globally, benefiting from an unparalleled raw material base and a strong manufacturing infrastructure across the economic value chain. This resilience showcases the enduring strength and global relevance of Indian textiles, encompassing both traditional handwoven masterpieces and contemporary innovations (Sethi, 2022).

PLANETARY CONNECTION OF PATTU TEXTILES THROUGH SPATIAL AND SUSTAINABLE CLOTHING PRACTICES FROM INDIGENOUS AND LOCAL ECOLOGICAL KNOWLEDGE (ILEK) LENS

THEORIZING INDIGENOUS AND LOCAL ECOLOGICAL KNOWLEDGE: INSIGHTS FROM HANDSPUN AND HANDWOVEN PATTU TEXTILES

Indigenous and Local Ecological Knowledge (ILEK) is shaped through dynamic interactions among humans, non-human entities, technical artifacts, and the living and non-living elements of nature (Spaargaren, Weenink, & Lamers, 2016). In practice theory, knowledge is understood as “enacted,” existing only through action. Tacit knowledge, or practical consciousness (Giddens, 1984), plays a vital role in the (re)production of

such practices (Ignatow, 2007). Tacit knowledge is inherently practical, tied to accomplishing tasks within specific ecological and social conditions, and resists abstraction (Polanyi, 2005; Gascoigne & Thornton, 2013).

This framework resonates with pastoralist community in India who creates its own unique set of ‘storied textiles’ (Das & Iyengar, 2021, p. 66). These textiles, such as Pattu, are not mere functional objects but embody cultural, historical, and practical significance within pastoralist communities. The idea of “storied” captures the intertwining of knowledge, tradition, and identity with material craftsmanship. Pattu textiles are artifacts of lived experience, reflecting the human nature relationships and craftsmanship central to pastoral communities’ heritage. By weaving together tacit knowledge and lived ecological practices, these textiles encapsulate both the tangible and intangible dimensions of tradition, serving as living narratives of communal resilience and ecological harmony.

Rooted in intergenerational knowledge and place-based practices, Pattu textiles offer a sustainable alternative to industrial fashion systems by integrating craft, ecology, and community. Their production relies on the interdependence of pastoralist, hand-spinning, and weaving communities, where livestock such as sheep and goats play a vital role in agro-economic life. This sustainable model reflects what Arturo Escobar (2018) describes as the *pluriverse*—a world where multiple ways of knowing and being coexist. By foregrounding Indigenous ecological knowledge, Pattu challenges modernist paradigms and affirms culturally rooted approaches to sustainability.

By examining Pattu-making practices through the lens of ILEK, we also uncover their relevance in addressing contemporary challenges like climate change. These communities’ migratory practices, shaped by seasonal fluctuations such as Himalayan snowfall or desert rainfall, illustrate adaptability and resilience essential for navigating environmental uncertainties (Centre for Pastoralism, 2022). Their ecological strategies, blending practical and economic wisdom, offer valuable insights for fostering sustainability and climate resilience globally. Incorporating local wool and traditional practices into broader textile systems can inspire a more sustainable and diverse future for fashion. The ecological knowledge embedded in Pattu textiles and the cultures that create them is deeply relational and situated, transmitted

through communal, ritualized learning (Fletcher, Pierre, & Tham, 2019). These practices bridge the gap between tradition and innovation, offering a profound understanding of natural systems often overlooked by modern, dualistic frameworks.

VISUAL APPROACHES AND TACIT KNOWLEDGE IN THE PRACTICE OF PATTU CRAFT

According to Sennett (2008, pp. 8-9), craftsmanship embodies “the skill of making things well... an enduring, basic human impulse, the desire to do a job well for its own sake.” Ingold (2000, p. 413) further elaborates that craftsmanship involves inspiration, engagement, holistic understanding, informal learning, and the honing of skills necessary for completing a task. These scholars highlight the integral role of skill in craftsmanship, which Ingold defines as a “practical mastery that we carry in our bodies and that is refractory to formulation in terms of any system of mental rules and representation” (Ingold, 2000, p. 162). This tacit knowledge is cultivated not through formal training but through routine practices, involving characteristic postures and gestures that are embodied over time.

This framework aligns closely with the practices involved in creating handspun and handwoven Pattu textiles. Among farming and pastoral communities, women routinely engage in handspinning during the afternoons, using Charkhas (spinning wheels) to transform raw, hand-carded sheep wool into uniform yarn. This yarn is then passed to the weaver’s family, where the entire household collaborates on pit looms to craft the Pattu fabric. Due to the loom’s structural limitations, the fabric is woven in narrow strips called Patti. Two strips are later joined using hand embroidery, giving the textile its name, Pattu. Once the woven fabric returns to the spinner’s hands, it undergoes further enhancement. Two pieces are sewn together, and borders are embroidered with vibrant colors. In the Thar Desert, these bright borders add a sense of individuality, while others may complement the natural wool’s natural tones. This interplay of spinning, weaving, and embroidery illustrates the seamless integration of tacit knowledge and visual methods in the crafting process.

EMBODIED SKILLS AND COLLABORATIVE TOOLS IN THE MAKING OF PATTU TEXTILES

The sustainable relationship between makers and the natural environment they rely on is encapsulated in the concept of co-production. Co-production emphasizes the mutual involvement and interdependence between humans, animals, and their surrounding ecosystems, generating ecological services and benefits (Fischer & Eastwood, 2016). This framework expands the understanding of social-ecological interactions, acknowledging the agency of both humans and non-humans, rather than perceiving them solely as providers or users of ecological resources (Flint et al., 2013). Craftsmanship, deeply rooted in “attentiveness,” thrives on practices such as “handling, using, and taking care of things” (Crawford, 2009, p.69), fostering an “intimacy” with materials, animals, and plants (Dreyfus & Kelly, 2011, p. 210).

The making of handwoven Pattu textiles exemplifies this co-productive relationship. Pastoralist and farming communities are intricately tied to their livestock, such as sheep, goats, and camels. These animals provide essential resources like wool, milk, and meat, while their routines shape the rhythms and structures of craft practices. Livestock cycles directly influence the timing of work, embedding Pattu-making within the ecological rhythms of the community.

Pattu-making seamlessly integrates intergenerational participation with embodied skills, where tacit knowledge acquired through lived experience, visual observation, and hands-on practice forms the foundation of this craft. Women often spin wool in the afternoons, transforming raw fibers into uniform yarn, while weaving and embroidery engage entire families in the production process. Tools like the Charkha (spinning wheel) and handloom serve as collaborative instruments, bringing together generations in the crafting of Pattu textiles. This intergenerational cooperation not only ensures the functionality of these textiles but also preserves their cultural significance, keeping traditions alive and relevant across time.

Through these embodied practices, Pattu textiles represent the interconnectedness of humans, non-humans, and the environment. This dynamic sustains local economies while safeguarding cultural heritage rooted in resilience, ecological awareness, and collective craftsmanship. By embodying co-production, Pattu-making serves as

a compelling model for sustainable craft practices that honor the interdependence of nature and culture.

In contrast, modern or industrial societies often experience a nature-deficit disorder (Louv, 2005), a disconnect from the natural world that impairs the “ecological conscience that motivates care and action” (Zylstra et al., 2014, p. 123). The embodied knowledge and intimate connection with nature inherent in Pattu-making traditions provide a counterpoint to this deficit, offering a blueprint for rekindling ecological relationships through meaningful, place-based practices.

The use of indigenous wool enhances the resilience of desert ecosystems by leveraging its natural adaptability. This interconnected ecosystem unites artisans—spinners, weavers, dyers, and embroiderers—with farmers and herders, forming a cohesive value chain that operates in harmony with the local environment. By strengthening the local wool value chain, artisans gain autonomy over raw materials, enabling ecologically sound and sustainable craft production.

This practice not only ensures the survival of traditional weaving and textile crafts but also safeguards cultural heritage and promotes ecological sustainability. At the heart of this system lies a network of interdependence, connecting communities, economies, and nature, and fostering resilience on both cultural and environmental fronts.

CONCLUSION

Pattu textiles exemplify the intricate connection between craft, community, and ecology, offering a model of prosperity that is deeply rooted in sustainability. Their production reflects a harmonious balance between human ingenuity and the natural environment, showcasing the value of Indigenous and Local Ecological Knowledge (ILEK) in fostering resilience.

By integrating traditional skills such as hand-spinning, weaving, and embroidery with locally sourced wool, Pattu-making sustains livelihoods, preserves cultural heritage, and supports ecological stewardship.

This craft embodies more than just functionality; it weaves together intergenerational knowledge, community collaboration, and ecological adaptability. Pastoralist and farming communities, through their daily engagement with livestock and the environment, demonstrate how co-production and embodied practices create a sustainable

and prosperous way of life. These textiles serve not only as functional artifacts but as living narratives that reflect cultural identity and environmental harmony.

In an era of rapid industrialization and environmental challenges, Pattu textiles provide critical insights into sustainable fashion and community resilience. They remind us of the importance of localized, eco-friendly practices that align with cultural and environmental needs. Drawing on Arturo Escobar’s (2018) concept of the pluriverse—a world where many worlds coexist—Pattu exemplifies how Indigenous and place-based knowledge systems challenge dominant, homogenizing models of progress and sustainability. These textiles, and the communities that produce them, point to alternative ways of knowing, making, and living that are rooted in relationality, care, and diversity.

By valuing and integrating these traditional practices, we can chart a path toward a future that embraces both prosperity and sustainability—one that honors cultural difference and ecological stewardship as central to a just and plural world.

NOTES

desi oon is local/indigenous wool

Pattu is a handspun, handwoven, unstitched textile found in both the Thar Desert in Rajasthan and the Himalayas in Himachal Pradesh, India.

In Rajasthan, India, the word “*Khaddi*” is commonly used in the local language to refer to a loom, particularly a handoperated loom used for weaving.

Pit Treadle Looms are among the earliest known treadle looms used in India, with origins dating back over four thousand years. Remarkably, these looms remain largely unchanged in their original design. Known for their versatility, pit treadle looms have enabled Indian weavers to craft a wide range of textiles, from the finest cottons and silks to coarse, durable woolens, demonstrating their adaptability across diverse materials and weaving traditions (Munshi, et al., 1992).

“Because so little was needed in the way of a loom frame, the pit loom is ideally suited for an environment, that offered little wood for construction.” (From the Book Of Looms by Eric Broudy)

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COMMUNICATION

SHADES OF GREEN

UNVEILING THE STRUCTURES AND PROCESSES OF GREENWASHING IN FASHION

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Abstract

The fashion industry faces significant challenges, including human rights and environmental concerns, prompting a shift toward sustainability. This shift reflects heightened awareness among stakeholders. However, alongside these positive developments, a trend has emerged: greenwashing. Defined as misleading consumers about a company's environmental practices, greenwashing complicates the industry's efforts to adopt sustainable practices and can perpetuate harmful behaviors. Despite extensive research highlighting the negative impacts of greenwashing, it continues to rise, indicating a gap in understanding the processes behind it. Various factors contribute to greenwashing within fashion businesses, yet these dynamics remain poorly understood. While market forces promoting greenwashing are recognized, the specific activities and organizational structures driving these decisions need further exploration. This research investigates the inner workings of fashion organizations, aiming to identify the structures and processes that lead to greenwashing. Through in-depth qualitative interviews with industry experts, it was found that greenwashing often occurs unintentionally due to misaligned goals, lack of knowledge sharing, greenhushing, and a need for shared definitions of sustainability claims. The findings underscore the need to adjust business structures and processes to mitigate greenwashing practices in the fashion industry and emphasize the importance of developing universal definitions and standards to enhance sustainability efforts.

Keywords: *Greenwashing, Fashion, Sustainability, Organizational development*

INTRODUCTION

The fashion industry faces various challenges, ranging from human rights to environmental concerns (Adamkiewicz et al., 2022). As a multi-trillion dollar industry, the fashion industry contributes significantly to global issues, is responsible for an estimated 2-8 percent of worldwide greenhouse gas emissions, roughly 20 percent of the planet's wastewater, and accounts for 9 percent of the annual microplastic losses into the ocean (The UN Alliance for Sustainable Fashion, 2021). Additionally, the fashion industry is experiencing a substantial loss of 100 billion dollars due to underutilization of materials and inadequate recycling (The UN Alliance for Sustainable Fashion, 2021). Compounding these with

the fact that 98 percent of workers in the fashion industry earn salaries inadequate to sustain their families, as highlighted by the Global Slavery Index (2023). Growing awareness of the fashion industry's unethical practices has impacted consumer attitudes.

A 2022 study from Adamkiewicz J., Kochańska, Adamkiewicz, I., and Łukasik found that 71 percent of millennials polled express a desire for brands to prioritize environmental consciousness and ethical practice. The same study revealed that 61 percent want brands more connected to social issues (Adamkiewicz et al., 2022). Many brands within the fashion industry have begun to adopt a series of changes toward more sustainable business models. Changes such as

new operational approaches and processes oriented to less destructive and more sustainable business models (McNeill & Moore, 2015). More brands are being mindful in choosing lower impact preferred materials and opting for circular practices that lead to more sustainable options in their product lines (Adamkiewicz et al., 2022).

Despite these efforts, a concerning trend has emerged amidst these potentially positive changes—greenwashing (Dangelico & Vocalelli, 2017). Greenwashing, “the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service” (TerraChoice, 2010, p.1), takes various forms and affects a wide range of stakeholders. Its consequences include hindering consumers from making informed decisions and causing confusion (Chen & Chang, 2012; Wu et al., 2020). Ultimately, this confusion from greenwashing can foster skepticism among consumers, reducing their willingness to pay for products perceived as more sustainable (Lee et al., 2018; Nguyen et al., 2019; Santos et al., 2023). An important reaction to greenwashing that should be acknowledged is greenhushing, which is under communicating or avoiding sustainability communication entirely (Ginder et al., 2019). Greenwashing and greenhushing lead to uncertainty and skepticism about sustainable practices within the fashion industry, potentially perpetuating harmful social and environmental practices and hindering progress toward a more ethical fashion industry (Yadav et al., 2023).

Despite a wealth of academic research highlighting the detrimental impact of greenwashing on businesses and society (Martínez et al., 2020), the instances of such practices continues to rise (Montgomery et al., 2023). This persistence suggests a gap in our understanding of the greenwashing process. Numerous intricate processes may contribute to greenwashing within a fashion business, whether intentionally or unintentionally. Presently, these processes are not fully understood or appreciated. While existing literature analyzes the market forces encouraging greenwashing, the specific activities, and organizational dynamics within fashion businesses that drive greenwashing decisions remain unclear and under investigated. This study aims to gain insight into the decision-making process within fashion businesses which results in greenwashing and the underlying motivations for such behavior. Understand-

ing the processes and structures that may foster greenwashing can pinpoint areas where efforts can be concentrated to diminish greenwashing in the fashion industry.

Understanding the mechanisms behind greenwashing is vital for the future prosperity of the fashion industry. By exploring the decision-making processes and motivations that lead to greenwashing, stakeholders can identify areas for improvement and promote a culture of transparency. This knowledge not only helps mitigate greenwashing but also enhances the industry’s overall impact on the economy, environment, and society. Furthermore, by investigating these business processes and structures, we can potentially improve regulatory guidance and effectiveness. Many businesses may be unaware of potential blind spots that hinder improvements to internal systems, which could inadvertently support deceptive practices. Failing to examine these dynamics risks allowing greenwashing to continue unchecked, reducing the credibility of earnest sustainability efforts across the fashion industry and reducing the value these efforts are capable of producing for fashion businesses. The central research question guiding this investigation is: What business structures and processes intentionally or unintentionally support greenwashing behavior of fashion brands in the United States?

METHODOLOGY AND RESEARCH DESIGN

A qualitative approach was adopted involving seven in-depth, semi-structured interviews with experts in sustainability (5) and marketing (2) within the fashion industry. Semi-structured interviews were chosen due to the sensitive nature of greenwashing discussions, providing a confidential environment conducive to open dialogue (Elam & Fenton, 2003). Participants were guaranteed anonymity to encourage candid responses, allowing for the exploration of unanticipated discussion topics, thereby enhancing data quality.

The study included seven professionals representing a range of company sizes all from either marketing or sustainability departments within fashion companies. Each interviewee had a strong understanding of communication processes in the fashion industry, which is important given the limited research on business practices linked to greenwashing. Participants were recruited through the researcher’s professional network and

connections cultivated over years in the industry. Participants were contacted via email and LinkedIn in early September 2023, with interviews conducted between September 22 and October 30, 2023. Interviews took place via Zoom and each session was recorded and transcribed using the online research management platform Condens, averaging 39 minutes long, with the shortest at 29 minutes and the longest at 46 minutes.

The questions posed were crafted to gain insights into greenwashing within a fashion organization and explore the specific business processes that allow for this practice to happen (intentionally or unintentionally). The conversations were focused on their organization's involvement in greenwashing and the challenges encountered when mitigating it. The inquiries spanned various areas, including sustainability within their roles, cross-functional communication within their company, and specific instances of greenwashing. Interviews concluded with an invitation for the participant to share any additional reflections or insights from their own experiences. Open-ended questions provided flexibility for unique perspectives.

Strict confidentiality was maintained for participants' identities and their organizations, encouraging open dialogue without fear of exposing sensitive information. Participants could decline any question or end the interview at any time. Each interviewee was assigned a unique identifier to preserve anonymity during data analysis.

Analysis began with a thorough review of audio recordings and transcriptions to ensure accuracy. Noteworthy excerpts from the transcriptions were extracted and transferred into a private Google document file, encompassing elements emphasized by interviewees, recurring themes across multiple interviews, and unique perspectives. An inductive coding approach was employed, generating systematic codes to identify themes from the interviews.

The analysis identified several key themes: (1) the impact of knowledge sharing and resource constraints, (2) the conflict between storytelling and greenwashing, (3) the need for universal regulations and standards, and (4) the concept of greenhushing. These themes were organized into color-coded sections within the transcriptions and further evaluated for deeper insights, leading to conclusive findings.

RESULTS AND DISCUSSION

The data analysis revealed several notable findings in the effort to understand what business structures and processes support greenwashing behavior of fashion brands in the United States. Every organization involved in the interviews acknowledged instances of greenwashing, emphasizing that these were often unintentional. They implemented measures like cross-functional knowledge sharing, internal communication protocols, certifications, and thorough reviews of sustainability messaging. However, a critical question remained: Why does greenwashing persist despite these safeguards?

THE CONFLICT BETWEEN STORYTELLING AND FACTUAL ACCURACY

Six of the seven interview subjects disclosed that a significant factor contributing to greenwashing in their organization was the tension between the competing goals of the sustainability department, which is focused on factual accuracy, and the marketing team's objective to craft compelling narratives. Interview Subject (IS) #1 shared

I think [greenwashing] can just be excitement on the part of the marketing and comms teams. [Marketing] will often take from things in their personal lives, or things they have read about, or whatever the case may be, and sort of embellish because that is their job to write and romanticize really beautiful language.

A recurring observation among the six was that marketing departments encountered difficulties developing a compelling narrative that met the approval of the sustainability teams. IS #5 explained

It is also really hard when you are trying to put together a marketing story because you want to be able to talk about things and embellish and be descriptive and, you know, create a world and a story. Being factual and concise does not always permit that.

The tension between the commitment to factual accuracy from the sustainability department and the marketing team's goal of crafting compelling narratives emerged as a significant factor contributing to greenwashing. Interviewees noted that this delicate balance often leads to embellishments, making it challenging for both

departments to align their goals and ultimately contributing to greenwashing.

In companies where sustainability was less prioritized, a lack of cross-functional education and knowledge hindered effective communication. This educational gap within marketing teams can lead to difficulties to accurately convey sustainability claims, increasing the risk of greenwashing. Without a strong emphasis on sustainability at all levels, organizations struggle to share updated information effectively, complicating their efforts to navigate the evolving sustainability landscape.

GREENHUSHING

While the questions of the study focused on greenwashing practices, greenhushing was a common theme that emerged. Five of the seven participants noted the practice of avoiding sustainability communication entirely, as a notable theme. IS # 4 said

Anytime I have tried to bring sustainability into the conversation from a marketing perspective, my boss is very, 'we have to be careful we do not want to say something that we are not actually doing.' They are very careful about how it is said, how it is marketed. So, in a sense, they are kind of trying to avoid [greenwashing] without maybe knowing that they are trying to avoid it. I think since we are such a big company, we have to be careful about what we say, how we say it, and what we stand behind because there could be more repercussions.

Greenhushing emerged as a shared concern within the industry despite their commitments to sustainability. IS #3 said

At a certain point, greenhushing becomes a concern. The customer is given no information about how to make better purchasing decisions. That is more of what I am afraid of. What does it look like if the pendulum swings so far to the left on greenwashing regulation that brands are like, 'I am just not going to communicate anything about my efforts.' And then customers have no information on which to base their purchasing decisions.

Some interviewees acknowledged that they participated in greenhushing before gaining confidence in their sustainability initiatives. They mentioned believing that other fashion companies

were also adopting a similar approach, partly driven by a fear of being called out publicly. IS# 6 said

When we started this journey, we did not discuss it for almost two years...we were really afraid to talk about it. And that was when call-out culture was not even as much as it is now. So, I understand why greenhushing has become a thing or that people fall into greenwashing because they just do not know how to navigate this space.

While not classified as a formal process or structure, greenhushing emerged as a prevalent theme throughout this study with substantial influence on other identified factors. IS #2 conveyed that numerous fashion brands grapple with whether it is worthwhile to communicate their sustainability efforts and identify more sustainable products or if they should choose to remain silent. This behavior was perceived as a prevalent trend among fashion companies, partly driven by a fear of criticism within the growing call-out culture.

Greenhushing reflects the pressing need for increased regulation and standards in the fashion industry. The apprehension among companies about potential backlash for miscommunication indicates a fear of making statements that could be perceived negatively by other brands or consumers. More explicit guidance on sustainable communication and sustainability standards would help mitigate the confusion surrounding appropriate messaging.

TIME CONSTRAINTS AFFECTING KNOWLEDGE SHARING

All seven interview subjects identified a lack of knowledge sharing as a key factor contributing to greenwashing, with time constraints for educating staff on sustainability practices being a prominent issue. The participants noted that a manual review of external communications was a primary method for preventing greenwashing, but the insufficient time allocated for these reviews often led to lapses. IS #1 stated, "In my perfect world, it would be a lot less work to [review communications] on the part of [the sustainability team]. We spend quite a bit of our weekly hours."

This sentiment was echoed by others who expressed a desire for sustainability to be integrated into every organizational function, reducing the burden on sustainability teams to educate others. For instance, IS #7 remarked, "I feel like

it is on me to communicate all things [related to sustainability]. Other teams, like the raw materials team, should be educating everybody about [sustainability].”

Existing research highlights that successful sustainability practices hinge on effective communication and knowledge-sharing (Khan et al., 2016; Van Hoof & Thiell, 2014). Sustainability must extend beyond departmental boundaries, becoming a cross-organizational value (Atiq & Karatas-Ozkan, 2013). Collaborative efforts among employees are essential for achieving organizational sustainability, yet time and resource limitations significantly hinder such communication.

Throughout the interviews, participants reiterated that a lack of knowledge sharing was a significant driver of greenwashing. They faced challenges in educating their teams about effectively communicating sustainability claims. Many expressed feeling stretched thin with their responsibilities, wishing they could dedicate more time to education but facing financial resource limitations. Some interviewees shared transformative experiences, noting that while manual reviews initially presented significant challenges, investing in training for team members resulted in a more efficient process over time. One participant noted a significant reduction in time spent reviewing external communications compared to a year prior, attributing this improvement to comprehensive sustainability communication training initiatives. This demonstrates the positive impact of investing in education and training, leading to increased efficiency and reduced instances of greenwashing.

While educational investments have shown promise, financial and time constraints remain significant barriers. One potential solution for fashion organizations is to establish a dedicated role within the marketing team to verify the accuracy of sustainability communications. This would ease the burden on sustainability teams, balance storytelling with the accuracy of sustainability claims, and reduce the need for extensive education across the two departments.

Such a dedicated role could improve cross-functional collaboration between marketing and sustainability departments, providing a worthwhile investment considering the financial risks associated with greenwashing. Greenwashing not only breeds consumer skepticism but also diminishes trust in a brand, ultimately affecting customers' willingness to pay for products associat-

ed with misleading claims (Lee et al., 2018; Nguyen et al., 2019; Santos et al., 2023).

While greenwashing currently lacks comprehensive regulation in the United States, companies can face legal repercussions under Section 43a of the Lanham Act for false representations in advertising (Feinstein, 2012). Additionally, many fashion companies based in the United States also conduct business in the European Union which has expanded its regulation on greenwashing under the Green Claims Directive. The directive was proposed in 2023 and requires businesses to substantiate their environmental claims with credible and independent evidence before making them (European Commission, 2023).

Therefore, fostering an environment of transparency and shared knowledge is crucial for mitigating greenwashing and promoting sustainable practices in the fashion industry. This research underscores the need for organizations to optimize their resources and strategies for educating teams, paving the way for more responsible and informed sustainability communication.

SHARED DEFINITIONS AND GUIDANCE

Four of the seven interview subjects identified the absence of shared definitions and guidance for sustainability claims as a significant factor contributing to greenwashing. The frustration among the interview subjects stems from the varied definitions of sustainability across companies, leading to greenwashing incidents when different definitions of greenwashing don't line up. IS# 2 said, “The number one biggest driver of greenwashing is that different people have different definitions of what it seems to be sustainable.”

The interviewees also shared that they often felt confused due to a lack of standardization and regulation of greenwashing. IS #7 said,

More guidance on what we can and cannot say would be helpful because I feel like we are all just trying our best, but we do not know what we are allowed to say about sustainability. For example, there is no law against saying eco-friendly [In the United States], but nobody uses it anymore, right?

Interviewees emphasized the need for clearer regulations, indicating that a standardized framework would improve communication about sustainability practices and reduce greenwashing. The lack of a shared definition complicates

brands' efforts to avoid greenwashing, and existing regulations in the United States, such as the FTC Green Guides and Section 43a of the Lanham Act, have not fully addressed these challenges (Adamkiewicz et al., 2022; Feinstein, 2012). Without clear guidance, brands navigate based on varying interpretations, leading to confusion and potential greenwashing incidents. This highlights the urgent need for accepted definitions of sustainability claims to clarify expectations and improve communication in the industry.

Interviewees who reported fewer instances of greenwashing had taken it upon themselves to create detailed internal frameworks guiding their sustainable communications, as articulated by IS #1: "It is a daily focus for us, and while the industry lacks robust regulation, we have established best practices to ensure accuracy and factual representation."

However, challenges persist; other interviewees expressed difficulty navigating an industry characterized by a lack of robust regulation. IS #7 emphasized the need for extensive education and guidance, eagerly anticipating the release of new green guides for further clarity and direction. These insights highlight the nuanced landscape fashion organizations navigate to communicate sustainability amidst varying degrees of regulation and underscore the fashion industry need for enhanced guidance and standards. To navigate this uncertain terrain, fashion companies can create internal documents detailing current sustainability regulations and guidance in other countries (such as the Green Claims Directive) for acceptable sustainability communication, and share cross-functionally.

This proposal suggests that individual brands could take a more responsible approach to handling sustainability communication, but it also emphasizes the importance of the industry itself taking responsibility for regulating these claims. The fashion industry in the United States could benefit greatly from putting in place stricter regulations and guidance for sustainability communication and claims. These steps are crucial for creating an environment that supports the prosperous development and progress of sustainability initiatives in the fashion industry.

FINAL THOUGHTS

This study delves into the intricate dynamics of sustainability communication within the fashion industry, unraveling the complexities of greenwashing and the business structures and processes that support greenwashing behavior within fashion organizations. The conflict between engaging storytelling and accurate sustainability information is evident, with six interview subjects citing this tension between sustainability and marketing teams. Time and knowledge constraints hinder effective communication, emphasizing the need for better cross functional education systems. A lack of shared sustainability definitions and guidance contributes to confusion and greenwashing. The industry's silence on sustainability, known as "greenhushing," underscores the necessity for enhanced regulations. Companies' reluctance to communicate openly reflects a fear of potential criticism that could be viewed negatively by other brands or consumers. Clearer guidelines on sustainable communication and established sustainability standards would aid in reducing the uncertainty surrounding appropriate messaging.

Addressing these challenges requires a multifaceted approach. Establishing sustainability as a shared value across the organization. Additionally, a dedicated role within the marketing team for verifying the accuracy of communications could be a viable compromise, alleviating time constraints and educating the cross-functional relationship. The study also emphasizes the importance of implementing stringent regulations and guidance in the United States to foster a transparent and standardized communication landscape. Until more explicit guidance is available, fashion companies in the United States are advised to depend on regulation from other countries such as The Green Claims Directive. Such guidance can be shared cross-functionally through internally shared documents outlining sustainability communication guidance.

Navigating these complexities can pave the way for effective sustainability initiatives, ensuring accurate communication, collaborative knowledge-sharing, and shared industry standards. Reducing instances of greenwashing is essential. Authentic and transparent green claims can build customer trust in sustainable purchases, leading to increased willingness to invest in environmentally friendly companies (Chen & Chang, 2013; Wu et al., 2020). This trust, in turn, enhances customer

engagement and profitability. Furthermore, decreasing greenwashing levels legitimizes sustainable practices, fosters partnerships, and encourages innovation, contributing to a more prosperous fashion ecosystem. (De Jong et al., 2020).

Ultimately, implementing changes in business structures and processes is essential for minimizing greenwashing instances and mitigating their negative impacts. This research highlights that fostering a more responsible and transparent business environment can better serve and protect the interests of all stakeholders, including consumers. By aligning business practices with genuine sustainability efforts, the fashion industry can thrive economically while positively impacting the environment and society, ensuring a prosperous future for all involved.

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DISCOVERING THE MYTH OF METAVERSE FASHION

A CRITICAL DISCOURSE ANALYSIS TOWARDS DEFINING PROSPERITY FASHION

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Abstract

This study contributes to defining ‘prosperity fashion’ by critically examining early metaverse fashion narratives, revealing a focus on economic gain for companies rather than holistic well-being, aesthetics, and consumer needs, thus highlighting the demand for new myths that could potentially seduce consumers to shift from physical to virtual apparel, whose specific emphasis remains to be determined through further research and discourse. This paper focuses on one case study – the 2021 Roblox Gucci Garden event, specifically analysing the widely referred transaction of a virtual Gucci Dionysus Bag with Bee that sold for more than its physical equivalent. A critical discourse analysis of mass media coverage demonstrates how this single transaction evolved into the most cited example of metaverse fashion’s investment potential, becoming a foundational myth in the emerging metaverse fashion discourse.

Keywords: *Metaverse, Digital fashion, Fashion discourse, Fashion myth, Power relations*

INTRODUCTION

If you do a quick search, Google will tell you that in 2024, the global metaverse had more than 600 million active users. Statista (n.d.) forecasts this number will be 2,633.0 million by 2030. Wikipedia describes *the metaverse* as a loosely defined term referring to virtual worlds in which users represented by avatars interact, usually in 3D and focused on social and economic connection (Wikipedia contributors, 2025). While the metaverse’s history goes back decades, the fashion industry turned its attention to it in 2019. A virtual Gucci bag sold for a price higher than its physical counterpart in 2021 became an emblematic go-to example of a fashion label’s success in the digital marketplace. Multiple brands’ activity peaked on online gaming

platforms like Roblox, Fortnite, and Decentraland in 2022, ceasing when OpenAI released ChatGPT in 2022. However, fashion remains a major player in the global metaverse market, including virtual and augmented realities alongside other immersive technologies. Statista (n.d) identified various possibilities and opportunities in education, entertainment, health and fitness, remote work, eCommerce, and gaming as elements forming the metaverse market structure, which is projected to experience optimistic growth according to the Global metaverse in fashion market 2024-2028 (2024) report.

Practitioners, experts, and academics view the metaverse as a novel opportunity for brands to cultivate relationships with new customers, particu-

larly considering that 80% of Roblox users—the largest metaverse platform—are younger than 16 (Huang, 2023; Statista, 2025), while also exploring its potential as an innovative business model. Often referred to as virtual or digital fashion, fashion in the metaverse “is still in its nascent phase”; its definition is not yet set and is open to modifications, stated the authors of the recently published edited volume *Digital fashion: Theory, practice, implications* (Spicher et al., 2024, p. 1). In this paper, I use the term metaverse fashion in the way it is still circulating in the public discourse – as an interchangeable synonym for virtual and digital fashion. While in actual practice, these terms are not always equivalent (not all digital/virtual fashion requires the metaverse; *phygital*¹ items simultaneously exist in pixels and in real life, and other distinctions), in the broad everyday news media discourse, the edges of these denominations are still too vague.

It is true that “academia has yet to catch up” in the digital fashion conceptualisation and theorisation, as attempted in the above-quoted book (Spicher et al., 2024). However, the novel phenomenon does not remain unnoticed by the researchers. As the authors of the comprehensive literature review on virtual reality in the luxury fashion industry explain, research on VR (virtual reality) fashion — a ‘relatively underexplored area’—is a growing field (Liu et al., 2024). Recent research papers focus on metaverse fashion economics and business models, marketing and fashion non-fungible tokens – NFTs (Park & Lim, 2023; Chrimes & Boardman, 2023; Jiang et al., 2023); technological aspects of digital apparel (Joy et al., 2022), customer attitudes, and virtual goods purchase intentions (Kim, 2023; Wang, 2023; Andò, 2024); haute couture fashion in the metaverse (Armitage, 2022); impact on sustainability (Mesjar et al., 2023; Periyasamy & Periyasami, 2023).

Since its advent, the history of digital fashion has been closely linked to virtual gaming (Boughlala & Smelik, 2024), possibly due to the ability to alter the ‘skins’ of users’ in-game characters – avatars. Scholars are still testing the waters of what motivates gamers to pursue new skins, *particularly the buying of* virtual outfits. Wang (2023) showed that “cool and interactivity have a substantial influence on purchase intention for virtual apparel”, while the desire for online

self-presentation “plays a mediating role” (p. 1). Another field survey revealed that “attention-seeking and reputation act as inhibitors” to the intention to purchase digital clothing (Kim, 2023). Furthermore, academics, journalists, and pioneers in digital fashion design often emphasise that this phenomenon has an inherent “symbiotic relationship between technology and creativity” (Boughlala & Smelik, 2024, p. 12; Jana, 2022). It would be reasonable to assume that this opportunity to exercise creativity could also serve as another driver for gamers’ engagement in customising avatars.

Advocates assert that pixelated clothing will enhance real-world fashion sustainability by reducing overproduction and overconsumption. The digital alternative to physical fashion “would eliminate waste, carbon footprints, and harmful chemicals from the production process,” declared the founders of one of the digital-only clothing flagships, DRESSX (Spicher et al., 2024, p. xxiii). Although these expectations may sound almost self-evident to many, no one can verify that virtual fashion will mitigate harm rather than cause other environmental problems. Nevertheless, sustainability claims could serve as a compelling argument to persuade consumers, mainly Gen Z and Millennials — the primary target demographic of the Metaverse (Pangarkar, 2025) — to commit to a virtual economy. According to the World Economic Forum (2022), Gen Z prioritises sustainability more than any other generation.

Whether or not the motives for participating in digital fashion — as identified by scholars, journalists, and industry practitioners — will lead to its prosperity in the metaverse remains unpredictable and impossible to forecast with certainty. Studying the future is challenging. What we can do is learn from past and contemporary practices. Research shows that, actually, consumers aren’t fully ready for the metaverse, with some firmly against it (Breiter & Siegfried, 2022). This mirrors the experience with “smart fashion” or wearables, whose presentation in public discourse in 2015–2016 was studied (Berger, 2017); despite market analysts’ high growth expectations, mass consumers were not ready to accept technological additions to their apparel. In the vein of social constructionism theory (Berger & Luckmann, 1966), public discourse will also be vital in the case of metaverse fashion, convincing people to accept this novel medium of self-expression that, as the emerging sector promises, will lead to a more

¹ The term refers to the integration of physical and digital elements that create a seamless experience where the boundaries between reality and virtuality are dissolved (Mele et al., 2023).

planet-friendly and creative fashion ecosystem.

Due to this critical role of public discourse in shaping technological adoption, an essential theme remains little noticed by academia: the language practices that surround and construct people's perception and understanding of new phenomena such as the metaverse. While the term was coined by the end of the last century and the first true metaverse platform, Second Life, was launched in 2003, the rise and peak of the virtual world's popularity came during the COVID-19 pandemic. The novelty of this phenomenon, which has a very short history compared to fashion's tens of thousands of years, presents both challenges and opportunities. Just as myth was the first stage of constructing a worldview and human place within it, the virtual world(s) is undergoing its own mythology-building epoch. My interest lies at the intersection of these two realms – metaverse and fashion. How will the old system of fashion, which in real life (IRL) is heavily loaded with its beliefs, stereotypes, scenarios, rules and heroes, interact with the ideal square one, such as the metaverse, and, specifically, its fashion? As researchers, we are in the unique position that allows us to assess the construction of a *potentially new semiological structure* as conceptualised by Lotman (1990) – the metaverse fashion system – in real life! Is the system of fashion in the metaverse indeed a new semiological structure, or is it a procreation of the older system? In this latter case, we can witness how this older system roots itself in digital soil, adapting its signifying practices while maintaining core symbolic functions despite the radical material shift.

My critical discourse analysis (CDA) examines how social actors discuss metaverse fashion in news media texts, drawing from a corpus of articles classified as “News” by NexisLexis (LexisNexis, n.d.). The dataset includes general public media (daily and weekly newspapers and magazines with local, national, and international circulation) as well as specialised business and fashion publications. This emphasis on broad media coverage offers insights into how the novel semiological structure of metaverse fashion is being constructed and negotiated through language practices in real time.

An extended analysis of global media representations of virtual fashion from 2013 to 2022 reveals a mythology-making machine operating at full throttle, with this paper drawing insights from

the Gucci Garden case study as part of a larger research project examining these emerging practices. A few ideas that dominate the revised public discourse should be considered the newborn myths of metaverse fashion. Notions about its “inherited sustainability”, “stimulating creativity”, and “democratisation” effects, as well as assertions that via metaverse, brands would finally connect to the otherwise unreachable consumer groups (predominantly Gen Z) and that assets in virtual worlds would secure investors financial prosperity – all these ideas circulate as taken-for-granted and ‘natural’.

The case I will analyse in detail is what I call “The Roblox Gucci Garden event,” specifically focusing on a seminal transaction in May 2021 when a virtual Gucci Dionysus Bag with Bee, offered as a “limited back accessory²”, was sold for a price exceeding that of its physical counterpart in real life. According to my corpus analysis, this transaction became the most frequently cited in mass media examples of metaverse fashion's investment potential, acquiring a mythical status within metaverse fashion discourse.

THEORY AND METHOD

“The bourgeois, or technological, or consumer society will always recuperate myth”, Barthes (Bellour & Barthes, 1980) said. For him, “everything can be a myth provided it is conveyed by a discourse” because “myth is a type of speech” (Barthes, 2009, p. 131). To deconstruct how the Gucci Garden virtual bag transaction was transformed into what promises to be a foundational myth of metaverse fashion's investment potential, this study draws on theoretical observations of mythology by Barthes (1983; 2009). However, to integrally grasp the dynamics of meaning formation in metaverse fashion discourse, we must move beyond pure semiology to examine social agency and power relations. Foucault's (1981) ideas informed my analysis of how power dynamics shape the construction and circulation of myths through public discourse in the given case.

“Myth is not defined by the object of its message, but by the way in which it utters this message”, explained Barthes (2009, p. 131). Discourse (language in use) and other “significant units of synthesis, whether visual or verbal,”

2 According to Associated Press (2021), during the Roblox Gucci Garden event, only 851 of the bags were available during two releases for its original price of 475 Robux, about \$5, “making it the rarest piece in the collection, compared with the 2.6 million wide-brim denim hats that were snapped up for free”.

belong to the forms of mythical speech. Not all verbal communication can be transformed into mythical speech - only historically founded speech, not that which has evolved from the “nature” of things. According to Barthes, mythology is a part of semiology whose concern is *meaning*. As such, the argument goes, this is one of the sciences dealing not necessarily with facts (except they are endowed with significance) but with values. “The meaning contained the whole system of values” (p. 141); therefore, semiology defines and explores facts “as tokens for something else” (p. 134). In semiological analysis, the goal is to interpret myth as a semiological schema, that is, to uncover the correlation between the *signifier* (a word, image or sound), the *signified* (the concept or meaning that the signifier represents) and the *sign* (“the associative total of a concept and an image”) (p. 137).

Foucault’s (1981) theory of power relations as productive, neither fully top-down nor bottom-up but as a system of disciplinary pressure and counterpressures, guided my analysis of how power dynamics influenced metaverse fashion myths, particularly in media coverage of the virtual Gucci bag sale. Following Foucault, discourses are both instruments and effects of power; they shape *what* can be said and thought and who can speak with authority on a given topic. In line with Barthesian mythologisation, a third question must be addressed: to *whom* is the discourse directed? For “the fundamental character of the mythical concept is *appropriation*,” that is, it “must appeal to such and such group of readers and not another” (Barthes, 2009, p. 143 [*italics in original*]).

As Foucault (1981) argues, “discourses must be treated first of all as sets of discursive events”, emphasising that an event “is not of the order of bodies” yet “it is always at the level of materiality that it takes effect” (p. 68). Following this theoretical postulate, my research employs corpus analysis with a highly detailed coding structure developed to label and count mentions of such events. While counting is not the primary goal, it validates how concrete occurrences with real-world impacts are likely to be noticed by different groups of social actors, both those who tell and those who listen. This approach gives me evidence-based grounds to distil ‘candidates’ for the events with the potential to transcend into a myth.

Following Fairclough’s (2013) approach to critical discourse analysis (CDA), which operationalises Foucauldian concepts through systemat-

ic linguistic analysis, this study examines texts in their social contexts across three dimensions: linguistic features, discursive practices (how texts are produced and consumed), and broader social context.

My adaptation of the CDA methodology consists of two stages: macro- and micro-level analysis. The first is a corpus³ analysis based on a codebook constructed according to theoretical premises. I use theoretical codes (Saldaña, 2012) derived from field-specific literature, open codes from preliminary analysis, and distinct codes for social actors, genres, and rhetorical devices. Data collection parameters include temporal scope, geography of the publication, language, media types, search queries, database choices, and units of analysis (the latter are always words, phrases and sentences). Analysis via MAXQDA software reveals code distribution throughout the corpus, illuminating power dynamics and discourse patterns. The second phase is a macro-level analysis focusing on contextualisation, interpretation, and explanation of the corpus analysis findings.

As I alluded to before, the Roblox Gucci Garden event case study came out from a corpus analysis of a larger project examining public discourse around “Roblox” AND “fashion” from 2013 to 2022. This only query, used for data collection via Lexis UniAcademic, was chosen for two practical reasons: to create a manageable dataset and because Roblox is the world’s largest metaverse platform. The corpus included all news accounts from the general public media without geographical or language restrictions. After cleaning and further manual selection⁴, 855 texts from various countries and continents were coded. For further contextualisation of the coding results, other discursive materials, such as comments’ threads on social media (YouTube, Reddit and, formerly Twitter) around a given discursive event, were used.

The first phase of critical discourse analysis of news reporting on “Roblox” AND “fashion” worldwide revealed that public discourse framed metaverse fashion primarily as a niche finance and commerce topic. Only 17% of texts appeared in mainstream newspapers and 24% in traditional media, with the remainder distributed via weblogs,

³ Corpus is a collection of all texts eligible for examination.

⁴ Cleaning encompassed removing duplicates, reprints across different media, and non-mass media content such as company directories, business profiles, market research reports, and similar specialised publications.

newswires, and industry press. Corporate voices dominated the narrative — CEOs represented 45% of all social actors mentioned — while consumers were marginalised, accounting for less than 1% of social actors and typically assigned passive roles. News accounts frequently repeated sustainability claims for digital clothing and assertions about future consumer spending in the metaverse without supporting evidence, while rarely addressing the aesthetics of the fashion items themselves. The targeted audience niche appeared to be the business actors, such as venture capitalists and NFT investors. Some events, such as Gucci's Virtual 25 sneaker in 2021, brought business discourse into mainstream media but were frequently portrayed as hype or exotic. This was often associated with the speculative NFT market, and scepticism about future business prosperity in the metaverse was common.

It turned out that the Roblox Gucci Garden event is the most frequently referenced real-life incident in the corpus; since its occurrence in May 2021, this example has been cited whenever discussing the metaverse, both in fashion contexts and beyond. Given this study's focus on mythology construction through a single case study, the following section will not further discuss the complete corpus analysis results. Instead, it will examine the digital Gucci bag sold on Roblox and its transformation into a mythological signifier in the young system of metaverse fashion.

FROM A FAILED EVENT TO A LEGEND

The official Wiki section of the Roblox website (Wiki, n.d.) informs that the Roblox Gucci Garden event ran from May 17 to May 31, 2021, with Gucci as the sponsor. Players could purchase 31 branded items using the in-game currency Robux, including the Gucci Dionysus Bag with Bee, which was initially priced at the equivalent of \$5.94. The event generated 286,000,000 Robux (over three million USD) from initial collectable item sales.

Vogue Business claimed to “exclusively reveal” the details of the virtual two-week art installation:

Behold, a fantastical virtual Gucci Garden to wander through, offering immersion in the everything-goes universe of creative director Alessandro Michele. <...> Visitors enter through a virtual lobby in which their avatars can view, try on

and purchase digital Gucci items. Once inside the themed rooms, avatars are transformed into blank, genderless, humanoid-like mannequins (McDowell, 2021, para 1).

The author's idea was to create unique experiences by randomising visitors' entry order, allowing each avatar to develop a distinct appearance that could be screenshot and shared on social media. As one of the Roblox directors explained to *Vogue Business*, “This adds to a level of immersion that would match, if not exceed, what you see in the real world.” This all was for the sake of “building brand awareness among young customers”.

Despite the *Vogue Business* announcement, the public media would hardly have noticed the virtual event⁶ if events had not taken an unexpected turn. One of the limited-edition items offered in Gucci Garden was sold for a price exceeding that of its real-world equivalent. This sensation was caught by specialised blogs and spread via *Newstex*⁷. This is how, most likely, the news about the niche fashion-tech event penetrated the broader public discourse.

Whereas mainstream journalists were largely unaware of the Gucci Garden event at the time it occurred, the Roblox community followed, participated in it, and actively expressed their experiences via social media. The seminal bag transaction was even recorded and published on YouTube by the gaming vlogger *SharkBlox*, with 1.45 million subscribers under the title “This Gucci bag went limited!!!” (SharkBlox, 2021)⁸. Approximately 420-450 unique users participated in the conversation and left over 2,000 comments. The overall sentiment of the discussion was predominantly negative and frustrated; most comments were fuelled with anger, disappointment (“this is the worst event ever”; “THIS EVENT SUCKS!!!”), regret and FOMO (“I never had so much regret of not buying a bag”). The common opinion was that the event was “a classic marketing stunt,” with users warning others that “they are manipulating us into buying items.” Many saw it as a calculated move: “Before: lol boring event, After: if you

⁵ Rook Vanguard is a creator of Roblox user-generated content (UGC) who collaborated with Gucci while developing the Gucci Garden virtual environment (Hackl, 2021).

⁶ In the corpus, the single source – Indian Technology News – responded with a short dedicated account on May 18, 2021.

⁷ *Newstex* is a ‘leading provider of high-quality news and commentary about emerging trends in business, law, politics, lifestyle, technology, and more’ (About Newstex, n.d.)

⁸ All social media posts are presented with their original grammar, spelling, and punctuation preserved.

snipe a collectable thing you will get UNLIMITED ROBUX!” One user pointed to the platform’s transformation from “powering imagination” to “powering your mom’s credit card” – a reminder about the platform’s primary younger target group. Users initially dismissed the Dionysus bag when it was neither limited nor collectable, and everyone could buy it for a few Robux. The item was seen as merely “a stupid handbag with a bee,” with a simple, even “ugly” design as “just a mesh with a decal”, where Gucci “just slapped a bee jpeg onto this bag.”

Despite the initial blowback for the event, a day later, the purses immediately became a hot commodity, as reported by *Polygon* on May 21:

Roblox scalpers started selling the purse for ridiculous amounts of money, with some people listing the purse for 1 million Robux — seemingly knowing full well that nobody would buy it at that price point. But some people did end up paying hundreds of thousands of Robux for Gucci item (Diaz, 2021, para 5).

To my knowledge, this account published by the American entertainment website *Polygon*, owned by *Vox Media*, was the only source that reported the details of the Gucci Garden Event, specifically the negative perception and disappointment among the Roblox community, and the role of speculation and price fluctuations of the celebrated bag.

However, the spectacular virtual transaction incident, summarised in the French *Madame Figaro* (Pierron, 2022) as “a virtual Gucci bag (Dionysus GG model) was sold for more in the digital world than in the real world!”⁹, very soon became a habitual reference not only in metaverse fashion discourse but in the metaverse narrative in general¹⁰.

In the corpus, from May 2021 to the end of 2022, almost one-third of the texts mentioned the Gucci name¹¹, and slightly more than 10 per cent of all publications referred to a “bag”. No other event or specific fashion item received anywhere near as

many mentions as the virtual Dionysus Bag with Bee.

Pointedly, almost from the beginning, this material discursive event started losing its factual connections; even the name of the bag (Dionysus) and its detail (bee) would often be skipped, setting aside the speculative intentions underlying the whole affair. “I wonder who in Roblox came out with the idea of promoting kids to buy some expensive Gucci drip which they cannot afford IR”, questioned one of the Reddit users. Nevertheless, hardly any of the journalists or other social actors whose voices were quoted in the corpus addressed the absurdity of the situation – that Roblox is, after all, a gaming platform for children. Another peculiar fact about the virtual Gucci bag is that it has no practical use outside Roblox. Initially, the purse’s ‘uselessness’ was emphasised in some accounts. For instance, The New York Times (Olson, as cited in Klein, 2021), in its podcast, noted that the bag “is not an NFT. You can only use that on Roblox” – a point earlier raised by internet entrepreneur and investor Alexis Ohanian on X while the Roblox event was still running, which was later quoted in other media. Soon, this utility detail was dropped, and in texts from 2022, it was not repeated. Yet, from the perspective of mythology construction, this course of discourse development is logical. “Myth is a value, truth is no guarantee for it” (Barthes, 2009, p. 147).

In the mythologisation process, a sign’s historical meaning detaches from its original signifier and becomes a new signifier linked to what Barthes calls a *concept* – a higher-level signified. As Barthes explains, this concept is “a kind of nebula, the condensation, more or less hazy, of a certain knowledge” (p. 135). Therefore, the signifier has two aspects – “one full, which is the meaning” (the history of the digital Gucci Dionysus bag sold on Roblox) and “one empty, which is the form” (a mere reference to the occurrence).

As observations above reveal, almost immediately after the seminal Roblox transaction, the factual signification of the event rapidly began losing its historical details, becoming a more or less empty form – converting to the signification of something else. Let’s try to decipher what this something else is. “A Gucci bag sold for more than \$4,000 on Roblox, more expensive than its real version, a few months ago. An example of the appetite for fashion and luxury items” (Touzani, 2022, para. 1), noted a typical article discussing

⁹ Here and further, all non-English texts has been translated into English using Google Translate.

¹⁰ During the primary data collection, I encountered articles not included in the final corpus, where the digital Gucci bag and its price were merely mentioned without any further attention to fashion. Instead, these articles focused on broad business opportunities in the metaverse.

¹¹ The next after Gucci in popularity brand in the corpus mentions, Nike, has 1,5 times fewer counts while both companies are the industry pioneers very active experimenting in virtual fashion.

various high-value transactions in the metaverse, focusing on fashion, real estate, and digital assets. This brief allusion lacks details and is not factually accurate (the event occurred almost one year prior, not “a few months ago”) – a type of temporal and price inaccuracy that became increasingly common in later texts referencing the case.

The text’s authors, writing months after the event, tie the bag case to the popularity of fashion and luxury in the metaverse, overlooking the transaction’s speculative aspect. The factual discourse presented in the discussions on social media during the Gucci Garden event shows that participation in the event’s sale was driven by a desire to make money; one commenter said on X, “I hope there are still some items because I want one and get rich in just seconds.” The spectacular deal transcended to the commenter’s perception of the whole event as an opportunity to become a “millionaire pretty easily,” thereby manifesting another signification turn.

The extraordinary price of the clumsy virtual replica of the iconic luxury product does not fully explain the proliferation of information about it in broad public discourse. In the history of the metaverse, one can find much more stunning spending on fashion. Take the nine-piece collection of digital NFTs, Dolce & Gabbana’s Collezione Genesi, sold for a couple of million, making it the most expensive digital fashion collection to date. The case was reported, among other media, by *Le Figaro*:

In October, Dolce & Gabbana sold four virtual jackets for \$400,000 each. The “Dress for a Dream” dress went for nearly \$1 million — but the buyer also got a real-life replica of the garment, custom-made in the Milan ateliers (Woitier, 2021, para 5).

However, reference to Dolce & Gabbana’s NFT case was never so high as to the bag with a bee. It seems that in the Roblox Gucci Bag case, nobody expected how things would go during the Roblox event; therefore, we are dealing with a *contingency*. “Myth, – wrote Barthes (2009), – has the task of giving a historical intention a natural justification and making contingency appear eternal” (p. 168). Likely, this material discursive event is already on its way to becoming a myth. For “a myth ripens because it spreads” (p. 177).

Probably coincidentally, yet remarkably, within two days after the virtual Gucci bag was sold for a record price, digital artist Mason Rothschild auctioned off an NFT called *Baby Birkin*, priced at the equivalent of \$23,500.

“The Birkin Bag by Hermès is such a status symbol across the globe”, explained the artist in the interview (Silbert, 2021). “The value of a Gucci bag is also mostly symbolic”, a participant of one of the X conversations noted. “More than a bag itself, people desire what a Gucci bag represents to them (being rich, making it)”, continued another commenter. The status symbol argument, however, appears questionable when examined closely. It is a typical taken-for-granted assumption that people need status symbols in the metaverse as they do IRL (what about children who want to play on Roblox?). The discourse of ‘luxury’, ‘status’ and ‘symbol’ may serve as what Barthes terms an alibi, legitimising the speculative investments that characterised metaverse fashion in 2021–2022. The future will tell whether this mythical concept of a limited/collectable luxury item as a winning investment option will further transform into a mature myth.

CONCLUSION

The metaverse fashion discourse, primarily confined to economic, business, and financial media rather than mainstream news outlets, reveals a specific mythological appropriation pattern. While Generation Z, Generation Alpha, and their parents were positioned as virtual fashion’s intended users, the discourse sought legitimacy through business and financial authorities. Through the lens of Foucault’s power relations theory, this dynamic is evident in three key aspects: the subject matter (predominantly financial and business-focused), the channels of distribution (business and finance media), and the privileged voices (business actors and industry experts). The corpus analysis, dominated by business actors rather than young consumers, demonstrates how commercial powers appropriated and naturalised the concept of metaverse fashion, transforming it from a potential youth cultural phenomenon into a business narrative. This appropriation process strips the phenomenon of its original (or meant-to-be) cultural context and repurposes it to serve commercial interests, making their dominance appear natural and inevitable – a manifestation of what Foucault identifies as the subtle exercise

of power through knowledge production and discourse control.

Beyond its potential transformation into a mature myth of profitable investment (or of proven desire for status symbol and luxury among the metaverse users?), the Gucci Dionysus bag case offers rich ground for mythological analysis. This first exploration of metaverse mythology merely scratches the surface of possible interpretations that this digital item, sold for more than its physical counterpart, might generate.

To secure the future prosperity of fashion, we must recognise its emerging mythologies and understand their potential harm. The fashion industry in the metaverse remains a niche phenomenon, albeit one expected to grow. The critical question is whether it will merely expand as a space for speculation or genuinely reshape fashion for the better, as some optimistically predict.

The early myth of metaverse fashion was fundamentally about money rather than the fashion itself. As my corpus analysis of public discourse from 2013 to 2022 demonstrates, the positive environmental impact of metaverse fashion remains in the realm of optimistic expectations that lack supporting evidence. Yet, the sustainability argument could be significant for metaverse fashion campaigns, as the primary target audience — young people — represents the most environmentally conscious generation. Convincing them to engage in digital fashion, thus making the entire apparel industry more eco-friendly and innovative, would necessitate contingent material events to forge new mythologies, akin to how the viral Gucci bag incident served as an effective vehicle for business narratives.

Given the power dynamics revealed in this analysis, any meaningful transformation would require a critical reassessment of how virtual fashion discourse is constructed and controlled. Further research should explore other emerging myths within the metaverse fashion discourse, particularly those surrounding “inherited sustainability,” “stimulating creativity,” and “democratisation.”

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PLAY TO PROSPER IN FASHION: GIVE MY AGENCY BACK!

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Abstract

The fashion industry plays a major role in driving planetary decline, primarily through encouraging overconsumption and fast fashion. While the industry's impact is well-documented, less attention has been given to the role of consumers in sustaining these systems through their decisions and everyday practices. Engaging consumers in exploring the industry's complex challenges is essential, and playful experiences offer a promising perspective. This contribution investigates the potential of games to foster transformative change. It begins with an overview of Italian case studies, showing that while educational games on sustainable fashion can raise awareness, they often fall short of prompting lasting behavioural change. To address this, a game-based project was developed in collaboration with an Italian B-Corp focused on eco-social sustainability. Using a participatory approach, company staff joined a one-day workshop to map the fashion supply chain and co-create game mechanics, dynamics, and aesthetics. A prototype was tested with participants of diverse backgrounds, using pre- and post-gameplay questionnaires to assess changes in interest, knowledge, and practices. Preliminary results suggest that gameplay can influence perceptions and behaviours, though revisions are needed to include more actionable content and everyday best practices.

Keywords: *Games for change, Consumer behaviour, Fashion, Eco-social responsibility, Player accountability*

INTRODUCTION

Once celebrated for its creativity and cultural influence, currently the fashion industry is increasingly under scrutiny for its role in contributing to environmental and social challenges. Indeed, it is indisputably true that the fashion industry has evident responsibilities in contributing to the planetary downfall. Central to this critique is the industry's stimulation of overconsumption, exemplified by the rise of the so-called phenomenon of fast fashion. Usually, fast fashion products are designed for quick disposal to encourage consumers to purchase frequently and replace items just as rapidly.

Together with other textile-dominated fields (e.g. healthcare sector), textile production

is considered to be the most harmful one to the environment. Indeed, according to the last EU report (EEA, May 2024) textile production accounts for 20% of global clean water pollution, while only 1% of used clothes are recycled, with most being incinerated or landfilled.

In such a scenario lots of efforts have been devoted to challenges like product recyclability, dematerialization and traceability (Alves et al., 2023; Schauman et al., 2023) by enabling top down interventions, but minor attention has been paid to the leading role fashion consumers have in fueling the current fashion assets through their decision making processes, attitudes and daily practices (Garcia-Ortega et al., 2023). Indeed, many consumers remain only partially aware of

the fashion industry's negative impact. Studies like those by Morrison and Beer (2017) suggest that demographic factors such as age influence consumer attitudes toward sustainable fashion, while Mandarić et al. (2023) highlight gender as a key factor in awareness of sustainable practices.

Against this backdrop, there is an emerging interest in understanding how consumers can be empowered to challenge these destructive practices (Alves et al., 2023). This paper seeks to explore how games as a form of playful interaction might be harnessed to allow fashion consumers to exercise greater agency. By engaging consumers in literacy-oriented experiences, games could reshape their decisions and behaviours, offering new ways to navigate the complex and often opaque fashion industry.

To do so, first the contribution envisions the concept of prosperity fashion by investigating key components and the role of the stakeholders. Then, a brief state of the art about the use of games as a bottom-up literacy strategy is outlined. A specific focus is devoted to providing an overview of the design of playful activities in the Italian landscape. Later on, a game design case study and its methodology are illustrated and a preliminary research field experiments presented. In the end, authors discuss the results in light of the research objective, that is to demonstrate that games can serve as an impactful tool in terms of fashion consumers' awareness.

DEFINING AGENCY WITHIN THE FRAMEWORK OF PROSPERING FASHION

To gain how extensively fashion impacts planetary wellbeing (Wilde et al., 2022), hereafter we briefly enlist four issues which mutually contribute to the definition of fast fashion as a wicked problem (Buchanan, 1992) from a perspective which extends beyond the human gaze.

Resource consumption. Textile production requires vast natural resources, particularly water and land, through various stages, such as agricultural cultivation, machine cleaning, and wet processing. For example, according to Asmi et al. (2022) each pair of denim jeans produced results in 33.4 kg of CO₂ emissions, consumes 3,781 litres of water, and requires 12 square metres of land for production.

Waste production and pollution. Defined as waste couture (Claudio, 2007), the EU textile

market produced 6.95 million tonnes of textile waste in 2020, averaging 16 kg per person, with only 4.4kg per person separately collected for reuse or recycling (EEA, May 2024). About 82% of this waste was from post-consumer textiles, while the rest came from manufacturing or unsold items.

Erosion of human rights. To keep fast fashion products affordable, textile production is often outsourced to under-resourced communities, such as low-income, low-wage workers, predominantly women, in low- and middle-income countries (LMICs). In addition to being underpaid, textile workers are increasingly exposed to life-threatening environmental and occupational hazards, which occur before, during, and after the production process (Bick et al., 2018).

Spread of an unrepresentative culture. In the name of the "illusion of democratisation of fashion" (Atik et al., 2022), the clothing production defines beauty ideals by pursuing a logic of Western standardisation rather than of representation. This shift leads to different intersectional forms of discrimination. For example, the current one-size-fits-all model of production reflects a lack of diversity in terms of body shape which can result from age, ethnicity or health conditions (Cavusoglu et al., 2023).

In light of this, we propose a framework to challenge the current fashion system and to envision how to feed prosperity within the textile production field. In our vision, prosperity in fashion finds itself at the intersection of three circles (Fig. 01).

Ethical economy refers to economic practices that prioritise fairness, transparency, and responsibility toward workers, consumers, and the environment. In fashion, this reflects in: fair labour practices by ensuring that workers throughout the supply chain are paid fairly, work in safe conditions, and are treated with dignity; responsible consumption and production by reducing waste, overproduction; focusing on quality over quantity, creating products that are made to last.

By accessibility we refer to making fashion inclusive and available to a broader range of people. This could encompass several aspects such as affordability by ensuring that sustainable and ethically produced fashion is not just for those with higher incomes, but accessible to people with various financial means. In the same way accessibility can be understood as transparent information to enhance knowledge accessibility for consumers to



Fig. 01

have access to clear information about the sustainability, ethics, and quality of the products they buy, so they can make informed choices.

Lastly, environmental sustainability emphasises reducing the fashion industry's ecological impact and conserving resources. This involves choosing sustainable materials, such as renewable, organic, or recycled options, to limit environmental harm. It may also include minimising waste by adopting zero-waste designs, upcycling, and recycling old clothing. Efficient use of water and energy is another key aspect, cutting back on resources and pollutants in production processes like dyeing. Lowering emissions is also essential, achieved by optimising manufacturing and transportation and sourcing materials locally whenever possible.

In this framework it is essential to consider three key stakeholders who play a crucial role due to their significant influence and vested interest in the fashion industry — designers, consumers, and companies. Through their choices in terms of decision-making process within their competency-related areas of the fashion ecosystem, all these stakeholders can become fashion activists in the sense of “agents of appropriate change” (Banerjee,

2008). This implies going beyond the more traditional role of designers as “aesthetic providers” (Murzyn-Kupisz & Hołuj, 2021), consumers as passive subjects and companies as only for profit focused organisations.

DESIGN-BASED INTERVENTIONS FOR EMPOWERING FASHION CONSUMERS: AND GAMES?

From fashion consumer's point of view, their commitment towards fashion activism can be practised by positioning themselves as wearers capable of independently and freely choosing whether to maintain or reject the current design–production–distribution–consumption model (Lange, 2019). In this perspective, engaging fashion wearers in uncovering wicked problems related to the fashion industry is crucial. By raising awareness, we can foster a shift in mindset that emphasises individual accountability. This heightened responsibility can drive positive behavioural change, leading to a more sustainable and equitable choice that benefits every agent involved in the system.

There are several ways to engage fashion consumers through design-oriented actions. Mazzarella (2023) argues that fashion activism can be led through participatory design processes, while Hackney et al. (2019) experimented with affective design to relocate clothing behaviour and relationship with fashion. However, while valuable in incorporating diverse perspectives, this kind of design-led approaches might result to be ineffective as they inadvertently tend to lead to a top-down knowledge transfer. As a result, participants may feel the responsibility of being concerned about the impact of their wearer-clothing relationships (Neto & Ferreira, 2022) without being deeply engaged with it. The formal and serious nature of this approach can restrict creativity and reduce wearers' sense of ownership, which are essential for fostering deeper understanding of complex topics like sustainability in fashion.

Since shifts in wearers' behaviour are slow to change (Nguyen, 2024), innovative strategies are essential to inspire individuals to adopt more sustainable fashion choices, driving positive change within the industry. According to Tassell et al. (2022), sustainable behaviour can be achieved through the arousal of positive mental states which can serve as behavioural triggers.

In light of this, game-based activities

present a favourable model by inviting participants to explore sustainability issues through play, enjoyment, discovery, and experimentation. Because play is intrinsically enjoyable, people are motivated to continue exploring and learning without the need for external rewards and this increases intrinsic motivation, which is essential for behavioural change (Csikszentmihalyi, 1990). Moreover, an advantage of game-based activities lies in its social and collaborative framework, which supports peer-to-peer learning. Participants engage with each other directly, sharing insights, discussing strategies, and collectively addressing sustainability challenges (Ginsburg, 2007, Blackmon, 1994, Ryan, Rigby, & Przybylski, 2006). This dynamic interaction enhances the learning experience, fostering a sense of community and shared purpose that is difficult to achieve in the more formal, structured setting of other design-led approaches.

Despite the potential of games to influence the fashion industry, currently there is a lack of literature exploring the intersection of gaming and fashion activism. Indeed, gamification is usually intended as a marketing strategy opportunity for fashion brands (Noris et al., 2023) or as a digital media phenomenon which enables fashion in becoming both culture and play in a virtual space (e.g. metaverse) to deeply engage with online communities (Wanick & Stallwood, 2023).

THE USE OF PLAYFUL EXPERIENCE IN FASHION: AN OVERVIEW OF CASE STUDIES IN THE ITALIAN LANDSCAPE

Fashion is a symbol of the Italian economy as it represents one of the most well-known specialisations of Made in Italy. According to one of the latest research of the Italian observatory Symbola, Italy is the first exporter in the EU and the second in the world, after China (€347 billion), of products from the Textile, Fashion and Accessories (TMA), with an export value of €66.6 billion. With its 36 fashion districts, Italy has major responsibilities in contributing to the eco-social impact of the fashion industry.

In light of the objectives of the current study, we performed desk research to survey the use of playful activities in the Italian landscape, targeting fashion consumers as primary users. Four case studies can be mentioned as interesting in the perspective of actively engaging fashion consumers: a) Declù is a role-playing game developed by

Trama Plaza, a volunteer-based association based in Milan, which encourages collaboration among players, who must work together and make sustainable decisions to succeed; b) Vesti il Futuro (<https://vestilfuturo.manitese.it/>) is an educational initiative designed by Mani Tese with the aim of involving Italian schools through 3 mini games, which simulate fashion industry dynamics to invite participants in examining the effects of fast fashion; c) Facciamo Shopping, developed by Reattiva, is an educational game intended to raise awareness among young people about consumerism, where participants engage in virtual purchasing where they must choose between fast fashion items and sustainable options; d) Wear a Change (<https://www.weareable-fashion.eu/it/>) is an initiative by We are Able, offering a toolbox of resources for sustainability in fashion. While not a game per se, it provides educational materials and practical activities for young adults and students.

While these educational games on sustainable fashion can raise awareness and encourage reflection, they may struggle to create lasting behavioural change. Key limitations include the temporary and unrepeatable experience, which may not lead to habitual change, and a gap between simulated scenarios and real-life consumer decisions, where convenience and cost prevail. The focus on individual actions over collective and systemic issues may also limit impact, as large-scale sustainability requires both industry and policy shifts. Additionally, the simplified narratives within these games might oversimplify complex issues. Lastly, the lack of scalability and accessibility of these initiatives can limit their broader societal influence.

Improving these aspects could enhance their effectiveness in promoting sustained sustainable consumption. For this reason, we decided to engage with a game design process, which could deal with highlighted pain points.

THE CASE STUDY OF “FODYNEST: WEAVING THE CHANGE”

In what follows we present an ongoing project with the Italian B-Corp startup Fody, based in Pistoia (Italy). In our vision, Fody embodies the framework illustrated above since the mission of the company is to implement activities with a high eco-social impact, creating value for people and the environment.

RESEARCH METHODOLOGY

Co-exploration and co-creation with Fody

A participatory research approach was chosen as a methodology driving the project. For this reason, Fody staff was involved as design partners in the first stage of the design process. To collect insights both regarding Fody's workflow and strategic decisions, a one-day workshop was organised.

The objective of the activity was the co-exploration of fashion supply chains in order to gain a deeper understanding of how the Fody supply-production chain differs from the most traditional fashion chain. To do so, participants were involved in a journey mapping activity.

By writing down on different coloured post-it, they were asked to pinpoint five key aspects of the design–production–distribution–consumption model:

- a) stakeholders; b) touchpoints; c) raw materials;
- d) means of transport; e) wastes.

The workshop included a sequence of four activities (Fig. 02):

- Mapping of standard fashion supply chains and Fody supply chain;
- Identification of win and pain points;
- Discussion of the emerging opportunities, challenges and limitations of both the supply chains;
- Exploration and envisioning of game features according to Fody's mission.

As a result of the workshop we collected many inspiring insights to be converted into game design mechanics, dynamics and aesthetics (Hunicke et al., 2004) as well as game contents. Below we sum up with the most significant value-driven messages, which Fody decided to pursue and aspire to spread as a work organisation operating towards a more eco-social oriented fashion industry:

- *Repurposing rather than dismissing*: Fody offers an alternative form for early disposal waste to textile-based companies by collecting their inventories (e.g. unsold stock, production waste) and transforming them into new products;
- *Making for profit-driven company purposes sustainable through non-profit actions*: although Fody operates as a for-profit entity, it balances this by engaging in non-profit actions. For every textile product sold in B2C or B2B markets, they produce an equal quantity of



Fig. 02

items—mainly blankets—which are donated to communities in need, such as refugees or animal shelters;

- *People empowerment through work experience*: Fody prioritises employing individuals who face systemic barriers to employment, such as those with disabilities or older adults often excluded by traditional companies. This commitment fosters social sustainability by empowering marginalised individuals through professional inclusion programs.

Game design

“FODYNEST: Weaving the Change” was developed as a tabletop game for eco-social change in fashion. To foster engagement and critical thinking—helping players not only retain data but also internalise best practices—FODYNEST is designed as a competitive management game. Players assume the role of a company executive who has to carry on business interests while optimising resources sustainably. Each round, players can place their worker tokens on various board locations to collect textiles, produce goods for sale or donation, expand their team, or enhance

production with new machinery. The objective of the game is to collect as many points as possible to scale the scoreboard and win the game (here you can find the whole game rules: https://docs.google.com/document/d/1bWRZEyaA8HA-POS-QfY5S6m-jRGJgrY6rGT6TSd_XVGk/edit?usp=sharing).

The design of some game mechanics and dynamics has been inspired by the production model of the Fody in order to demonstrate how profit can be ethically and sustainably achieved through conscientious decision-making. Below are some examples of how a set of game mechanics were designed to act as activators and facilitators of eco-social change.

- *Sustainability awareness through tactile experiences*: each player begins with basic resources, including a textile card displaying fabric on its cover and a sustainability index on the other. When in the material gathering phase, players can add textile tokens to their resources, draw a new textile card from the deck and guess their level of sustainability only by touching the fabric-made cover. The design intent here is to reinforce both material recognition and to stimulate the habit of questioning a fabric's origin and environmental impact in players.
- *Social responsibility rather than technology supremacy*: Production game mechanics mirror Fody supply chain by dividing goods into for-profit and nonprofit items, encouraging a balance between economic and social objectives. The game dynamics associated with human and technology enabling resources (e.g. machinery) further emphasise the importance of creating an eco-social and work ethical model. For example, workers progress through workshops, internships, and employment stages, unlocking bonuses. Additional bonuses are awarded by matching workers' preferences with specific tools, highlighting their individual value.
- *Information and best practices knowledge transfer through quiz and either/or situation*: in order to gain coins or points players could tempt fate by drawing a card by two decks. The first contains true or false or multiple choice quizzes about sustainability in fashion, while the second poses players in front of a choice between more sustainable versus economically beneficial actions. The game is balanced to

stimulate critical thinking and to demonstrate that sustainable choices ultimately lead to success, even if initially less profitable.

Game prototype

Aligned with the sustainability objectives set by the game design, we created the first physical prototype using Fody. During the workshop, we gathered offcuts from Fody's production, consisting of various textile materials. Smaller pieces were used to create tactile fabric cards, while a larger piece was used to prototype the board game.

FIELD EXPERIMENTS THROUGH PLAY SESSIONS

To prove whether engaging fashion consumers in a playful activity could be an effective way to foster their attitudes towards more sustainable practice, we involved 18 people, aged 22-38, in 5 play sessions. Data were collected through a mixed method in order to verify the research hypothesis and to evaluate participants' experience as players. This preliminary field research was performed at Santa Chiara Fab Lab (Siena, Italy) and each play session was structured as follows.

First, participants were asked to sign an informed consent form and to fill a self-evaluation grid before the play session started. Inspired by the tool of conflict spectrum (Kraybill, 2004), the grid has been designed to help participants assess their levels of engagement, knowledge, and practices related to sustainability in the textile industry. The grid consists of three gradient colour horizontal bars, each representing a different area for self-assessment. Participants were asked to position their figure on this scale to rate themselves on each dimension.

Once completed this step, a facilitator introduced the game instructions. Consciously, we decided not to reveal the game objectives and design process in order to reduce sources of bias which could influence participants' behaviours within the game and in expressing personal opinions or overall feedback. When confident with the game mechanics, participants played a mean of 6-7 game rounds (Fig. 03).

At the end of the game, participants were asked once again to fill the grid. The objective of the second self-evaluation was to understand how participants' assessment rates differ in each dimension after having played "*FODYNEST: Weaving the Change*". In this perspective, visualisation of the position variance of participants' figures



Fig. 03

can serve as a first indicator to monitor the impact of implementing playful activity in enhancing fashion sustainable practices.

In light of an iterative game design process, we involved participants in a 15 minutes focus group. The session covered the following questions to stimulate the narration about the gaming experience:

- How did you experience the game? Is there any you would like to modify? Would you play the game again?
- In your opinion, which are the objectives the game intends to achieve?

RESULTS

Results show that, by the end of the play session, 17 out of 18 reported an increased level of interest in fashion sustainability (Fig. 04). This outcome supports our hypothesis that games are powerful and critical tools for fostering awareness within civil society and its communities. Notably, the competitive dynamic embedded in the game design proved to be a key element of engagement, as participants fully embraced their roles as company leaders, thereby deepening their involvement. Moreover, they frequently asked if there would

be any chance to play once again or whether they could explain the game features and rules to people who may be interested in such issues and games.

Regarding participants' level of knowledge, only 4 participants significantly improved their self-assessment. This outcome may reflect limitations in the design of the game's informational content. Specifically, the data-driven information presented in the game was perceived as overly analytical and distant from participants' lived experiences, making it difficult for them to grasp the real-world significance and quantify the impact of the data. To address this, future iterations of the game should incorporate content redesign strategies (e.g. use of metaphors and similes) that make information more tangible and relatable. These adjustments could foster greater empathy and understanding among players.

There was no substantial change in participants' self-assessments of their future sustainable fashion practices. While some participants acknowledged that the game heightened their awareness of problematic practices in which they might engage, they also noted that the game lacked positive reinforcements by failing to suggest actionable good practices. During the focus group,

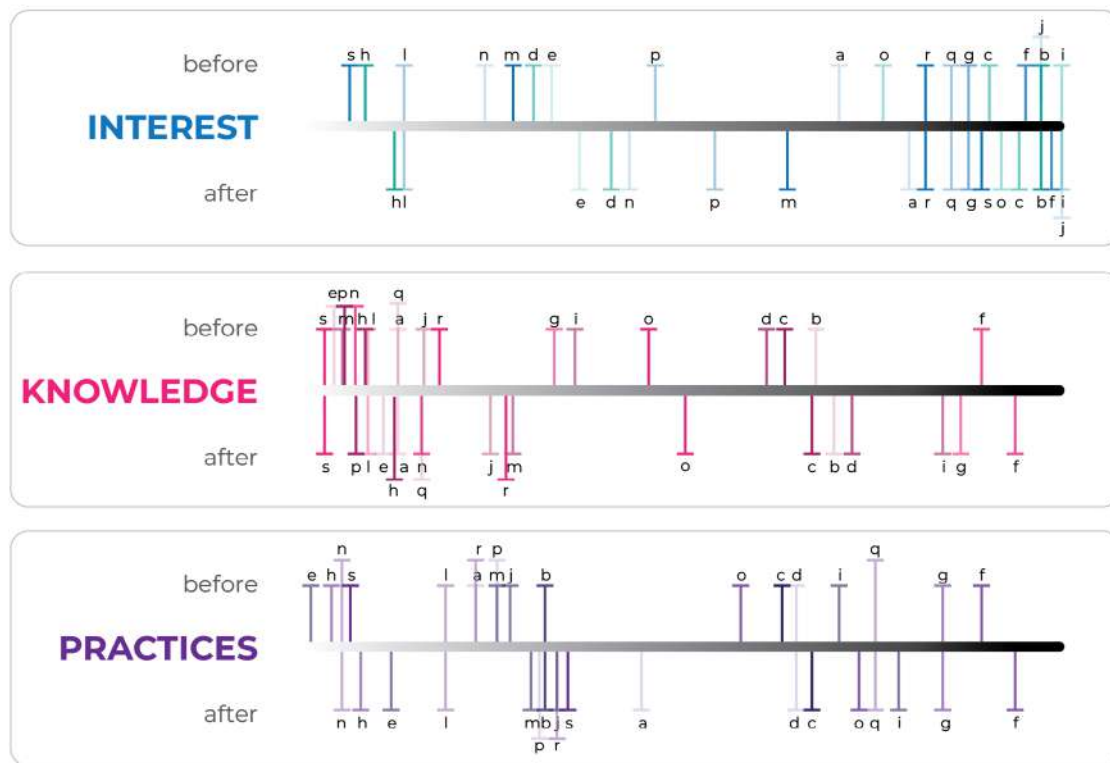


Fig. 04

participants highlighted the need for game content to include solutions and practical guidance to encourage behavioural change. However, participants affirmed that recognizing material levels of sustainability through the experience of touching inspired them to replicate the same action before purchasing any textile product.

CONCLUSIONS AND FUTURE DIRECTIONS

This paper underscores the urgent need for transformative action within the fashion industry, which continues to contribute significantly to environmental degradation and social inequity. By framing prosperity in fashion through the lenses of ethical economy, accessibility, and environmental sustainability, we highlighted the necessity of reimagining the roles of key stakeholders—designers, consumers, and companies—as agents of change. Moving beyond traditional roles, these stakeholders must actively engage in shaping a sustainable and equitable fashion ecosystem.

In this perspective, we identified game-based approaches as a promising way to promote literacy and inspiring behaviour change,

focusing on the figure of fashion consumers. Games' intrinsic enjoyment fosters sustained engagement, while their social dynamics support peer-to-peer learning and collective action. By positioning games as catalysts for fashion activism, this work opens pathways for empowering consumers to critically engage with the fashion system.

To experiment with this hypothesis, we designed a board game called "*FODYNEST: Weaving the Change*" by involving the Italian B-Corp startup Fody. Once prototyped, we tested it through play sessions. The objective of this preliminary field research was to monitor the impact of implementing playful activity in enhancing interest, knowledge acquisition and practices towards fashion sustainability.

Results of the "*FODYNEST: Weaving the Change*" play sessions suggest that games can effectively foster awareness and engagement with sustainability in the fashion industry, particularly through competitive dynamics and tactile interactions. By the end of the sessions, participants reported an increased interest in sustainable practices, affirming the game's potential to provoke reflection and stimulate critical thinking.

However, the findings also highlight areas for improvement. While the game successfully sparked curiosity and emotional connections—especially through tactile experiences with textile materials—it struggled to convey actionable practices for lasting behavioural change. Participants recommended integrating more relatable information, actionable solutions, and collaborative mechanics to better reflect the collective effort required for systemic change in the fashion industry.

In conclusion, “*FODYNEST: Weaving the Change*” shows promise as a tool for engaging consumers with the complexities of sustainable fashion, but further iterations are necessary to increase its impact. Future actions will be devoted to involve fashion sustainability experts in co-designing game contents and strategies to make sustainability principles more tangible and relatable, embedding positive reinforcements to encourage behavioural shifts. This iterative process will ensure that the game evolves into a powerful transformative tool for fostering eco-social change.

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CAPTIONS

[Fig. 01] Visualisation of a framework to prosper in fashion © Letizia Vaccarella

[Fig. 02] Mapping activity during the workshop with Fody staff © Giulia Teverini

[Fig. 03] Participants during a play session © Giulia Teverini / Letizia Vaccarella

[Fig. 04] Overall visualisation of participants' self-assessment © Letizia Vaccarella

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CIRCULARITY

A DIGITAL APPROACH TO SLOW FASHION

MAPPING SECOND-HAND STORES IN PORTO

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Abstract

This paper discusses the design of “I finded,” a mobile app aimed at mapping and promoting second-hand clothing stores within Porto’s historic centre. Developed as part of a master’s thesis at the University of Porto in 2023, the app addresses the rising interest in second-hand clothing and the limited awareness of such shops in Porto. Given the fashion industry’s significant environmental impact, the project encourages sustainable shopping choices to support eco-conscious consumer behavior and environmental sustainability. The app’s main goal is to make second-hand stores more accessible, featuring a consistent store page format with a summary, image carousel, style description, target demographics, customer reviews, location with map, and contact details. Research methods included questionnaires, interviews, visual analysis, and observation, with a focus on inclusivity, diversity, and usability in design. Two shops, “Kilo” and “Com Sotaque,” served as test cases, each offering unique aesthetics within the second-hand market. By integrating sustainability into design, this project aims to promote environmental conservation and encourage a sustainable future. The app represents a concrete outcome, with the next step being potential collaborations with local institutions to bring it to life.

Keywords: *Second-hand shops, Slow fashion, Sustainability, Conscious consumption, Porto circuit*

INTRODUCTION

The fashion industry, long criticized for its significant environmental impact, is increasingly exploring sustainability solutions, one of which is the rising “second-hand” market. This market emphasizes the resale of pre-owned items as an alternative to new purchases, with a notable focus on fashion and clothing. The second-hand approach is gaining traction in many countries as consumers seek more environmentally and economically responsible choices.

Research conducted in the context of ifinded research in the city of Porto, has shown that perceptions about second-hand fashion are often influenced by three main biases: prejudice, concerns over quality, and financial insecurity.

However, an array of second-hand options catering to various tastes and budgets is gradually dispelling these myths, encouraging more people to reconsider outdated stereotypes.

One area experiencing substantial growth is the luxury second-hand market. Initially, owning second-hand luxury items was met with skepticism, often stigmatized by sentiments like “Who buys used items?” or “Why buy used if you can afford new?” Such views are increasingly outdated, as the second-hand luxury market embodies deeper social and environmental values that go beyond these superficial notions.

This shift reflects a broader change in attitudes: many now see value in decluttering wardrobes and selling items that would otherwise

sit unused and depreciate over time. According to Assunção (2021), this trend spans generations but manifests differently across age groups. Young adults are engaging by investing in their first designer pieces, marking a milestone purchase, while older consumers are approaching fashion with a focus on refinement and mindful consumption. As Assunção notes, "...today, people think differently, from an 18-year-old buying their first designer bag to a 60-year-old who no longer sees the need to have so many items sitting unused in a closet."

Several factors contribute to the persistence of fast-fashion consumption, notably the ease and affordability of buying new. Few people consider second-hand gifting, often associating it with financial constraints or inferior quality. This mindset perpetuates the fast-fashion cycle, characterized by impulsive consumption and environmental disregard. Yet, those who break free from this cycle recognize the benefits of sustainable shopping, a perspective that needs to reach a broader audience.

This shift in consumer behaviour is closely linked to the growing emphasis on sustainable shopping practices. Sustainable shopping refers to purchasing habits that prioritise environmental and social responsibility, aiming to reduce waste, minimize overproduction, and extend the life cycle of products. Within this context, second-hand shopping emerges as a key strategy: by buying pre-owned items, consumers help to lessen the demand for new production, reduce textile waste, and decrease the overall carbon footprint associated with fashion. Rather than contributing to the fast-fashion cycle, second-hand shoppers actively participate in a more circular economy, where reuse and thoughtful consumption take precedence over constant acquisition.

The second-hand market continues to grow rapidly, with signs pointing to further expansion. According to ThredUp's 2023 Resale Report, the market is projected to reach a total value of \$351 million by 2027, up from its current \$117 million. This growth reflects a positive trend toward increased environmental consciousness and budget constraints, leading major brands to cautiously enter the second-hand space.

Retailers acknowledge that sustainability, revenue, and brand loyalty are key advantages of resale, with second-hand sales also providing a safeguard against counterfeiting ("57% of young

Portuguese are open to buying second-hand products," 2023). Young consumers, particularly Generation Z, have been at the forefront of this movement, challenging norms and advocating for environmentally and socially aware practices.

A survey by Wallapop, featured in "Grande Consumo" (2022)¹, revealed that frequent second-hand shoppers gradually feel more secure, satisfied, and conscious, reinforcing the value of sustainable habits: "(...) when respondents make second-hand purchases more frequently, they feel less insecure and suspicious, and they start to feel more conscious, satisfied, useful, and intelligent."

The COVID-19 pandemic² further accelerated this market's growth by shifting consumer behavior. With borders closed and limited access to new goods, online searches for second-hand items surged by 572%, as reported by "Terra" in Brazil (2022)³. This surge demonstrated that e-commerce facilitated continuous access to pre-owned luxury items, sustaining consumer interest during challenging times.

In Portugal, the arrival of the Vinted app in 2021 marked a significant milestone for second-hand fashion. This platform, available across Europe and boasting over 40 million users, offers secure transactions and quick access to second-hand clothing, thus broadening the reach of sustainable fashion.

Recognizing these shifts, fast-fashion retailers have also begun adapting. For example, *Zara* relaunched an online platform in late 2022 that allows customers to sell, repair, or purchase second-hand *Zara* items. According to Ampuero (2022), this initiative supports a "circular consumption strategy," extending the life of garments and curbing the demand for new production.

This introduction underscores the evolving landscape of second-hand fashion, marked by shifting attitudes, market growth, and industry adaptation, all contributing to a more sustainable future.

1 57% of young Portuguese people are willing to buy second-hand products. Grande Consumo.

2 The impacts of COVID-19 on the fashion world. UFJF Notícias

3 Online consumption of luxury second-hand items is boosted by the COVID-19 pandemic.

CONSUMPTION AND SECOND-HAND MARKETS

The textile industry has far-reaching and significant negative impacts, both immediate and long-term. The documentary “The True Cost”⁴ profoundly influenced the author’s views on clothing consumption by shedding light on the full lifecycle of the fashion industry—from initial production to runway showcases, consumer behaviour, and ultimately, the disposal of garments in global landfills. It prompts viewers to ask crucial questions: Who makes our clothes, and under what conditions? The documentary uncovers the grim reality of this industry, highlighting that while the price of clothing has plummeted over the years, the human and environmental toll has escalated sharply. As noted in the film, “the cost of clothing has decreased over decades, while human and environmental costs have risen dramatically” (The True Cost, 2015).

Brands are increasingly recognizing that consumer behavior is shifting toward more sustainable and conscious practices. Carvalhal (2016) insightfully observed, “. . . I said that the natural selection of brands would occur based on relevance, and that life would demand truth, authenticity, and purpose from them. Today, I add another tag to this list: consciousness.”

If major companies are adapting to this new awareness, perhaps it is time for individuals to do the same. The process starts by examining and questioning our own habits. The book “F**k Fast Fashion”, published by Trapeze (2020), serves as a practical guide, offering 101 actionable ways to transform purchasing behaviors and contribute to the planet’s well-being. One of its most straightforward yet impactful suggestions emphasise buying vintage clothing.

While purchasing second-hand items is not entirely without environmental impact, it greatly minimizes the footprint compared to buying new. Vintage shopping helps extend the lifespan of existing garments, reducing waste and the emissions linked to producing new items. This practice not only preserves resources but also champions a culture of reuse that challenges the fast-fashion model.

Notably, the 2023 Met Gala showcased several influential figures re-wearing previously seen outfits, demonstrating that even at one

of fashion’s most high-profile events, sustainable choices are celebrated. The Instagram accounts @environment and @impact, which focus on social impact, climate news, and environmental topics, highlighted these instances, proving that sustainable fashion can hold a place on the global stage.

To support this shift toward more sustainable consumption, the app “I Finded” was developed to help users locate second-hand stores in their vicinity. By providing a user-friendly way to find shops that align with their preferences, “I Finded” makes sustainable shopping more accessible. This app, available to anyone with a smartphone, helps users easily search for second-hand clothing options tailored to their needs, streamlining the process for those who might not know where to begin and emphasizing a commitment to eco-friendly consumption.

METHODOLOGY

This study focuses on developing an application for the second-hand clothing market by integrating UX/UI design principles and Design Thinking methodology to deliver an optimal user experience. The project originates from the need to challenge and reduce prejudice associated with second-hand clothing while facilitating easier access to such products. The research follows the core phases of Design Thinking: empathy, definition, ideation, prototyping, and testing.

EMPATHY PHASE

The initial phase, *empathy*, aimed to deeply understand the target audience by exploring their perspectives and pain points related to second-hand clothing. The initial sample was identified as the owners of second-hand shops, with the remaining participants recruited through the snowball sampling technique. In total, 73 people were interviewed. Qualitative methods such as interviews and questionnaires were employed to gather insights. Findings highlighted major challenges, including the social stigma around second-hand clothing and limited knowledge about where to find these products or their origins. This phase provided essential insights that guided subsequent steps, ensuring user-centric development.

DEFINITION PHASE

In the definition phase, data from the empathy stage were synthesized to form a clear understand-

⁴ “The True Cost” is released to address the real cost of fashion today. Fashion Network.

ing of user needs. The research emphasized the importance of showcasing the quality, uniqueness, and sustainability of second-hand clothing to overcome negative perceptions. This phase helped establish the core objectives for the application, focusing on addressing user concerns such as product hygiene, authenticity, and detailed information on provenance.

IDEATION PHASE

During the ideation stage, brainstorming sessions led to a range of ideas, including innovative ways to enhance user navigation and interaction. One key refinement involved reversing the typical content hierarchy within the application to streamline user journeys and make navigation more intuitive. This phase prioritized solutions that align with user preferences for seamless exploration and information clarity.

PROTOTYPING PHASE

Prototyping began with preliminary hand-drawn sketches to establish foundational design concepts. These sketches evolved into wireframes and, eventually, a digital prototype that allowed for basic usability and navigation flow testing. The progression from low-fidelity to high-fidelity prototypes enabled the iterative development of the application's interface, ensuring that user feedback could be easily incorporated.

TESTING PHASE

Due to time and logistical limitations, full-scale testing was not completed. However, the testing phase remains a crucial component for refining the application based on real user interactions and feedback. To gather preliminary insights, a survey conducted via the author's social media provided validation for the project concept. Results indicated strong interest in second-hand clothing, especially among young consumers, but also pointed out persistent barriers, such as stigma and insufficient communication about product quality and origins.

FINDINGS FROM QUESTIONNAIRE DATA

The data gathered from the questionnaire highlights the difficulties users face in locating second-hand stores and items that align with their personal style. The findings also reinforce the importance of transparent communication regarding the provenance of items and their preparation for resale, particularly to address consumer concerns about hygiene and quality.

In conclusion, the study indicates that the second-hand fashion market has significant potential, especially among younger generations seeking sustainable and distinctive clothing options. The proposed mobile application aims to overcome existing barriers by providing reliable information, dispelling common prejudices, and simplifying the search process. By addressing current gaps in the market, the app could contribute to a shift in consumer perceptions and increase both the accessibility and appeal of second-hand fashion.

PROJECT OVERVIEW: DESIGNING THE APP

The development of the app centers on creating a user-friendly platform that bridges the gap in the second-hand clothing market while challenging and reshaping common misconceptions. By focusing on both functionality and educational content, the app is designed to shift consumer perceptions about second-hand clothing, emphasizing quality, style, and sustainability (Fig. 01).

FUNCTIONALITY AND PURPOSE

The app was conceived to dispel the myth that second-hand clothing is inherently old or of inferior quality. A survey conducted for this project revealed that many consumers avoid second-hand shopping due to this stereotype. To address this, the app presents curated information showcasing how featured stores select items based on quality, durability, affordability, and diversity, including niche offerings. This ensures users can shop confidently, knowing their purchases align with their standards and values.

NAMING AND BRAND IDENTITY

Choosing a memorable and approachable name was crucial for the app's success. "I findd" plays on the phrase "I found," creating an accessible and quirky brand that resonates with users. Despite the unconventional grammar, this playful twist sparks curiosity and helps establish a connection with the audience, embodying the app's innovative spirit and approachability.

VISUAL DESIGN AND AESTHETIC CHOICES

The app's visual design draws inspiration from pastel colors reminiscent of the Renaissance era, blending these with bright, energetic tones. This

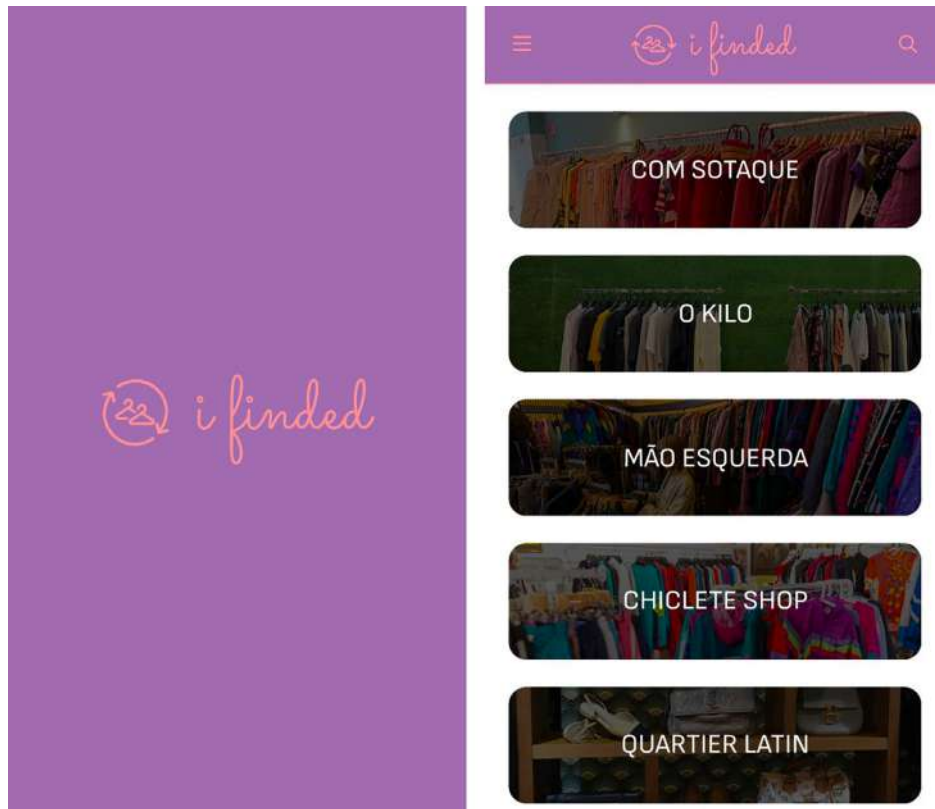


Fig. 01

selection reflects the varied, eclectic nature of second-hand fashion, which often features a wide range of colors, patterns, and textures. The use of “Candy Colours,” popular in fashion and design since 2020, adds a contemporary touch that evokes positivity and energy.

Pastel tones are known for their dual nature: vibrant yet calming, making them perfect for promoting a welcoming, fresh, and inviting aesthetic. The app’s interface design uses these colors alongside clear, classic sans-serif fonts to ensure optimal readability and contrast. As Joly (2015) points out, the visual appeal of structured font and layout guides the user’s eye through an intuitive hierarchy, making navigation seamless (Fig. 02).

INCLUSIVITY AND REPRESENTATION

Special attention was given to curating a diverse range of images representing different genders, body types, sexual orientations, and ethnic backgrounds. The goal is to foster inclusivity and make users feel seen and represented. This aligns with the app’s mission to be a safe and welcoming space for all.

IMAGE-CENTRIC APPROACH

Recognizing the powerful role of imagery in modern communication, the app’s design incorporates visual content as 80% of its material. This strategic emphasis not only enhances user engagement but also provides a richer, more interactive experience. Store profiles feature photos of shop interiors and sample items, allowing users to gauge whether a store aligns with their tastes and expectations.

“We are ‘consumers of images’; hence, we must understand how images communicate and convey their messages; we cannot remain indifferent to one of the tools most dominant in contemporary communication.” (Joly, 2015)

LOGO AND CIRCULAR ECONOMY CONCEPT

The app’s logo symbolizes the principles of a circular economy⁵, embodying the idea of reusing, repurposing, and recycling to extend the lifecycle of products. This approach underscores the app’s mission of promoting sustainable consumption,

⁵ Circular Economy: Definition, Importance, and Benefits. European Parliament.

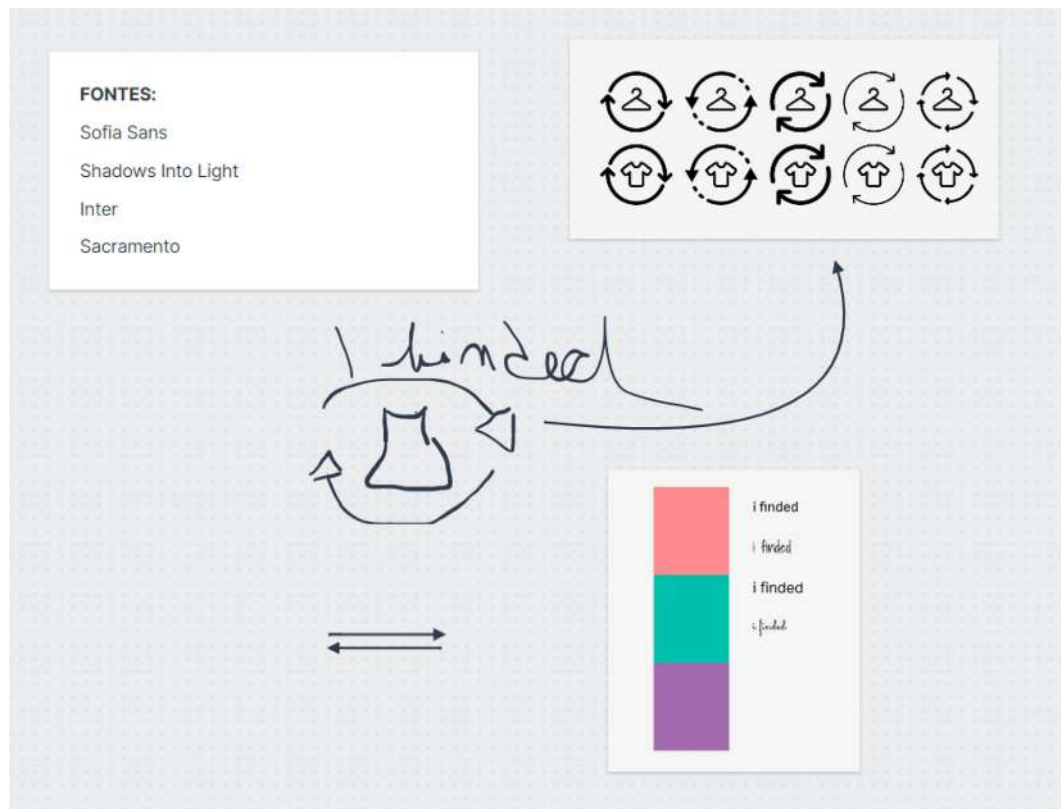


Fig. 02

where nothing goes to waste, and items are given a second life. By aligning with this model, the app contributes to reducing environmental impact and fostering a more sustainable fashion industry (Fig. 03).

CURRENT APP FEATURES AND FUTURE DEVELOPMENT

At present, two stores, including Com Sotaque, have clickable profiles that showcase detailed store information. Other stores like *Mão Esquerda*, *Quartier Latin*, and *Chiclete Shop* have been scouted for inclusion in future updates, allowing for expanded access to more second-hand shopping options.

The app also features a secondary section aimed at educating users about the benefits and practices of sustainable fashion. This section, accessible via the menu, offers articles on sustainable trends and second-hand fashion insights, with three introductory articles already available to promote informed and conscious consumption (Fig. 04).

KNOWLEDGE HUB FOR SUSTAINABLE PRACTICES

To further support the mission of demystifying second-hand shopping, the app's knowledge hub offers practical articles that empower users with sustainable tips and practices. This initiative helps integrate eco-friendly choices into everyday life, fostering a culture of responsible consumerism.

By emphasising clear communication, an engaging visual design, and educational resources, the app "I finded" sets the stage for changing perceptions and creating an accessible pathway into the world of second-hand fashion.

CONCLUSION

This research has provided valuable insights into the second-hand clothing market, revealing that these businesses select high-quality items and fabrics to ensure durability and added value. Entrepreneurs in this field are actively working to dispel myths surrounding second-hand consumption, making it more appealing and accessible. This shift encourages consumers to take their first step toward buying second-hand, understanding that their choice contributes to lower emissions and

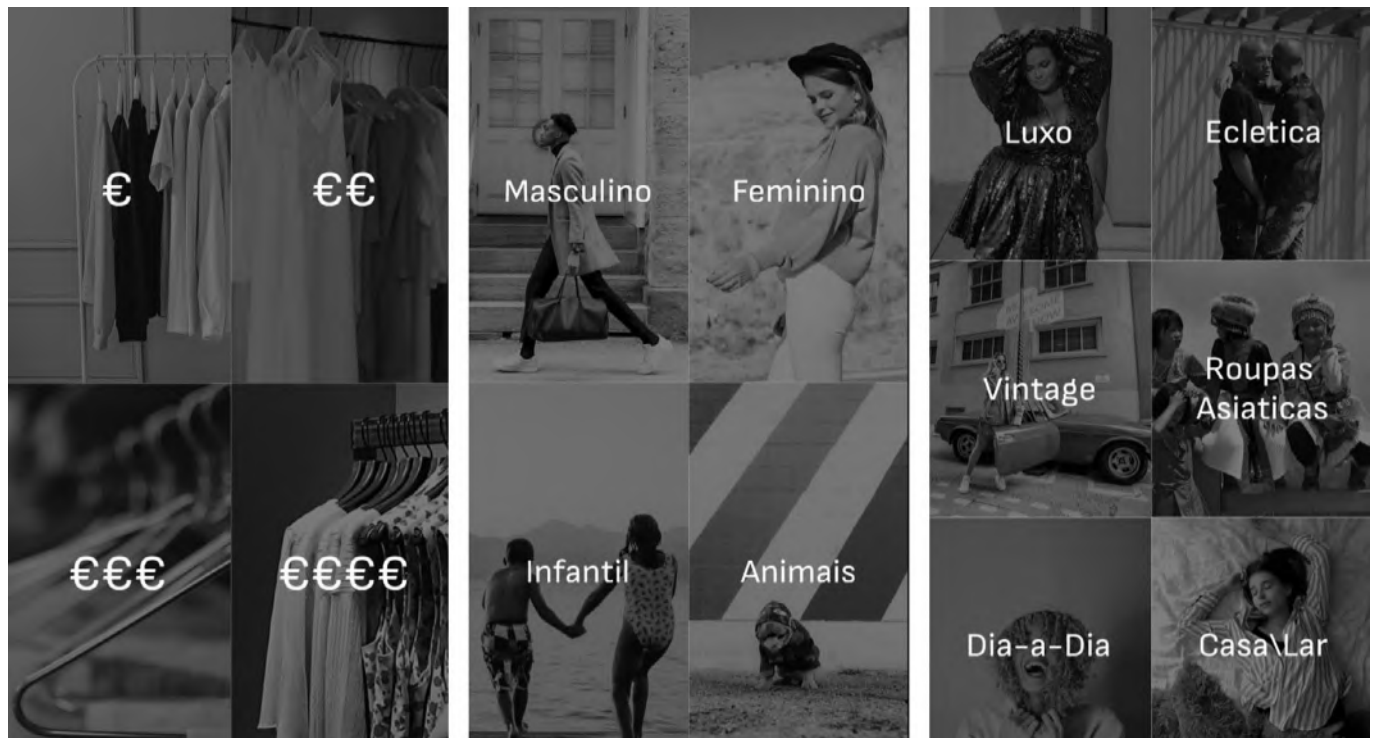


Fig. 03

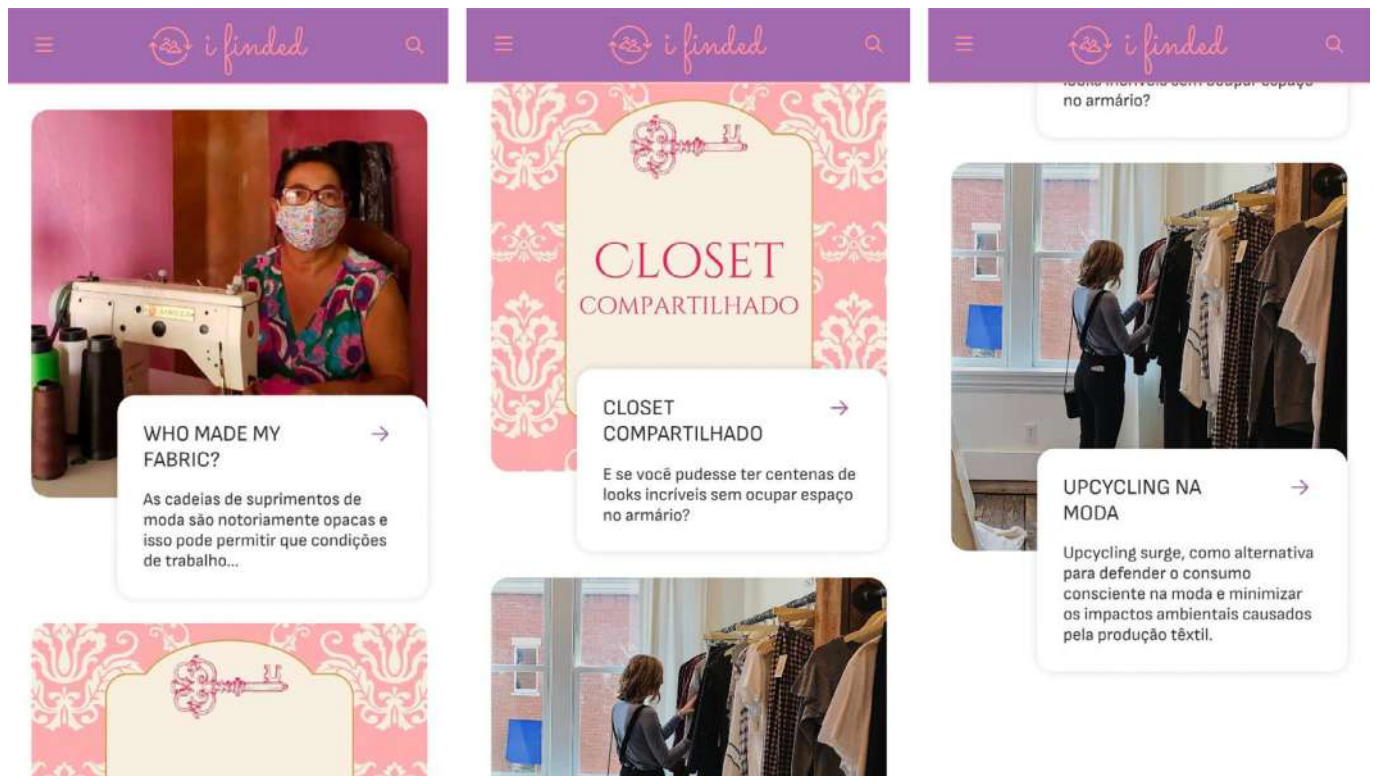


Fig. 04

provides a unique, cost-effective garment. Over time, this often leads to an emotional connection with these items, reinforcing the appeal of sustainable fashion.

Unlike digital platforms that offer second-hand clothing, many brick-and-mortar stores in Porto remain hesitant to sell online due to logistical challenges and the unique, limited nature of their inventory. Unlike fast fashion, second-hand stores often carry only one piece in a specific size or color. While some view this as exclusivity, others see it as a limitation. This aspect of the second-hand market highlights the importance of setting consumer expectations and showcasing the benefits of finding one-of-a-kind items.

The app at the center of this project aims to draw new consumers into the second-hand market by featuring stores like O Kilo and Com Sotaque, each with distinct aesthetics and unique approaches. Longtime patrons are typically loyal to both the practice of second-hand shopping and specific stores, frequently returning to discover new treasures. Research through surveys and interviews shows that Portuguese consumers, in general, have been slower to embrace second-hand shopping, partly due to the late entry of fast fashion brands after Portugal's EU integration.

Personal experiences, such as participating in clothing swaps and hand-me-down traditions, reinforce the notion that second-hand consumption goes beyond sustainability—it fosters community and shared experiences. My time in São Paulo (2016–2019) involved participating in women's clothing swap events that combined practical exchanges with storytelling, laughter, and camaraderie. Similarly, swap fairs in Porto reflect this spirit, emphasizing the values of sustainability, connection, and collective action.

Early exposure to second-hand practices, such as my mother donating outgrown clothes to neighbours and community centres, shaped my perception that newness is relative; an item doesn't need a "new" tag to be valuable. This mindset has stayed with me, where each second-hand piece I acquire feels renewed and unique to me.

Modern shopping centers increasingly showcase brands claiming sustainability, using recycled materials and sustainable practices. However, the challenge of distinguishing between genuine sustainability efforts and mere greenwashing⁶ remains significant. While consumers may

question the authenticity of such claims⁷, the key lies in individual responsibility and awareness. Absolute avoidance of fast fashion or products with unclear supply chains may be unrealistic, but a conscious approach can guide more informed decisions, fostering a gradual shift towards responsible consumption.

Integrating sustainability into design discussions is crucial, as design is a vital tool for innovating products and services that provide better solutions. Designers must embrace the principles of "Design for Planet", which focus on creating products, systems, and solutions that prioritize environmental and social responsibility. This approach aims to minimize negative impacts and conserve natural resources while fostering inclusivity and community engagement.

"Design for Planet" covers all aspects of sustainability, including product lifecycles, material choices, energy use, and social impact. While this research has focused on the fashion sector, the underlying principles can be applied across industries to contribute to environmental conservation and promote a balanced, sustainable future. By incorporating these practices, designers can inspire broader change and support the development of solutions that benefit both people and the planet.

CAPTIONS

[Fig. 01] Screenshot of the "ifinded" application showing the brand logo and the five second-hand shops featured in the study, located in Porto. Created by Ana Fidelis (2023). Reproduced with permission.

[Fig. 02] Colour palettes and typefaces used in the visual identity of the "ifinded" application, including brand logo evolution and typographic choices. Created by Ana Fidelis (2023). Reproduced with permission.

[Fig. 03] Diverse criteria for accessing second-hand shops in Porto as presented in the app interface (e.g., gender, price, pets, age, luxury, vintage, Asian clothes, daywear, home, and eclectic). Created by Ana Fidelis (n.d.). Reproduced with permission.

[Fig. 04] Visual representation of the "shared closet" initiative, allowing users to borrow clothes temporarily as an upcycling strategy. Created by Ana Fidelis (2023). Reproduced with permission.

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⁶ Report accuses 24 major global companies of greenwashing. *Jornal de Negócios*.

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SHAPING A PURPOSE-DRIVEN FASHION INDUSTRY BY DESIGN

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Abstract

The European Commission has emphasized the insufficiency of current sustainability efforts and the need for drastic emission cuts by 2050. New EU regulations, such as the Green Deal and the Eco-design for Sustainable Products Regulation, reinforce this demand for sustainable industrial transformation. Within this framework, the fashion industry faces major sustainability challenges due to its reliance on linear, profit-driven models. These dynamics foster overproduction and globalized markets, prompting a reevaluation of production systems. Purpose-driven enterprises have emerged, aligning business strategies with values and sustainability goals. This article examines how design can guide the fashion industry towards prosperity via purpose-driven models. As setting design goals shapes strategic vision, design becomes central in aligning innovation with sustainable objectives. Research shows that the design phase holds significant potential for sustainability gains. The author conducted an iterative study of European fashion firms, combining desk research with case studies to identify key purpose-driven practices. The resulting model highlights how companies voluntarily integrate profit with social and environmental impact. Three case studies illustrate the application of this model and its broader relevance. This work explores how European fashion firms use design to move from economic growth toward holistic, ecosystem-focused prosperity.

Keywords: *Transforming Fashion, Purpose-driven paradigm, Prosperity thinking*

INTRODUCTION

In recent years, sustainability has rapidly emerged as a transformative global force, fundamentally altering the priorities within the fashion industry (Gazzola et al., 2020). What was once considered a niche issue has now moved to the forefront, primarily propelled by consumer demands and evolving legislative frameworks designed to counteract the historical and scientific repercussions of industrialization and global value chains on the environment, people, and climate change (Harr, 2024). Such repercussions are particularly severe in the fashion field as the scale of clothing consumption is staggering. 150bn garments are made annually, and almost 40% of these are not sold (Guardian, 2024). Despite the enormous

quantity of clothing produced, global production and consumption are projected to increase by 49% by 2030, climbing from 62 million to 92 million tons (Clean Clothes Campaign, 2024). In Europe, around 7 million tons of textiles were thrown away in 2020, averaging about 16 kg per person (EEA, 2024). The environmental consequences are significant, with a truckload of textiles discarded in landfills or incinerated every second (EMF, 2017). This troubling trend underscores the urgent necessity for the fashion industry to reevaluate its practices and prioritize sustainability as a core principle to meet consumer expectations and reduce its considerable socio-environmental impact.

European consumers, in particular, are increasingly calling for brands to take accountability for their social and environmental impacts, urging companies to adopt transparent, responsible practices (Pal et al., 2019). This growing consumer pressure is exemplified by bottom-up movements such as Fashion Revolution, which emerged after the 2013 Rana Plaza disaster and continues to mobilize millions worldwide. Through awareness campaigns and calls for transparency, Fashion Revolution has been instrumental in educating consumers and pushing the industry toward ethical and sustainable practices (Fernandes et al., 2020). They represent a new type of consumer/stakeholder, as discussed by Morace (2008) —one who seeks authenticity and alignment between their personal values and those of the brands they support. Consumption has moved beyond purely aesthetic and consumerist elements, embracing a more ethical dimension centered on well-being and quality of life. Today's consumers evaluate companies based on social responsibility and their capacity to provide real value, consciously moving away from “performing” or relying solely on appearances (Morace, 2008). Complementing this consumer-driven momentum, governmental policies are increasingly mandating a transition toward sustainability, creating a powerful dual influence where regulatory frameworks support public expectations (D'Itria & Colombi, 2023). Accordingly, the European Commission's European Green Deal outlines a comprehensive roadmap for achieving climate neutrality by 2050, emphasizing transforming high-impact sectors such as fashion. This ambitious initiative aims to significantly reduce the fashion industry's environmental footprint through a series of targeted measures. Aligned with these objectives, the Eco-design for Sustainable Products Regulation focuses on enhancing product durability, reusability, and recyclability across various sectors, including textiles. This regulation mandates that fashion products be designed with circularity in mind from the very beginning, fostering a shift towards more sustainable manufacturing processes. Furthermore, the EU Strategy for Sustainable and Circular Textiles introduces specific measures to minimize textile waste and promote eco-friendly practices throughout the production cycle. By addressing the entire lifecycle of textile products, this strategy encourages innovation in sustainable design and production, ultimately driving

the fashion industry toward a more circular and responsible future. Together, these initiatives are poised to significantly impact the fashion sector by facilitating a transition toward more sustainable practices that benefit both the environment and the economy through new guidelines for companies and active engagement of citizens and stakeholders in deliberative processes surrounding the European sustainable transition, thereby underscoring the urgent need for the fashion industry to not only mitigate its environmental impact but also invest in innovative solutions that align with public values and governmental sustainability goals.

This dual influence marks a pivotal shift toward a more responsible and resilient fashion industry, where brands are expected to integrate responsible principles into every aspect of their business. Furthermore, these changes push for a transition from traditional linear systems to circular models, fundamentally redefining the concepts of value and profit (Kandpal et al., 2024). In this new paradigm, success is measured not just by financial returns but by the ability to create lasting positive impacts on society and the environment, fostering a business landscape where sustainability and profitability are intertwined. This shift challenges companies to rethink their operations, encouraging them to innovate in ways that prioritize resource efficiency, waste reduction, and the regeneration of ecosystems, ultimately leading to a more sustainable and equitable fashion future. A significant outcome of this shift is the move from traditional market-driven approaches to purpose-driven business models (D'Itria & Aus, 2023; Gartenberg, 2022). Generally, sustainable companies align supply with consumer demand by responding to specific trends, such as regenerative agriculture or biodiversity efforts, or addressing customer requests for greener options (Salvador López, 2023). However, a new generation of purpose-driven companies is emerging, defined by their commitment to embedding sustainability core values into every business decision to make the ecosystem prosper (Sternad et al., 2017). This purpose-driven approach has the potential to reshape the fashion industry by building a culture centered on purpose (Gyori et al., 2020). These businesses drive continuous innovation in sustainable practices, creating value for shareholders, society, and the planet (Rey et al., 2019). This transformation reflects the evolving landscape of the fashion sector, where the alignment of

purpose with action is no longer optional but a critical path to meeting the demands of both a conscientious public and a supportive regulatory framework (Thorisdotti & Johannsdottir, 2020). In this context, the paper investigates how design reimagines sustainability within the fashion industry by advancing models focused on prosperity. The findings emphasize that a purpose-driven strategy is fundamentally design-driven, setting specific targets for achieving sustainable change (Verganti, 2009). With a design-centered perspective, companies can take a holistic approach that aligns their purpose with the practical needs of circular business models, promoting growth among stakeholders and benefiting the broader community (Battistella et al., 2012).

This study investigates how European fashion companies cultivate prosperity by utilizing design as a fundamental driver of innovation. Grounded in the framework of Prosperity Thinking (Vignoli et al., 2021), these companies reimagine design with an emphasis on planetary well-being, moving beyond traditional design thinking methodologies. Prosperity Thinking offers a structured approach to fostering a world that equitably meets the needs of all living beings while operating within the Earth's ecological boundaries. It advances a holistic and inclusive vision of prosperity by integrating economic growth with social and environmental sustainability. As an evolution of Design Thinking, this paradigm shifts from a user-centered perspective toward a more comprehensive model that prioritizes both human and ecological well-being (Vignoli et al., 2021). In this context, Prosperity Thinking aligns with broader global trends, such as circularity, regenerative fashion, and systemic sustainability transitions, which emphasize closed-loop production systems, waste reduction, and the restoration of natural ecosystems. By incorporating these principles, fashion companies develop sustainable solutions that operate within planetary limits while simultaneously aligning economic, social, and environmental objectives. This framework facilitates the integration of micro- and macro-level innovation, enabling firms to address complex ecosystem challenges and contribute to the responsible design of a world that equitably serves all forms of life. Through an extensive mapping of prosperity-driven practices across nearly 15 companies and an in-depth examination of three specific case studies, this study identifies design-centric strategies that

promote Prosperity Thinking at key stages of the supply chain, including design, manufacturing/production, and consumption. However, while these companies successfully address distinct dimensions of responsibility, they continue to face challenges in integrating these initiatives into a cohesive, holistic framework that fosters collaborative value creation and long-term prosperity renewal. Section 2 outlines the methodology, materials, and processes used to map the prosperity initiatives of fashion companies. This study phase was conducted iteratively, enabling data refinement that informed the research model. Section 3 presents and analyzes the findings, showcasing how the current fashion ecosystem is evolving through innovative practices and a reexamination of established norms. This is illustrated by case studies highlighting voluntary efforts to align profit motives with social and environmental benefits, encouraging the broader fashion industry to develop effective strategies and embrace new attitudes toward prosperity. These efforts involve creating shared knowledge, generating opportunities through production, and transforming consumption systems. Lastly, Section 4 concludes the article by discussing how the proposed model presents research opportunities to investigate how design can facilitate new strategies for promoting prosperity-thinking innovation in the fashion industry, particularly through redefining value and strategizing specific actions along the supply chain.

METHODOLOGY

The study began with an initial phase of desk research, which was then followed by a case study approach to narrow and refine the broad focus of the investigation. As Johnson (2007) suggests, this method is especially effective for examining existing knowledge on a specific subject, as it addresses research complexities by transforming the individual case into a manageable unit. This approach enables an in-depth exploration within its original context, thereby capturing a range of interconnected elements and attributes (Priya, 2021). Data were collected from the Fashion in Process Research Lab's knowledge reservoir at Politecnico di Milano, supported by the authors' involvement in two field studies (ECODECK, <https://www.mics.tech/projects/2-10-eco-design-circular-knowledge-ecodeck/>; RE-WASTE, <https://www.mics.tech/projects/2-8-re-waste-circular-eco-systems-in-textile-chain/>) conducted in partner-

ship with a consortium of Italian academic and research institutions as part of the Italian PNRR framework, along with insights from the author's doctoral research (D'Itria, 2022).

The initial phase involved a comprehensive mapping of the practices of 10 international fashion companies concerning the dimension of prosperity. This analysis provided a crucial foundation for analyzing the measures to enhance the strategic role of design in planning the fashion system's cycles. By focusing on the intersection of design and prosperity, this effort promotes a holistic and purpose-driven approach to fashion, enabling the creation of sustainable strategies that engage businesses, stakeholders, and the ecosystem. Integrating design into strategic planning, these companies work on innovative solutions to address the complexities of unsustainability (see Tab. 01).

Out of the 15 companies, three were selected as case studies for further analysis, focusing on how their practices move beyond the conventional concept of profit to address the product and its design, the production processes, and the opportunities for integrative contamination among the different actors, as well as consumption and its linear, capitalist development. This exploration aims to establish a form of prosperity that is inclusive and beneficial to the various stakeholders within their ecosystem (Tab. 02).

The final case study database comprised diverse sources, including corporate reports, scientific articles, industry publications, and government documents. Following identifying the case studies, an additional qualitative phase was conducted, utilizing secondary data gathered through supplementary document research. This methodology facilitated a more comprehensive profiling of the companies and an evaluation of their integration of the refashioning dimension. Specifically, the focus was on how these companies actively engaged in responsible design practices aimed at minimizing the impacts of their products and conserving/nurturing resources through prosperity strategies for designing, producing, and responsible consumption.

This study proposes a systematic approach for employing higher-level codes to construct an innovative model to develop a prosperity system that enhances how we understand products, their production, and their use. Higher-level codes involve identifying critical themes derived from the research, organized according to the methodolo-

gy established by Corbin and Strauss (1990). This framework envisions an ecosystem where designers foster innovation by strategically planning fashion prosperity rooted in sustainable design practices. This encompasses planning alternative approaches for creating fashion products that facilitate a shared design process among peers, the production of garments that provide opportunities for prosperity to stakeholders throughout the supply chain, and the implementation of conscious consumption strategies that promote alternative, responsible purchasing avenues. The model aims to enhance the understanding of designed products by effectively integrating these dimensions. The three macro-categories presented here are based on strategies that promote prosperity by fostering dynamic systems, purpose-driven mindsets, and shared values (Haar, 2024; Reich, 2021). They demonstrate how innovation arises from systemic processes encompassing all product generation and supply stages, tailored to their specific functions, characteristics, and potentials. By adopting these approaches, ecosystems are cultivated to preserve resources, empower individuals, and regulate consumption through the concept of prosperity, thereby ensuring that resources circulate at their maximum value within a reimagined framework of the fashion industry that integrates design, manufacturing, and consumption (D'Itria & Colombi, 2023; Patwa & Seetharaman, 2019). The following section outlines the proposed model and conducts an analysis of the examined cases, presenting them as representations of the original ecosystem model with an emphasis on the design, manufacturing, and distribution phases. While the scenarios discussed may not capture all potential outcomes, they exemplify typical practices that underscore the roles of designers and their strategic initiatives in fostering a comprehensive understanding of solutions to enhance prosperity in the fashion industry (D'Itria et al., 2024; Priya, 2021).

RESULTS AND DISCUSSION

Drawing from the prior discussions, this paper aims to examine how fashion companies develop design strategies focused on prosperity through product design, manufacturing, and consumption, with the objective of transforming the processes of planning, production, and accessibility within the industry. This section outlines the results obtained from the methodology, highlighting that these

Country	Sector	Name
Brazil	Apparel & Accessories	Osklen
France	Shoes	Veja
India	Apparel	Swati Kalsi
Italy	Apparel	Stella Jean
Italy	Apparel & Accessories	Cooperativa Alice
Italy	Apparel & Accessories	Rayon Vert
Spain	Apparel & Accessories	Ecoalf
Sweden	Apparel	Atacac
USA	Apparel	Eileen Fisher
USA	Apparel & Accessories	Patagonia

Tab. 01

Case studies

Country	Sector	Name	Description of Initiative
Sweden	Apparel	ATACAC	Atacac reinvents fashion by combining new technology with traditional arts and crafts, creating innovative solutions that enhance the overall garment experience.
Italy	Apparel	STELLA JEAN	Stella Jean is an Italian brand emphasizing sustainability and multiculturalism within the fashion industry. Recognizing fashion's potential as a cultural activity, the brand aims to create significant opportunities for decent work for men and women globally.
Italy	Apparel & Accessories	RAYON VERT	Rayon Vert is an Italian brand established in 2017 as a research-driven clothing line and design consultancy that adheres to the principles of open manufacturing.

Tab. 02

qualitative implementations can be categorized into three main avenues: collaborative design approaches, intentional manufacturing practices, and transparent consumption strategies.

In light of these three primary directions, this paper articulates the identified trajectories within the current industry contexts to delineate design pathways that could inspire and foster new, meaningful perspectives in sustainable fashion design. The aim is to empower designers to advance toward prosperity.

From an operational perspective, the research identified three macro themes in the exploration of prosperity practices through a fashion design lens, which surfaced at the intersection of the pathways investigated (Fig. 01):

- *Opening design knowledge.* This refers to companies that champion open-source fashion, embracing a philosophy of transparency and collaboration within the industry. By providing access to patterns and 3D models of their garments, these organizations empower consumers and designers to participate actively in the creative process. In alignment with their commitment to inclusivity, they offer these resources at no cost, fostering an environment that encourages innovation and collective engagement in fashion design. These stakeholders cultivate a community prosperity rooted in the potential of knowledge by reevaluating the dynamics between the economy and society (Moore, 2023). This perspective highlights a form of prosperity that is symbiotic rather than commercial.
- *Crafting purposeful production.* This refers to companies striving to generate opportunities by cultivating prosperous and equitable supplier networks and establishing long-lasting relationships between brands and suppliers. The aim is to acknowledge the capacity of fashion as a cultural activity to create significant employment opportunities for individuals, regardless of gender, worldwide. These stakeholders cultivate a community's prosperity rooted in the potential of relationships by reevaluating the dynamics between economy, culture, and society. This perspective highlights a form of prosperity that is non-mercantile in nature.
- *Unlocking product access.* This concept pertains to reconfiguring traditional access to product practices by eliminating intermediaries and

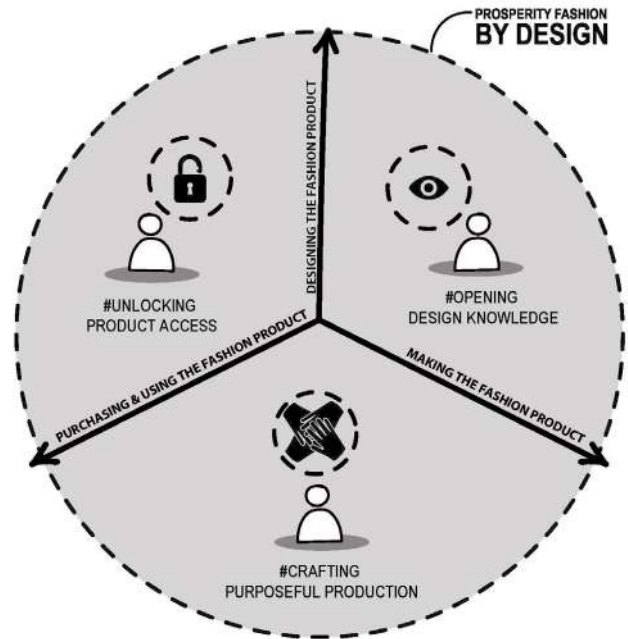


Fig. 01

minimizing the necessity for new over-production. It reevaluates product distribution by facilitating direct access to various products, empowering consumers to become active participants in the physical creation of the product through the activation of synergies within the ecosystem. These stakeholders promote community prosperity by focusing on relationships and reevaluating the relationship between society and the economy. This perspective emphasizes a type of prosperity that enhances access, promotes individual engagement, and nurtures synergies within the ecosystem.

Three case studies are presented per the outlined framework, each illustrating one of the proposed categories. These cases exemplify the themes of reconfiguring profit-driven strategies to prioritize prosperity through intentional design. The companies selected are acknowledged for their contributions to responsible fashion, promoting purpose to challenge market dominance and redefine the dynamics of design, manufacturing, and consumption within the industry.

Atacac (<https://atacac.com/>), a Swedish fashion studio established by Jimmy Herdberg and Rickard Lindqvist, is pioneering a transformative approach within the fashion industry. The studio aims to overhaul conventional garment design, presentation, sales, and production processes by introducing progressive technological innovation methodologies. A key element of Atacac's strategy is its use of advanced 3D modeling, which modernizes and redefines traditional pattern-making practices (Särmäkari, 2023). Beyond its internal objectives, Atacac's mission promotes an open, cooperative ethos in the wider fashion community. The studio freely distributes its patterns and models, reflecting its commitment to fostering a more sustainable and collaborative industry. This approach contrasts sharply with the consumerist-driven mindset typical of the capitalist fashion market. Atacac aspires to incite industry-wide change by emphasizing ethical engagement and sustainable practices over profit maximization. The studio's pioneering sales and production methods act as an experimental platform, where the team tests new concepts and principles that are then shared with other brands through consultancy services to enhance design practices. Notably, Atacac's Sharewear initiative embodies this collaborative philosophy: with each new product launch on its online store, Atacac offers free downloadable 2D patterns and 3D models. This strategy supports a network of independent brands and home-based creators who use these resources, thereby challenging traditional consumption-focused paradigms in fashion. Through a Creative Commons license associated with Sharewear, users can adapt and commercialize these designs while crediting Atacac in any commercial application. Additionally, users are encouraged to share their adaptations, contributing to continuous innovation within the community. Atacac's broader philosophy emphasizes that garment-making is an ancient craft, not a modern invention. By advocating for collaboration and transparency, Atacac challenges mainstream consumerist norms, aiming to inspire a more sustainable, innovative, and prosperous future for fashion design. The studio envisions prosperity not as a byproduct of excess consumption, but as a community-oriented effort built on sustainability, creativity, and shared resources.

Stella Jean (<https://www.stellajeans.it/>), an emerging Haitian-Italian designer and former model, infuses her creative vision with her rich

cultural heritage, which is central to her namesake brand's ethos. Through her work, Jean seeks to challenge dominant fashion narratives often driven by consumerism and capitalist ideals. Rather than pursuing profit alone, her designs emphasize cultural heritage and social responsibility, advancing a more layered understanding of prosperity that extends beyond financial gain (Redondo, 2015). At the core of Jean's approach is **Laboratorio delle Nazioni**, an innovative framework and sustainable development platform within the fashion industry. This initiative focuses on building equitable supplier networks and fostering lasting partnerships between fashion brands and global artisans. Each Stella Jean collection results from a cultural exchange that merges Italian design with the unique skills of artisans from regions such as Peru, Haiti, Burkina Faso, Mali, and other parts of South America, Africa, and Asia. Jean engages directly with these artisans, conducting in-depth fieldwork to establish connections, document traditional skills, and revive craftsmanship that is at risk of fading. This collaborative model enables Jean to co-create clothing, textiles, and accessories that integrate traditional artistry with refined Italian design. Through this, she leverages fashion as a cultural medium to generate employment and support economic independence. The **Laboratorio delle Nazioni** initiative embodies the principle of "nothing about them without them," underscoring the role of shared knowledge in supporting self-reliance within local communities. By creating job opportunities and fostering skill development, this initiative addresses limitations within traditional welfare systems, advocating for a model that values cultural exchange and respects individual identities. Jean's approach reshapes conventional commercial structures, promoting a vision of prosperity rooted in collaboration and shared objectives. This integrative framework enriches community welfare by reevaluating the relationships among economy, culture, and society, ultimately defining prosperity as a communal achievement built on cooperative partnerships rather than isolated economic transactions. Through her work, Stella Jean demonstrates the fashion industry's potential as a force for social change, advancing equitable opportunities and sustainable growth by harnessing the collective strengths of diverse cultural heritages.

Rayon Vert (<https://rayonvert.international/>) represents a pioneering initiative within

the fashion sector, prioritizing creative exploration alongside accessibility of products. Initially envisioned as a research-focused line producing prototypes and limited editions, Rayon Vert soon recognized the value of offering a broad selection of consistently available items, without compromising on innovation. This approach calls for a rethinking of conventional production models. Rayon Vert promotes a direct-to-consumer strategy, cutting out intermediaries to reduce overproduction and streamline product access (Caserini, 2022). This reimagined model empowers consumers to play an active role in the garment creation process, enhancing engagement and fostering interconnected relationships within the fashion ecosystem. The model provides two options for production. First, Rayon Vert offers kits containing pre-cut fabrics and all necessary components, accompanied by detailed instructions and assembly tools. Customers can choose their desired pieces and receive complete kits to assemble themselves or with assistance from local tailors. Second, Rayon Vert makes its patterns freely available for download as vector files, allowing users to source their own materials and personalize the garments to their taste. This flexible approach encourages collaboration and supports small, local businesses. To further support these initiatives, Rayon Vert will offer a directory of fabric suppliers and categorize products according to required assembly skill levels. Partnerships with FabLabs and repair shops aim to increase awareness of personal fabrication and encourage repair, reinforcing the idea that people are more inclined to mend items they have had a hand in creating. Through these efforts, Rayon Vert embodies a transformative model of fashion production that defines prosperity in terms of accessibility, personal involvement, and community collaboration.

The advancements in qualitative knowledge systems highlighted by these cases have effects that extend beyond individual companies, influencing the wider fashion industry by developing new design and production frameworks. These changes encourage shifts in consumer behavior that prioritize prosperity through purpose-driven models, which are fundamentally based on design principles that focus on specific objectives. As the industry shifts toward a model centered on prosperity, the strategic relevance of design becomes more pronounced in the planning of the fashion system's cycles. These practices stem

from strategies and processes established during the design phase. By centering on design, these approaches foster a holistic and purpose-driven view of prosperity within the fashion industry, enabling the creation of effective strategies for businesses, stakeholders, and the community. It harnesses design as a means to transition from a limited focus on economic growth to a wider, forward-thinking perspective that embraces a thorough understanding of the entire ecosystem.

CONCLUSIONS

This article proposes an interpretive model designed to codify prosperity-focused solutions that shape the development of design strategies to facilitate the sharing of knowledge, values, and access, thereby reimagining planning and production processes within the fashion sector. Embracing a design-for-prosperity approach is positioned as a crucial strategy, shifting the emphasis for designers toward open sourcing, resource sharing, and accessible products, rather than reinforcing the conventional, unsustainable profit-driven model.

The model invites a critical examination of production and consumption practices, processes, and impacts, promoting a responsible path to sustainable transformation. In particular, it integrates designers' perspectives with existing production and consumption dynamics, acknowledging the significant role these practices play across the product lifecycle—from initial design through usage and planned disposal. This approach can transform consumer relationships with fashion items by prioritizing prosperity-oriented design and creating products that foster intentional engagement. The alignment between design, manufacturing, and consumption revises traditional capitalist values, encouraging more sustainable and intentional decisions within the fashion industry and supporting a more sustainable, responsible future.

CAPTIONS

[Fig. 01] Fashioning a Purpose-driven Design. Original work by the authors (D'itria & Colombi, 2024).

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SUSTAINABLE FASHION THROUGH TRADITIONAL TURKISH WOMEN'S CLOTHING TECHNIQUES

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Abstract

The production of garments from fabric involves multiple stages, each contributing to the final product's design and the resulting fabric waste. The fashion industry produces 97 million tons of waste annually, of which 18 million are leftover textiles. Fast fashion increases the amount of textile waste created by industry and consumers. The zero-waste approach has begun to be implemented in clothing design to minimize the amount of fabric waste generated in the pre-consumer production stage. The collection design and patternmaking stages, well before the cutting process, present a pivotal opportunity to apply zero-waste fashion design techniques. At the design stage of zero-waste clothes, the fashion designer and pattern maker precisely plan to ensure that fabric pieces fit together like a puzzle using the entire fabric width. In response to the growing concern over fabric waste, this paper explores how traditional garment construction techniques can be applied to contemporary garment design to reduce waste. Traditional construction methods were used for three dress patterns to explore how they might affect fabric utilization and garment production.

Keywords: *Zero-waste design, Sustainable fashion, Fabric waste, Traditional Turkish clothing*

INTRODUCTION

The fashion industry may seem like a fairy tale- a dazzling reality filled with vibrant colors, exquisite designs, creativity, innovation, and abundant beauty. However, behind this fascinating realm lies a far more troubling environmental impact than most can imagine. Many stages of global fashion, from production to consumption, have profound ecological consequences, particularly related to water use, chemical pollution, carbon emissions, and textile waste (Niinimäki et al., 2020, p. 189). The European Environmental Agency has identified the fashion industry as the fourth-highest consumer of primary resources (Olivar Aponte et al., 2024, p. 2). The fashion industry generates more than 97 million tons of waste annually and

consumes approximately 79 trillion liters of water (Niinimäki et al., 2020, p. 189).

Water is a key resource in fashion, cultivating natural fibers and processing fabrics. This intensive water use leads to local groundwater depletion and drinking water losses worldwide (Niinimäki et al., 2020, p.192). At the same time the fashion industry is the second most polluting industry, resulting in 20% of all global wastewater (Bailey et al., 2022, p. 1). Cotton, one of the most used fibers, requires vast amounts of water and chemicals, contributing to ecological toxicity and water stress (Moazzem et al., 2021; Rex et al., 2019, as cited in Olivar Aponte et al., 2024, p. 1). Furthermore, projections by the Boston Consulting Group (BCG) and the Global Fashion Agenda

(GFA) indicate that water consumption in the industry could rise by 50% by 2030 if current practices continue. Meanwhile, polyester, the most dominant synthetic fiber in the textile market at 82%, derives from fossil resources and releases microplastics into aquatic ecosystems, endangering wildlife and posing risks to human health through the food chain (Bailey et al., 2022; Henry et al., 2019; Palacios-Mateo et al., 2021; Stone et al., 2020, as cited Olivar Aponte et al., 2024, p. 14).

As the industry continues to expand, so does its environmental footprint. Fast fashion, known for its rapid design and production cycles, allows retailers to provide a wide range of low-cost clothing options (Niinimäki et al., 2020, p. 189). By 2030, the global consumption of apparel and footwear is expected to surge from 62 million tons to 102 million tons, equal to 500 billion t-shirts. This growth threatens to push several planetary boundaries beyond their limits (Global Fashion Agenda & The Boston Consulting Group. 2017, p. 2).

One significant yet often overlooked form of fabric waste is pre-consumption waste generated during garment production. Each garment generates an average fabric waste of about 15% per item. Considering the mass production of apparel, this could be translated to over 60 billion square meters of scrap fabric produced annually by the fashion industry (Nursari & Djamal, 2019, p. 98; Ramkalaon & Sayem, 2020, p. 809). Excess fabric is discarded during the conversion of textile rolls into garments. The analysis reveals that much of the waste originates from the beginning of garment production: the design and pattern-making stages. This research analyzes the zero-waste design aspects and construction principles of traditional Turkish clothing, focusing on the women's garments of the late Ottoman era. It was conducted through patternmaking analysis of forty-seven garments from three ethnographic museums in Izmir.

ZERO-WASTE FASHION DESIGN AND ZERO-WASTE DESIGN PERSPECTIVES OF TRADITIONAL TURKISH WOMEN'S CLOTHING

ZERO-WASTE FASHION DESIGN

Zero-waste fashion design emerged in response to growing environmental concerns associated with the fashion industry, mainly the significant amounts of textile waste generated during

production (James et al., 2016, p. 143). The term 'zero-waste fashion design' is a progressive methodology intended to eliminate fabric waste from a garment's pattern-making stage, even approaches that do not eliminate the waste entirely (ElShishtawy et al., 2022, p. 191). Under the zero-waste fashion design framework, reducing waste drives innovation and fosters the exploration of new, creative approaches to cutting and construction methods (Kim & Kim, 2022, p. 200). Various designers have contributed to this field through their distinct methods and philosophies, including Timo Rissanen, Holly McQuillan, Julian Roberts, Carlos Villamil, and Yeohlee Teng. Their contributions emphasize innovative pattern-making, holistic design strategies, and sustainable design practices. Tang defines "Zero-waste, as a philosophy, refers to a design method or lifestyle that generates little or no waste, be it textile or time and energy. It is becoming more prominent today, perhaps as an effort to push fashion into a sustainable future" (Interview with Yeohlee Teng, 2017).

Timo Rissanen (2013, p. 19) emphasizes that waste elimination must begin at the design stage for the fashion industry to achieve optimal waste management. Fashion designers should adopt a zero-waste approach in the design and pattern-making stages to promote sustainable practices. Rissanen adds that changes are necessary for current conventional production practices to align with this goal. Zero-waste fashion design can serve as a creative challenge in patternmaking by merging the roles of designer and patternmaker into a cohesive process. This approach emphasizes the consideration of aesthetics and functionality fostering innovative solutions in garment creation while ensuring that all fabric is used effectively (Carrico & Kim, 2014, p. 58). Tan and Chon (2016, p. 165) suggested that the roles of the fashion designer and patternmaker are inherently interconnected, as each relies on the other's expertise and knowledge. Patternmakers are technical designers who grasp the aesthetic elements of design, while fashion designers possess a creative vision informed by the fundamental principles of pattern-making. This co-creative partnership can enhance the efficiency of the design process, transforming it from a transactional to a collaborative relationship.

Ramkalaon and Sayem (2020, p. 816) proposed that the conventional design process in the fashion industry, characterized by segmented stages and minimal communication among

professionals, hinders the implementation of zero-waste patterns in mass production. This approach involves establishing a team of designers and patternmakers who work together from the beginning, integrating patterns with fashion design. The design steps should not proceed in isolation; instead, they should interact continuously to ensure a cohesive development process until the desired prototype is achieved. Despite the growing prevalence of zero-waste design approaches, the adaptation of these techniques in mass production remains a significant challenge for the fashion industry (ElShishtawy et al., 2022, p.195).

ZERO-WASTE DESIGN PERSPECTIVES OF TRADITIONAL TURKISH WOMEN'S CLOTHING

While zero-waste design has gained considerable attention in contemporary fashion studies, its historical application in traditional Turkish clothing has not been fully recognized or explored. Previous research on traditional garments typically focuses on cultural, aesthetic, and functional aspects, with limited attention to the waste-reduction strategies inherent in the design process. In contrast, this study provides a comprehensive analysis of traditional Turkish garments, revealing some common features that support the zero-waste approach. The results show that pattern-making methods used in traditional Turkish clothes, significantly reduce the wastage rate (Aktas & Ozkavruk Adanir, 2024a, p. 354).

The Use of Straight Lines and Geometric Patterns

In contemporary fashion, garments are often constructed using curved lines in areas such as armholes, necklines, hips, waist, and other contours. The pattern pieces include irregularly shaped polygons and asymmetrical elements. They typically result in gaps between the pieces when laid out for cutting. These gaps lead to small scraps of fabric that are considered waste.

In contrast, traditional Turkish women's clothing is characterized by using straight lines and regular geometric shapes mainly rectangles, squares, triangles, and diamond shapes in its construction. Patterns were designed to interweave with one another and allow for more efficient use of fabric. Every edge and seam of these garments are linear elements without curved lines. As these garments are designed from straight-edged regular geometric shapes that share the same cut edges, the

pattern pieces interlock each other. This arrangement eliminates gaps between the pattern pieces, helps to create garments that are easier to produce and allows optimal fabric use. Nancy Micklewright analyzes the construction techniques of traditional Turkish clothing, and she clarifies that all pieces were rectangular or cut along straight lines so that the entire fabric width was used with no scraps left over (1986, p. 188).

It should be noted that selvage was never cut and used as seam allowance. This practice allowed for more economical use of the fabric since it eliminated the need for additional fabric for seam finishing. At the same time, it helped to maintain the seams' strength and durability.

Traditional Techniques in Garment Construction and Design

Traditional Turkish women's garments from the late Ottoman era, include a three-skirt robe (*ucetek entari*), a short jacket (*cepken*), a dress, a shalwar, and a shirt. In the nineteenth and early twentieth centuries, the average fabric width of Turkish women's clothing was approximately 50 cm, which was well-suited to the measurements of the female body. During this era, Turkish women's clothing patterns were created using the entire width of the fabric. The three-skirt robe features a narrow, standup collar and a V-shaped neckline, with an open front fastened at the bodice by plaited buttons and loops. The garment, reaching ankle length, includes side slits, front and back skirts widened by godets. Godets are constructed from a rectangle fabric divided lengthwise into six triangles. These triangular pieces are then sewn to the front opening and side slits to add width to the hip and abdomen areas. To construct the front and back body pieces of the three-skirt robes and jackets, the fabric was folded crosswise so that the cut ends match and there is no seam at the shoulders. Then, the front body was cut lengthwise until the neck, and an opening was cut for the neckline. The front and back of the garment were made from a single rectangle (Aktas & Ozkavruk Adanir, 2024b, p. 15) (Fig. 01).

The sleeves were always cut on the crosswise grain of the fabric; therefore, the length of the sleeve was constructed from the width of the fabric. Since the sleeves were cut along the crosswise grain, the sleeve's fabric pattern is aligned perpendicular to the garment's fabric pattern. The sleeves were placed straight to the body without curvature or shaping at the armhole. Triangular gussets were



Fig. 01

positioned under the armholes. Designing sleeves with this method involves simpler patternmaking techniques and regular geometric shapes that are easier to sew and assemble.

Traditional Turkish shalwar comprises many diverse construction methods, sizes, shapes, fabric types, and embroideries. Even though the measurements and proportions of the pieces used to make a shalwar varied, the logic of pattern-making with a zero-waste approach has been applied to all ranges. Nancy Micklewright points out that the visual effect relied on the generous but not wasteful use of fabrics and other materials. Even though the tailoring of the garments seems simple, they were carefully constructed, and great attention was paid to the details. The shalwar is made from two leg pieces on the sides and crotch pieces extending to the waist that connect the leg pieces. The number of crotch pieces may increase when the crotch is formed by sewing fabric pieces vertically to each other following the straight line of the fabric. There are often seams in the center front and the center back; however, there are no seams or stitching on the sides as they are placed on the fabric fold. The sides are rectangular without being cut. In

some examples, the fabric is turned inside to make plackets for the drawstrings at the waist and the bottom of each leg, while in other samples, extra fabric is added.

The *cepken* is a type of short jacket that holds significant importance in traditional Turkish clothing. It is typically worn on top of a three-skirt robe and shalwar. The design of the *cepken* features an open front and a cropped length, typically ending above or at the waistline. It's characterized by its small stand-up collar and long sleeves, which hang down to the palms. Geometric-shaped (Triangular, quadrilateral, or diamond-shaped) gussets are often added to the jacket to add fullness. Some short jackets show extended gussets that run from the armhole down to the waist. The quadrilateral gussets are cut longer and wider from a rectangular fabric to provide extra flexibility. Additionally, the sleeve is constructed from a single piece of cloth.

The traditional shirt was the first layer of clothing worn by women and men. It was prepared without a neck opening and could be opened and decorated according to the wearer's preferences. Interestingly, the shirt could also be worn upside down, with the hem becoming the waistband and the sleeves covering the legs to wear as underwear.

Analyzing the Fit and Function of Gussets and Godets

In traditional Turkish clothing, the elimination of curved lines is compensated by adding triangular and quadrilateral-shaped gussets and godets in areas such as the underarms, sides, waist, hips, and crotch. These additions enhance comfort and facilitate ease of movement, allowing the garments to better conform to the body's shape and improving overall fit.

Gussets and godets are important elements in the formation of traditional clothing. Micklewright states that the sleeve part of the garments was formed by a large rectangular piece of fabric and a small gusset (1986, p. 191). A gusset is a triangle or quadrilateral-shaped piece inset between the seams of the sleeve and bodice in the underarm area, providing additional space and improving the fit of garments such as three-skirt robes, dresses, shirts, or jackets.

A godet is a large triangular or quadrilateral-shaped piece, inset between two pieces of fabric or into a slit to add volume to the hem of the garment. Godets were placed on both sides of the skirt and shirt. As a result, the garment's body

is widened. The shape and placement of geometric pieces added to the underarm area for fullness can create the illusion of curved lines. Although the pieces may be angular, their strategic positioning allows them to mimic the body's natural curves.

The size of the gussets and godets varies according to the wearer's measurements. These additions are essential for customizing garments to fit the individual. This adaptability is crucial in traditional clothing, where a tailored fit and aesthetic appeal are highly valued (S. Tansuğ, personal communication, January 8, 2022).

Another sustainable method used in traditional clothing is the incorporation of drawstring closures, which gather and tighten the waist to secure the shalwar on the body. Drawstrings are also applied at the ankles. This technique provides a perfect fit for multiple sizes, accommodating changes in body weight. The adjustable drawstrings ensure the shalwar remains comfortable and well-fitted, enhancing the garment's longevity.

APPLICATION OF TRADITIONAL TURKISH ZERO-WASTE TECHNIQUES IN CONTEMPORARY GARMENT CONSTRUCTION

In mass garment production, patterns are often cut from fabric without aligning the edges, resulting in irregular pieces that do not fit together efficiently, much like mismatched puzzle pieces. This method frequently leads to significant fabric waste. However, a more efficient and sustainable method inspired by traditional clothing construction could provide practical solutions to this problem. Traditional techniques, such as using straight lines, regular geometric shapes, and incorporating elements like godets and gussets, were used to design three dress patterns to optimize fabric use and minimize waste.

The white dress featuring a fish pattern is made from remnant fabric measuring approximately 150 cm in width and 110 cm in length. This dress pattern consists of fourteen pieces. Traditionally, the front and back pieces of the dress are made from a single rectangular fabric, folded in half with the shoulder positioned along the fold. As contemporary fabric widths have increased, the traditional pattern was adjusted to maximize the use of the fabric's full width. The front and back bodies are constructed from separate pieces stitched together at the shoulders. The dress features underarm gussets and triangular godets

arranged at the front and sides of the garment (Fig. 02).

The off-white mesh summer dress is made from a remnant fabric that measures 150 cm in width and 200 cm in length. The design includes ten pieces, with four godets added to the sides of the front and back pieces and two gussets positioned under the arms. The front, back, and sleeve pieces all have the same width (Fig. 03).

The white cotton dress and belt are made from a remnant fabric that measures 150 cm in width and 170 cm in length. The dress pattern includes fourteen pieces. The skirt features six triangular godets positioned at the center front, center back and sides of the garment. Underarm gussets are included to enhance comfort and movement (Fig. 04).

The dresses were constructed using only rectangles, triangles, and squares. The pattern pieces were arranged without gaps, and the selvages were used as seam allowance.

CONCLUSION

Fashion firms still benefit from the fast fashion model, but the industry's long-term sustainability relies on moving away from this model and implementing sustainable practices. Certain software programs automatically optimize the marking process by arranging irregular pattern pieces on strips of fabric. However, approximately 15% of the fabric is wasted during this process. The successful integration of these methods shows how traditional knowledge can inform and inspire contemporary sustainable fashion practices, providing valuable insights for designers aiming to address the growing concerns of textile waste in the fashion industry. These garments are constructed using almost the entire fabric, ensuring that fabrics are consumed to their fullest potential, thereby minimizing scraps and remnants.

Zero-waste fashion design is a promising approach to reducing the fashion industry's environmental impact. Numerous designers and researchers are actively exploring methods to eliminate fabric waste generated during garment manufacturing. By carefully planning and strategically designing pattern pieces in collaboration with designers and pattern makers, effective solutions are created to minimize fabric waste that would otherwise contribute to environmental degradation. This approach challenges designers to think creatively and encourages the industry to prioritize ecological



Fig. 02



Fig. 04



Fig. 03

responsibility, ultimately leading to a more sustainable and ethically conscious fashion system. As the fashion industry approaches a critical turning point, the need for transformative change has never been more urgent.

CAPTIONS

[Fig. 01] Silk ikat, striped kutnu, three-skirt robe, early 20th century, Izmir Ethnography Museum. Photo: Ceren Aktas.

[Fig. 02] Fish-printed white dress designed by using traditional pattern-making techniques Photo: Ersan Çeliktas, Model: Ipek Uyarer.

[Fig. 03] Off-white mesh summer dress designed by using traditional pattern-making techniques Photo: Ersan Çeliktas, Model: Ipek Uyarer.

[Fig. 04] White cotton dress designed by using traditional pattern-making techniques Photo: Ersan Çeliktas, Model: Ipek Uyarer.

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SYSTEM DESIGN FOR THE SUSTAINABLE ENHANCEMENT OF ITALIAN WOOL PRODUCTION CHAIN

THE INTEGRATED APPROACH OF FILA NATIONAL OBSERVATORY PROJECT

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Abstract

The Italian wool industry is facing considerable challenges, largely due to mounting environmental concerns that are undermining its economic viability and sustainable production management. This paper presents the strategy of the FiLA National Observatory project, launched in 2024. The project objective is to reconfigure the value creation processes through a circular economy approach for the indigenous wool supply chain, establishing an energy-neutral, human-centred, and inclusive model. Italian wool (20-30 μm) is facing significant challenges in the international market, particularly from finer New Zealand wool (15 μm). Additionally, approximately 10,000 tonnes of annual greasy wool production is often treated as special waste, highlighting the urgent need for a systematic intervention to understand the strategic positioning of Italian wool within the broader context of the textile supply chain. This should extend beyond fashion and knitwear design to encompass a wider macroeconomic landscape. By 2025, the FiLA Observatory will develop a digital platform to support networking and system competitiveness, promoting innovation in processes, products, and services. Through mapping actors, identifying research opportunities, and defining macro-economic trends, the project proposes a comprehensive model that integrates economic, productive, environmental, and social aspects, ultimately contributing to a new paradigm of prosperity in the fashion industry.

Keywords: *Design Driven Innovation, System Design, Circular Economy, Wool Supply Chain, Sustainable Production*

INTRODUCTION. THE FILA OBSERVATORY AS A SYSTEMIC APPROACH TO NATIVE WOOL SUPPLY CHAIN INNOVATION

The native Italian wool supply chain has recently become a key debate point, primarily due to two major factors. Firstly, there is the issue of its decline in global competitiveness, and secondly, the pressing need for revitalization to address growing concerns regarding sustainability. With approximately 6.5 million sheep producing around 10.000 tonnes of greasy wool annually, the industry represents a significant economic and environmental resource that is largely underutilized (Sanua et al., 2020). Historically recognized for its high-quality materials, Italian wool now faces substantial

market challenges due to its fibre characteristics: with a fineness between 20 and 30 μm , it struggles to compete with imported New Zealand wool (approximately 15 μm) in premium textile applications, leading to market disadvantages despite significant transportation-related environmental impacts (Klepp & Tobiasson, 2022).

The European Regulation EC 1069/2009 classifies raw wool as a by-product of animal origin. This classification has transformed wool from a valuable resource into a disposal burden for farmers, imposing additional costs and environmental impacts, as argues the 2023 Textile Exchange, Materials Market Report. Furthermore, in September 2024 the Italian standardization system has introduced UNI 11952, a significant

regulatory development that specifically addresses sheep farming for wool production within a bioeconomic framework. This standard recognizes wool production as an “environmental product” intrinsically linked to grazing practices, which play a fundamental environmental role from fire control to weed reduction and pasture fertilization. While the standard implementation supports the extensive low-energy consumption breeding system typical of sheep farming, providing guidelines for animal welfare, environmental impact management, biosecurity, and product traceability, it also presents new challenges for farmers.

Meeting these requirements requires technical knowledge, management skills and economic resources that many farmers have difficulty acquiring, especially in a context where wool revenues are very low, and where the condition of farmers is therefore particularly precarious, making it difficult to sustain the investments needed to meet compliance requirements while continuing their essential role within a supply chain that was once considered a resource, but is now a problem to be solved.

Furthermore, the challenges faced by the Italian wool sector are further exacerbated by the fragmentation of the supply chain, characterized by a lack of coordination between the various stakeholders, including farmers, processors, producers and final processors, each of which faces distinct operational and economic pressures, which in turn give rise to inefficiencies in resource use and value generation. Finally, the current linear production model makes these issues more complex to manage, not favouring horizontal relational processes and contributing to waste generation and excessive energy consumption. This picture clearly indicates the need for a transition towards more sustainable practices.

In response to this context, the FiLA National Observatory project, launched in 2024 and funded by MICS - Circular and Sustainable Made in Italy, an Extended Partnership between Universities Research Centers and enterprises financed by Italian Ministry of University and Research (MUR) thanks to funds made available by the European Union under the NextGenerationEU (PNRR) program, proposes an evolved and up-to-date model of value creation reconfiguration processes. The project aims to establish a comprehensive platform to support networking and system competitiveness through innovation

of processes, products and services, fostering a sustainable native wool production chain. Through a design-driven and systematic approach, the FiLA Observatory will map the relevant actors, identify promising research topics, and define macroeconomic and socio-cultural trends to foster sustainable development. The Observatory model will offer advantages for the wool sector, by enabling systematic data collection and analysis, facilitating knowledge sharing among diverse stakeholders, and providing a platform for coordinating innovation efforts.

Unlike traditional top-down regulatory approaches or market-driven solutions, an observatory can act as a neutral intermediary, fostering collaboration while respecting the autonomy of individual actors. Addressing existing knowledge gaps through coordinated observation and intervention can foster sustainability in the sector, even at the national level (Matlhoko, 2023; Gaddi, Mastrolonardo, 2024). The Observatory approach is particularly relevant for the wool industry due to its ability to address three critical needs: first, the need for improved coordination among fragmented stakeholders; second, the requirement for systematic monitoring and assessment of sustainability practices; and third, the importance of facilitating knowledge transfer and innovation across the supply chain.

METHODOLOGY FRAMEWORK

The theoretical framework of this research integrates multiple approaches to address the complexity of sustainable systems. Moving beyond traditional GDP centric models (Stiglitz, 2009), the project embraces Moore's (2023) vision of transitioning from pure economic growth to a broader concept of prosperity. This transition is particularly relevant in Fashion System value chains, where Fletcher (2011) advocates for a fundamental redefinition of success metrics to include social and environmental impacts.

The project adopts a systemic design methodology that frames the wool supply chain as an interconnected ecosystem where waste from one process becomes a resource for another. This perspective builds on Bistagnino (2009) system thinking for sustainability, which emphasizes the relationships between components rather than isolated elements. Verganti (2009) design-driven innovation strategies are integrated to ensure that technical solutions are accompanied by meaning-

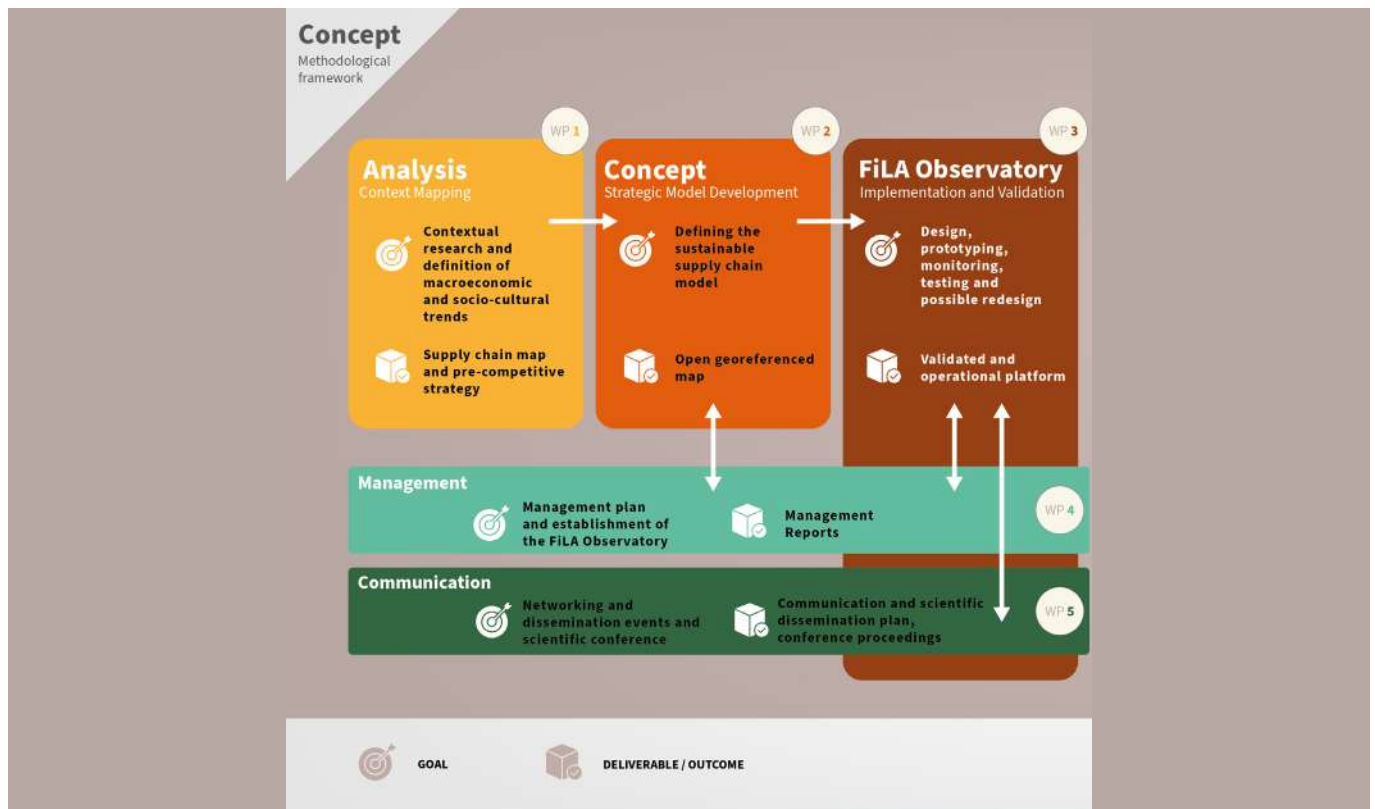


Fig. 01

ful cultural and social innovations. The approach is further grounded in Magnaghi (2020) territorial development strategies, recognizing the crucial role of local contexts and community engagement in sustainable development.

The methodology synthesizes three complementary theoretical streams. Industrial ecology principles (Frosch, 1992), provide the foundation for understanding material and energy flows within the system, while Ayres (1994) integrated industrial symbiosis framework guides the development of mutually beneficial relationships between different actors in the supply chain. These technical approaches are complemented by Wenger (1998) community-based economic models, which emphasize the importance of social learning and collective action in achieving sustainable transformations.

As shown in Figure 01, the research methodology unfolds through three interconnected phases, each building upon the previous while maintaining flexibility for iteration and refinement. The analysis and establishment of context is the foundation for the subsequent engagement with stakeholders and system analysis. This includes detailed mapping of material flows,

energy usage, and waste streams within the current wool supply chain. International best practices are evaluated against local conditions to identify applicable innovations and potential barriers to implementation.

METHODOLOGIES FOR DATA COLLECTION AND ANALYSIS

The research phase of data collection, that is -at the time of concluding this paper- in the final phase of its analytical part, used a mixed approach to obtain both quantitative metrics and qualitative insights along the entire wool supply chain. The mixed approach was dictated by reasons related to the need to relate quantitative numerical data to the fundamental relationships between stakeholders and actors of different hyper-local territories, often linked by relationships of proximity and territorial belonging. To meet this important need dictated by a fragmented supply chain, stakeholders' interviews were conducted as a basis for the collection of qualitative data, involving various actors of the supply chain, from shepherds to textile producers. These specific interviews explored operational challenges, innovation opportunities and stakeholder perspectives on sustainabili-

ty, providing a rich contextual understanding of the dynamics of the sector.

The quantitative analysis of the supply chain, on the other hand, integrated the findings of the previous qualitative approach by considering production processes, material flows, production costs and market dynamics. This analysis incorporated multiple streams of data, including production volumes, processing capacity and market prices, allowing the identification of critical inefficiencies and potential intervention points within the supply chain. The cross-referencing of quantitative and qualitative data allowed for the integration and verification of cases where innovative processes and sustainability requirements were implemented alongside traditional practices.

A certainly relevant case study that emerged from the intersection of the analysis of the international scientific literature and the evidence of an important critical issue, the lack of greasy wool washing centers on the national territory that have a sustainable approach both from the point of view of non-chemical waste and water consumption. In this context of analysis, as an example, we can mention the good practice adopted in Val Verzasca, in Italian Switzerland, where the Pro Verzasca Association has patented, with the support of the Professional University of Italian Switzerland (SUPSI), a washing plant capable of processing small quantities of wool, obtaining a quality product comparable to that processed with industrial technologies intended for high-volume production, without the use of chemicals and with low energy consumption.

Following the principles and framework for Life Cycle Assessment described in ISO 14040, these assessments will also examine energy consumption, water use, chemical inputs and waste generation, providing quantitative measures for strategies to reduce environmental impact, including over the entire life cycle of the sheep.

This mapping will be made visible and communicable on the Observatory's web platform using Geographic Information System (GIS) technologies to provide a spatial understanding of the supply chain, documenting the distribution of resources, processing plants and transport networks. The aim is not only to visualise current supply chain configurations, but also to identify opportunities for the development of local clusters and collaborations between regions that have

not previously been connected due to territorial distance. Life Cycle Assessment (LCA) references will be studied to assess the environmental impact of the entire wool production cycle.

In parallel, the identification and development of the strategic business model for the valorisation of the FiLA Observatory has followed a structured process that integrates economic sustainability with social and environmental impact considerations. The process began with a complete mapping of the value proposition for each category of stakeholder in the supply chain, from shepherds to final producers, focusing on transforming disposal problems into economic opportunities, while ensuring quality certification and territorial identity.

The model will enhance the exchange relationships between actors through differentiated levels of participation and innovation opportunities, defining the access to the services of the web platform.

The validation phase, which will be activated in the next steps of the project, will implement territorial pilots to verify the prices of the services, calibrate the relationship between the value generated and the management costs, and refine the service offer based on user feedback. The final model will therefore integrate the principles of circular economy, value sharing and social innovation, hopefully creating an economically sustainable system that supports the transition to more virtuous practices in the wool supply chain. Governance mechanisms will ensure a fair distribution of benefits among participants, with a particular focus on supporting more local, small and vulnerable production entities (Fig. 02).

INCLUSIVE APPROACH

The FiLA Observatory is an inherently inclusive network that fosters collaboration while preserving individual autonomy, thereby creating a balanced and sustainability-oriented ecosystem. In this ecosystem, each stakeholder maintains its independence while benefiting from collective resources and knowledge sharing. Consequently, participants can engage in collaborative initiatives while maintaining their unique market positioning and operational autonomy.

The network's design promotes sustainability by facilitating proximity-based collaborations, reducing transport impacts and strengthening local economic ties. Furthermore, the network enables

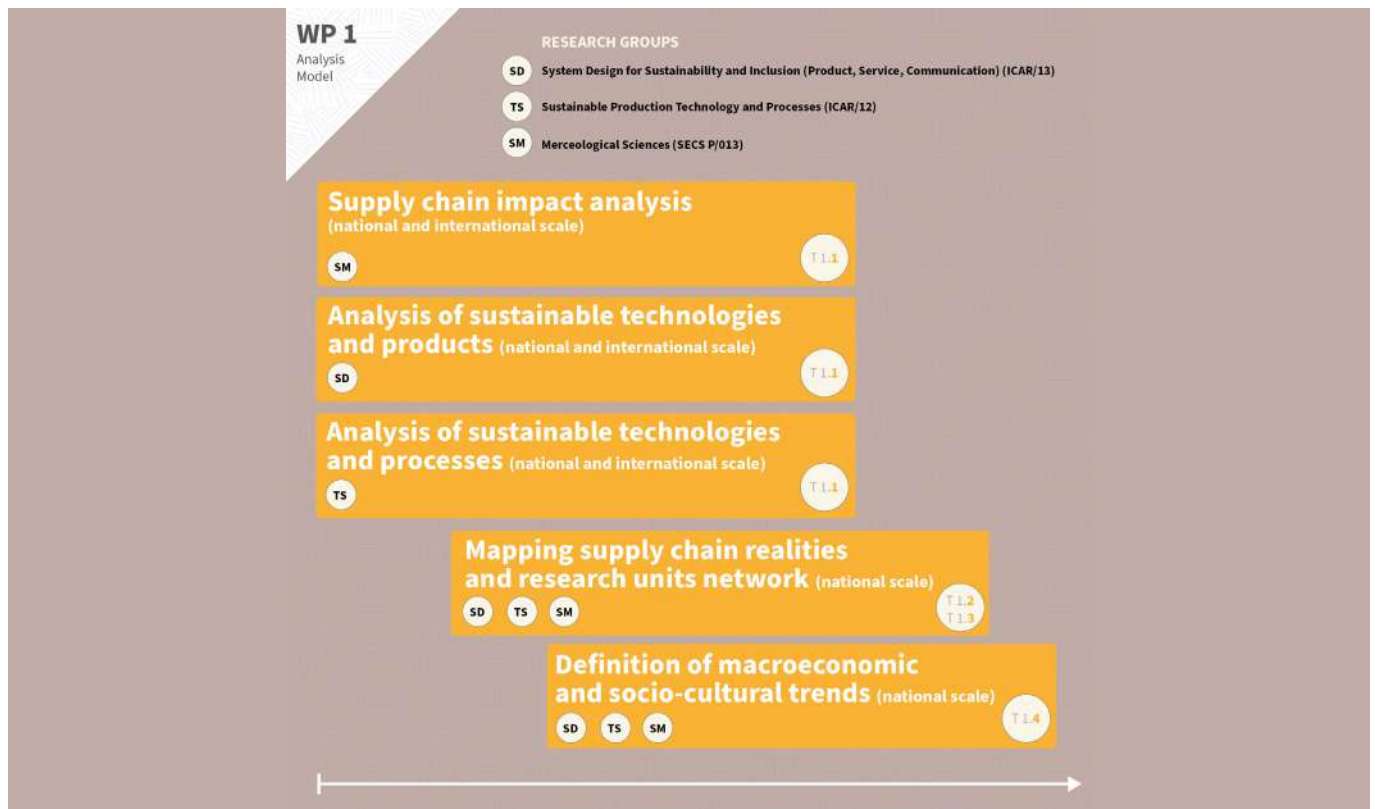


Fig. 02

the formation of micro-networks and horizontal clusters, creating supply chains that can better respond to market challenges. Finally, it provides a platform for sustainable innovation that emerges organically through stakeholder interaction and knowledge exchange.

This network structure demonstrates how systemic design methodologies can be applied to create sustainable value chains that benefit all participants, while promoting environmental stewardship and social responsibility. The model's success is predicated on its capacity to balance the needs of individual stakeholders with collective benefits, thereby establishing a framework for the long-term sustainable development of the wool sector.

The database creation process was structured following an integrated approach, in which good practices derived from the qualitative analysis of scientific literature on the specific context of the supply chain (addressed from the point of view of the analysis of impacts, sustainable technologies related to processes, products) and met and verified the quantitative data (the mapping of stakeholders) as shown in Figure 03.

MONITORING FRAMEWORK

The project implements a comprehensive bottom-up monitoring framework designed to track progress and impact across multiple dimensions of sustainability as social indicators, environmental performance and welfare indicators.

Social indicators focus on measuring the quality and extent of stakeholder engagement. These metrics include participation rates in network activities, collaboration intensity between different stakeholder groups, and the development of new partnerships. Knowledge sharing effectiveness is evaluated through tracking the adoption of best practices and the spread of innovations within the network. Cultural indicators assess the project impact on traditional wool-working knowledge and practices. These measures track the preservation and evolution of traditional techniques, the development of new skills among stakeholders, and the integration of innovation with cultural heritage. Learning outcomes are monitored through formal training participation and informal knowledge exchange within the community. Economic monitoring encompasses both traditional financial metrics and broader value creation measures. Beyond tracking direct revenue and cost implica-



Fig. 03

tions, the framework examines the development of new market opportunities, improvements in resource utilization efficiency, and the creation of additional value streams through cross-sector applications.

Environmental performance monitoring utilizes both direct measurements and modelled impacts. Key metrics include reductions in waste generation, improvements in energy efficiency, water conservation, and the adoption of circular economy practices. The framework particularly emphasizes the tracking of improvements in wool washing processes and the development of local, environmentally sustainable processing capabilities.

Welfare indicators examine the broader community benefits arising from project initiatives. These measures assess improvements in local employment opportunities, enhancement of community resilience, and the strengthening of local economic networks. Particular attention is paid to the project contribution to maintaining viable rural livelihoods and supporting traditional wool-working communities.

THE FILA OBSERVATORY MODEL

The Observatory's digital platform will be a hub for stakeholder interaction and knowledge sharing. It will include a geo-referenced mapping system that will display resources and processing facilities in the main Italian regions for the wool supply chain, allowing for the continuous expansion of the database.

The collaborative nature of the platform will be manifested through spaces dedicated to stakeholder engagement, where industry participants will be able to share experiences, challenges and innovative solutions. In addition, an archive will showcase best practices and research results, making data-driven research information accessible to all participants.

The development of sustainable processing methods will be a strategic element of the project's implementation and value proposition. The project will support the creation of local operational clusters, strategically located to minimize transport impacts and maximize resource efficiency. Quality improvement protocols specifically designed for local wool varieties will help improve the market competitiveness of Italian wool, while preserving its

unique characteristics, both from a commercial and narrative point of view, and from a territorial and community promotion point of view.

The success of the Observatory depends heavily on effective stakeholder collaboration. Multi-stakeholder engagement protocols ensure balanced representation and participation from all sectors of the industry. The governance structure establishes clear decision-making processes while maintaining flexibility to adapt to changing industry needs. The possibility of taking on an advocacy and policy role on a specific supply chain issue could also be an important added value of the Observatory.

Regular knowledge-sharing events and training programmes promote continuous learning and skills development among participants. Cross-sectoral innovation initiatives, exchanges of EU founding researchers and academic and scientific meetings are part of the Observatory's work.

The FiLA Observatory represents a significant step toward helping the Italian wool industry through systematic innovation and sustainable practices. The project success depends on continuous stakeholder engagement and the ability to adapt to evolving market conditions and technological advances. Several critical challenges warrant ongoing attention. The long-term financial sustainability of the platform requires careful consideration of revenue models and value creation mechanisms. Maintaining consistent stakeholder commitment and participation demands continuous demonstration of tangible benefits and value creation. The regulatory landscape and market dynamics require constant monitoring and adaptive responses. The scaling of successful pilot initiatives presents both opportunities and challenges for broader industry transformation.

CONCLUSIONS AND OPEN PERSPECTIVES

By integrating circular economy principles with local development strategies, the FiLA Observatory project aims to contribute to a more sustainable and prosperous future for the sector. Through its approach to stakeholder engagement, sustainable process development and digital integration, it is intended that local development and circular economy principles provide a framework for implementing an integrated design strategy to add value to a material. The growing burden of

disposal costs could catalyse initiatives aimed at transforming the perception of Italian wool from waste to valuable resource, underlining the urgency of a strategic response to increase the resilience and sustainability of the sector. Considering these challenges, the proposal to create a network within the Italian wool supply chain has emerged as a possible solution to foster collaboration, transparency and innovation among stakeholders. Furthermore, the current state of the Italian wool supply chain reflects broader concerns about sustainability and traceability, as consumers increasingly demand responsibly sourced materials. The establishment of an Observatory could not only improve transparency and traceability within the sector but also contribute to the adoption of more environmentally friendly practices, meeting consumer expectations and mitigating environmental impacts. While the potential benefits of a Network Observatory are significant, several challenges remain, including the need for rigorous data management and stakeholder engagement, which will also benefit farmers whose economic conditions are starting to make it impossible for them to continue the decreasing amount of farming work required throughout the supply chain.

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The contribution is the result of a common reflection of the authors. Nevertheless, the introductory paragraph (numbered as 1) and the paragraph 2 are attributed to Luciana Mastrodonardo. The paragraph 3, 4 and 5 are to be attributed to Rossana Gaddi.

CAPTIONS

[Fig. 01] Project Concept and Methodological framework of the value proposition of the FiLA Observatory (with expected results and specific outcomes): Graphical elaboration by the authors, 2024.

[Fig. 02] Methodologies for Data Analysis: Graphical elaboration by the authors, 2024.

[Fig. 03] Database Setting process: Graphical elaboration by the authors, 2024.

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RETHINKING FASHION

SUSTAINABLE FASHION FOR INTEGRATED AND REGENERATIVE PROSPERITY

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Abstract

Well-being has traditionally been measured through economic growth and the accumulation of wealth, often neglecting the limitations imposed by natural resources (Latouche et al., 2011). The current economic model overlooks the principles of the circular economy, which are increasingly undermined by anthropogenic phenomena such as global warming. Additionally, growing geopolitical instability is weakening conventional governance systems (Sachs, 2015). Within this context, the European Commission's "Safe and Sustainable by Design" (SSbD) framework (2022), aligned with the objectives of the European Green Deal, promotes a systemic approach that integrates safety, sustainability, and functionality. It aims to reduce the use of hazardous chemicals and minimize environmental impacts throughout the entire life cycle of products and processes. There is an urgent need to rethink production systems through a "reparative, regenerative, and restorative" economic model (Sbordone et al., 2022), which transcends the limits of the circular economy by prioritizing biological cycles and the bioeconomy (Fava, 2022; Giampietro, 2024). The Quintuple Helix model contributes to redefining relationships among stakeholders, placing natural capital at the center (Carayannis et al., 2012). In this scenario, design intrinsically connected to life plays a critical role in re-establishing sustainable relationships between humans and the environment (Antonelli, 2012), particularly in the fashion and textile sectors, by fostering locally grounded initiatives focused on repair, regeneration, and territorial enhancement.

Keywords: *Circular economy, Local bio-economy, Social Innovation, Regenerative Design, Quintuple Helix Innovation Model*

INTRODUCTION

Traditionally, well-being has been measured through economic growth and the accumulation of wealth, a paradigm that often overlooks the limitations imposed by the planet's natural resources (Latouche et al., 2011). The prevailing economic model fails to recognize the emerging values arising from the adoption of circular economy principles; values that are threatened by anthropogenic phenomena causing irreversible damage to the ecological balances of ecosystems. In particular, global warming has triggered complex dynamics on a global scale, accelerating the processes of degradation and deterioration of ecosystems. On the other hand, increasing geopolitical instability undermines and weakens tradition-

al governance models (Sachs, 2015). The European Commission's Safe and Sustainable by Design (SSbD) framework (2022) represents a significant orientation in industrial processes for the generation of new materials and products. In line with the objectives of the European Green Deal, SSbD adopts a systemic approach aimed at integrating safety, sustainability, and functionality. This approach guides design processes by proposing preventive and proactive interventions that aim to gradually replace the use of harmful chemicals and reduce impacts on health, climate, and the environment throughout the life cycle of materials, products, processes, and services. The goal is to transform the current production model through a systemic logic characterized by a critical, multidis-

ciplinary, and multilevel approach. It is essential to rethink production systems within a “restorative, reparative, and regenerative” economic model (Sbordone et al., 2022) that integrates the environmental, social, and cultural dimensions of sustainability. This model transcends the circular economy by prioritizing biological cycles in value creation and proposing value chains according to the value constellation (Normann & Ramírez, 1993). Daniel Christian Wahl (2016) emphasizes the need for a new paradigm for long-term sustainability, suggesting that strengthening local economies can reduce dependence on global resources and improve the ability to address specific challenges in local contexts. This requires pathways for innovation to build robust and more ecologically sound local economies. The Quintuple Helix model, as an innovation paradigm, values territorial capital by redefining relationships between actors starting from natural capital (Carayannis et al., 2012), stimulating a new vision of ecological and social balance, and generating systems of knowledge and culture that act as catalysts for transformative action. Design plays a crucial role in recovering values related to human existence (Antonelli, 2012). This contribution aims to analyse the relational dynamics between the fashion sector and future production models, identifying strategies for valorisation, starting from design, that fit within a logic of repair, restoration, and regeneration. The new sustainability criteria focus on local-scale impacts. In this perspective, design becomes a practical tool for re-establishing a balance between human needs and the planet's resources, thus contributing to a deeper reflection on the modes of coexistence and shared responsibility.

POLICY, GOVERNANCE MODELS, AND NEW SYNERGIES

The European textile ecosystem is undergoing processes of economic, technological, geopolitical, and social transformation, characterized by increasing complexity and dynamism. These changes create a complex set of challenges and opportunities, highlighting disruptive dynamics in textile production and consumption on a global scale. The evolution of European policies on sustainability and the transition towards circular economic models addresses environmental issues while stimulating innovation, maintaining the principles of safety and sustainability with respect to materials, products, processes, and services. A significant

milestone was the publication of the “EU Strategy for Sustainable and Circular Textiles” (EU, 2022), which marked a turning point in the redefinition of textile sector regulations. The textile and apparel industry was prioritized at the centre of a broad and integrated regulatory framework, designed to substantially influence the production, distribution, and consumption processes of textile products within the European Union. This was a prelude to the subsequent transformation of the sector into a highly regulated industry, with direct implications for global value chains in the textile sector (Textile ETP, 2024). Compliance with the new regulations presents an opportunity to rethink economic models towards greater sustainability and social responsibility. In particular, within the textile sector, these regulations promote eco-design, waste management, supply chain transparency, and the regulation of chemical substance use. Eco-design, which reduces environmental impact, is crucial for the textile industry, which has significant effects on the environment. EU Directive 2008/98/EC introduced the recovery of materials as resources, and the “Eco-Design Directive for Sustainable Products” (ESPR) sets stricter criteria, promoting climate neutrality, resource efficiency, and the circular economy. The regulations focus on energy efficiency, reduction of carbon and water footprints, durability, reparability, recycled materials, and information transparency. The introduction of the Digital Product Passport (DPP) provides consumers with detailed and up-to-date information on sustainability, facilitating more informed choices. This initiative allows for the identification of products designed to last, easily repairable, and recyclable, thereby contributing to a significant reduction in energy consumption. It is combined with the REACH Regulation and the Safe-and-Sustainable-by-Design (SSbD) framework to support design that excludes the use of harmful chemicals, promoting the development of low-impact products.

LOCAL CIRCULAR ECONOMY: FROM SUSTAINABLE CO-BENEFITS TO THE BIOECONOMIC MODEL

Sustainability represents one of the most urgent challenges for businesses across all sectors, including the textile industry. The transition of the European textile and fashion sector towards sustainability requires advancements in scientif-

ic knowledge and practical solutions, alongside technological innovations in the fields of materials science, process engineering, and biotechnology (Ecosystex, 2023). Circular Economy (CE) offers an alternative to traditional linear models (Romani et al., 2021), contributing to the reduction of greenhouse gas emissions, resource consumption, and waste production, with positive impacts on health, the economy, and biodiversity. The circular approach optimizes the use of resources through strategies such as the Narrowing Loop, which promotes the sharing of secondary raw materials; the Slowing Loop, which reduces the speed of cycles; and the concept of End of Waste, which closes material loops (Bocken et al., 2015; Achterberg, 2016; Blomsma, 2017). The Butterfly Scheme (2021) represents the closure of loops within the CE model, distinguishing between technical and biological cycles. In the technical cycle, products are kept in circulation through reuse, repair, and recycling; in the biological cycle, biodegradable materials are returned to the Earth to regenerate nature. However, the focus on the biological cycle presents challenges, as only certain fibers can be composted, and textiles contain harmful chemicals (Niinimäki, 2013). Greenhouse gases generated by the composting of synthetic substances contribute to global warming, raising concerns about the closure of the cycle. Despite these issues, it is crucial to develop alternative circular strategies that integrate interventions in both the technical and biological cycles (Liu et al., 2019). Textile waste can be recovered and transformed to produce new fibers or biologically treated to make waste suitable for production in the technical cycle, such as composting that facilitates the separation of fibers in mixed materials (Yao, 2018). The new value derived from waste is a key concept in the Bioeconomy strategy, which has received increasing political attention over the last decade. “Bioeconomy promotes the use of renewable biological resources to reduce dependence on fossil fuels” (MIPAAF, 2017). The two models are integrated: bioeconomy provides renewable resources for circular cycles, optimized by the principles of circular economy. “Circular Bioeconomy” is a regenerative economic system aimed at maximizing the value of local biological resources and promoting sustainability, contributing to climate change mitigation and economic growth (Giampietro, 2019). The goal is to rethink an economy that serves people, advancing circular

design strategies to create systems that contribute to the restoration of local ecosystems. Innovations in the textile sector require targeted design interventions to bring about tangible improvements. The shift towards Bioeconomy, starting from the Circular Economic model, involves considering the mutual conditions of sustainability, defining priorities that generate reciprocal benefits among the actors involved, known as sustainable co-benefits (Sbordone et al., 2023). These co-benefits extend environmental sustainability to social, cultural, health, economic, political, technological, territorial, and urban dimensions, guiding current supply and value chains toward more sustainable models. This requires an in-depth analysis of material sourcing phases and the associated extraction and transformation processes (Dahiya et al., 2020), with the aim of promoting regeneration in local contexts (Caldeira et al., 2022).

DESIGN FOR SOCIAL INNOVATION: THE RELATIONAL VALUE OF FASHION

A systemic approach to design, which considers the interconnections between resources, people, and contexts, emerges as an effective response to global challenges, promoting positive and sustainable change. In particular, fashion, as both a cultural expression and a daily practice, can become a powerful tool to overcome individualism, foster cooperation among diverse cultures, and build collective value. In this context, design is not merely a response to aesthetic or functional needs, but a change agent that, through dialogue and the active participation of communities, can become a vehicle for the Common Good. Designing with this perspective means contributing to the creation of a more inclusive, equitable, and sustainable future. By combining a clear understanding of the present with a visionary drive for change, industrial design could find new, more effective ways to fulfil its purpose. As Papanek (1971) introduced: “Design should not focus solely on aesthetic or functional aspects but should aim to improve the living conditions of people, particularly those living in marginalized circumstances.” In this way, design becomes a means to address social inequalities, aiming for solutions that not only satisfy market needs but that also tangibly improve the lives of the most vulnerable people.

Systemic design focuses on the interconnections between various system elements, promoting

an integrated vision that goes beyond individual products. This approach allows for the analysis of complex contexts, understanding systemic dynamics, and guiding design towards sustainability by efficiently using local resources and valuing traditions and territorial specifics (Fagnoni, 2018). The goal is to promote “ethical” fashion that transcends individualism and fosters cooperation between different cultures and worldviews. True innovation arises from dialogue and the cross-pollination of diverse experiences. To understand what design for social innovation can do, one must look at the protagonists of innovation. This means observing the people who participate and the social forms they generate, particularly those in which individuals collaborate to achieve results they could not attain alone, thus producing social value (Manzini, 2015). These collaborative organizations require the active participation of all involved parties, proposing radically different ways of being and acting from those that dominate. Therefore, the task of design for social innovation is to make these collaborative organizations possible. One of the dangers of our educational systems is the loss of the sense of community and connection with the world outside academia (Hooks, 2022). Social innovation occurs when people, skills, and resources meet in a new way, creating meanings and opportunities never seen before. Social enterprises, unlike other social organizations, stand out because everyone involved actively participates in achieving the outcome, thereby generating a recognized collective value.

RETHINKING FASHION: FROM CRITIQUE TO SOCIAL PRACTICE

As proposed by Manzini (2015), “Collaborative production enterprises are based on new models of production and distribution. The collaborative attitude of such organizations, applied to productive activities, is creating a new generation of small and micro social enterprises, such as those in Fab Labs and the maker movement.” This implies that social innovation is developing through collaborative production models, promoting cooperation and the creation of collective value. The economic models of these innovations express a social economy that blends characteristics different from traditional economies based on the production and consumption of goods. It includes the intensive use of distributed networks to support and manage relationships, supported by mobile devices and other means of communication. The

boundaries between production and consumption are blurred, with an emphasis on collaboration and repeated interactions, care, and maintenance rather than one-off consumption (Murray, 2009).

Although social innovation is still far from dominant thought, in various countries, especially those affected by crises, there is growing interest in the new social and economic models it proposes. To reflect on the transformation of fashion, it is useful to consider the critique of the fashion system itself. Fashion studies have evolved into critical fashion studies. Critical fashion theory highlights the ability of the system as a whole (production, representation, consumption) to align with other forces, such as politics, and even surpass them in conveying social messages, going beyond the aesthetics of a garment (Caratozzolo, 2022). This scenario of ethical-aesthetic re-imagining of fashion becomes a ground for radical change in individual and collective lifestyles, with a positive impact on society. Fashion, understood as a free discipline, can find a place in marginal contexts, becoming a spokesperson for tangible acts of resistance. Marginality thus becomes a decisive space of possibilities, a space of resistance that offers the condition for an innovative perspective from which to view, create, and imagine alternatives (Hooks, 2022).

REPAIR, RESTORE, REGENERATE: THE DESIGN IMPERATIVE IN THE FACE OF ECOLOGICAL CHALLENGES

The transformation of socio-economic models and the creation of new values depend on the ability to address the ecological crisis as an urgent change that requires innovative and multidimensional responses. In a global context marked by rapid technological developments and environmental challenges, design emerges as a fundamental tool for solving these issues, adopting approaches of repair, restoration, and regeneration focused on local resources (Sbordone et al., 2022). These approaches aim to restore the balance between resources and their efficient use, extending benefits across multiple dimensions: environmental, social, economic, and political, promoting responsible resource management both individually and collectively (Broken Nature, 2019). Design, with a human-centered and environmental vision, promotes participatory processes involving various actors and translates theories into concrete

actions to address emerging challenges. Bio-design (Antonelli, 2012) integrates biological principles into design processes, adopting an action-research approach that involves continuous data monitoring and adaptation of practices to specific contexts. This approach stimulates the creation of new materials, the design of innovative processes, and the configuration of products and services, all oriented toward a circular economy. The phases of repair, restoration, and regeneration form a progressive process aimed at restoring ecological and social balances, with a focus on local resources (Sbordone et al., 2022). Repair aims to immediately recover compromised balances, intervening reactively to halt degradation. Although fundamental, it is a temporary phase that prepares the ground for more structural actions. Restoration goes beyond recovery, aiming to return an improved balance, enhancing the resilience of damaged systems. In this context, design reorganizes natural resources into creative cycles, valorising local traditions and creating connections between ecological and social systems (Sbordone et al., 2022). Restoration represents an opportunity to strengthen the bond between humans and nature, promoting the integration of technological innovation and natural resources (Antonelli, 2019). Regeneration marks a further evolutionary step, with the goal of creating resilient socio-ecological systems capable of self-regulating and regenerating autonomously in the long term. Design evolves production processes into circular and regenerative models, requiring a holistic vision that integrates economic, social, and environmental needs. The self-sufficiency of territories is promoted, resource rebalancing occurs, and production chains are reconnected, valorising local vocations and contributing to an evolving relationship between living systems and technological innovation. In this process, the environment becomes the heart of the model. Circular economy develops progressively through incremental and radical innovations (Cainelli et al., 2020), aiming to reduce the exploitation of natural resources, lower emissions and waste, and ensure that socio-ecological systems operate within limits favourable to human life. Circular economy and bioeconomy emerge as crucial paradigms for restoring a balance between ecological and socio-economic systems, contributing to the creation of more resilient and sustainable models.

ADVANCED SUSTAINABLE TEXTILES: QUINTUPLE HELIX & SYSTEMIC DESIGN

The innovation model that best integrates social, environmental, and economic needs is the Quintuple Helix (Carayannis et al., 2012), which involves five key actors: businesses, research institutions, public administrations, civil society, and the natural environment. This model recognizes that innovation is closely tied to social and environmental contexts and that cooperation between different actors is essential for sustainable solutions. In the context of local development, a relational system emerges based on interconnected interactions. Collaboration between public administrations, businesses, research institutions, and civil society is crucial for developing eco-friendly solutions. Administrations promote environmental policies, while businesses and institutions implement them, developing innovative technologies. Civil society plays a key role in raising awareness and encouraging responsible behaviors, stimulating bottom-up change. Natural capital, such as water, renewable energy, biodiversity, and plant-based materials, is essential to ensure that innovation is sustainable. Design becomes the mediator between these components, creating connections and developing a production and consumption model based on local, open, and interconnected systems. Through networking processes, collaboration among local actors is promoted according to a holistic territorial approach, which integrates systemic thinking with the methodologies of Systemic Design, critical for the transition to sustainable models. As Wahl (2016) emphasized, human impact on Earth needs to be reimagined, requiring transformative actions. Systemic Design emerges as a key discipline for the transformation of local economies into sustainable ones (Luthe et al., 2020). This approach is based on an interconnected logic, where the output of one system becomes the input for another, creating circular flow dynamics (Ceschin, 2010; De Biase, 2016), fostering the construction of self-regenerating and resilient systems. In this context, residual biomasses, such as agricultural and forestry waste, represent a strategic resource that can be requalified, transforming waste into economic, social, environmental, and cultural value. Research conducted by the Textile Design Lab (TexLAB, 2025) at the Department of Architecture and Industrial Design of the University of Campania Luigi Vanvitelli supports and develops

the methodologies and practical and theoretical experimentation necessary to apply systemic design to new practices, proposing innovative solutions for resource enhancement in the textile design sector and beyond.

BEST PRACTICE IN RESEARCH CONSULTANCY: TEXLAB PERSPECTIVES FROM DESIGN FOR REGENERATIVE CONTEXTS

The research conducted at TexLAB (TexLAB Team: Amato, C.I.; Cecere, E.; De Toro, S.; Martucci, S.; Orlacchio, M.) is embedded in the methodologies and experimentation of Design for Regenerative Contexts. This approach translates into the definition of best practices that include tools for guiding circularity (Fig. 01), the use of hybrid materials derived from biomass valorization, and the promotion of open innovation within Design Driven practices. The laboratory fosters collaboration with industrial partners, universities, public administrations, and local communities, focusing on both scientific and applied research. TexLAB's goal is to enhance local resources to design new systems, products, and services, contributing to the creation of a network of relationships and co-creative processes. This process reorganizes the territory, allowing TexLAB to establish itself as a hub for scientific consultancy with positive and proactive impacts in the various fields in which it operates.

FROM FARM TO CLOTHES: CONTRIBUTIONS TO THE HEREWEAR PROJECT FOR CIRCULAR TEXTILE ECONOMIES

TexLAB, as part of the Textile & Clothing Business Labs (TCBL) network, participates in the European project Herewear (Horizon 2020-2024), focusing on stakeholder community management and the dissemination of research findings on sustainable and circular practices in the textile sector. In 2020, the lab contributed to organizing the "From Farm to Clothes" event at the Officina Vanvitelli of Unicompania, promoting at regional, national, and European levels the creation of a market for biobased, circular textiles sourced from local production (Fig. 02). The research led to the formation of a network focused on the recovery and management of plant biomass, developing a model aimed at local self-sufficiency with large-scale applicability. TexLAB's research activities include creating sustainable yarns from

residual biomasses, valorising local traditional crops, and adopting advanced technologies for innovative hybrid applications. The laboratory has developed prototypes using equipment such as semi-digital looms (Kniterate) and 3D printers (Stratasys J750, Wasp) to test yarns, create experimental patches, and hybridize polymer structures, expanding applications in the textile, apparel, footwear, and leather industries. Another key area is the adoption of ecological dyeing and printing processes, using residual plant components to produce natural dyes through the Natural Colour Code System (NCCS), which defines new color codes for biobased solutions in the textile sector. Another significant contribution of TexLAB to the Herewear project was providing scientific support during the final phase, offering consultation on the management of residual biomass in Campania. The lab cataloged and collected data on plant biomasses, structuring them into datasets and representing them in infographics and shapefiles for geo-referenced visualization via GIS software. This phase included updating the state of the art and creating a database useful for implementing a local circular model, promoting sustainable management of natural resources.

TEXLAB FOR EDUCATION: SUSTAINABLE FASHION LANDSCAPES, DEFINING NEW FASHION VALUES THROUGH CO-CREATIVE RECYCLING

The project "Sustainable Fashion Landscapes" promotes a co-creative ecosystem focused on social and design innovation, raising awareness about the impact of human activities on the ecosystem. It explores new models of consumption and production by valorising textile excesses (deadstock) and creating a capsule collection (Fig. 03). Cataloging pre-consumption and post-production resources is crucial for selecting fabrics to transform into innovative products. This project involves volunteer organizations, national stakeholders, and the Master's Degree Program in Design for Innovation, with a focus on Fashion and Textile Design, enriching the skills of students and women, such as those from the Centro REMIDA Napoli, which is dedicated to environmental responsibility and social inclusion. In collaboration with Tessuti di Sondrio, the project "SARTE" offers training opportunities for women in difficulty.

Master's students in Fashion Eco-Design collaborate with expert designers and seamstresses from social tailoring to create a capsule

From farm
to Clothes / Herewear
→ Bio-based textile
from circular economy

TexLAB Lifecycle Map

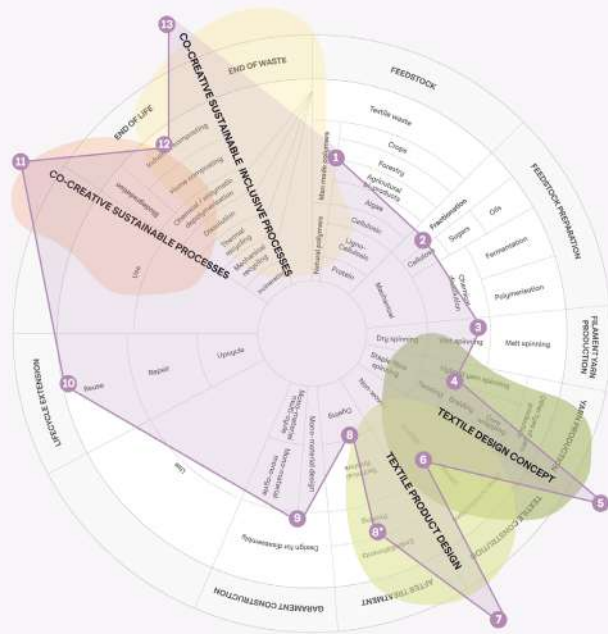


Fig. 01



Fig. 02



Fig. 03

collection using reclaimed fabrics. The designers work on creating gender-fluid garments, using recycled materials and hybrid manual and digital techniques, with colours inspired by nature. The project promotes inclusivity and Body Positivity, designing garments that challenge traditional notions of masculinity and femininity. Training and collaboration are central to the project, offering continuous learning pathways that engage women, designers, and students. Recovered textile resources are processed through creative recycling techniques, and the integration of various experiences helps to form an aware and proactive community. The creative process includes prototyping, blending traditional tailoring techniques with modern practices. The resulting garments meet aesthetic needs while reflecting expressive values, with styling and communication promoted through exhibitions, such as Milano Unica 2022, and digital content shared on social media. The product packaging uses textile materials from the collection, enriching the consumer experience with informative labels, making the entire process more transparent and engaging for end consumers.

TEXLAB FOR EDUCATION: TEXTILE MATERIALS AND 3D INTEGRATION EXPERIENCE

The course “Laboratorio di Industrial Design 2” at the University of Campania focuses on design oriented toward circularity, promoting the use of local primary and secondary raw materials, with particular emphasis on pre-consumption waste as valuable resources. The students were guided in defining new co-creative nodes within the value chain, emphasizing the importance of synergy between production sectors, waste recovery, and the integration of advanced technologies to develop sustainable products.

The projects developed highlight how waste recovery can be integrated with Additive Manufacturing (AM), particularly through the use of 3D printers, to transform materials destined for disposal into valuable components for Design and Fashion Design: Project 1: Wool Waste Recovery The first project focuses on recovering waste from the wool supply chain, particularly discarded spools due to issues like inconsistent fibers and impurities. To valorise these materials, a two-step process was adopted: the wool threads were treated with fish glue and spread on a flat surface to form thin sheets. A 3D structure was then designed to support the treated sheets and threads. The integra-

tion of textile surfaces and printed structures led to the creation of custom-designed components, such as lamps, leveraging the complex geometries enabled by AM technology. Project 2: Dairy Waste Recovery The second project focuses on recovering local dairy waste, combined with agar to create a soft, flexible material. This material was then used to produce a dynamic lamp, highlighting the interaction between natural materials and advanced technologies to generate sustainable solutions. Project 3: Cotton Waste Valorisation The third project addresses the valorisation of cotton waste unsuitable for industrial production, combined with sound-absorbing materials to create modular panels for Interior Design. The inclusion of denim scraps enriches the product, adding aesthetic value and soundproofing performance (Fig. 04). Project 4: Chronophotography and Parametric Modelling The fourth project explores the integration of chronophotograph and parametric modelling, focusing on discretion and temporal continuity in Fashion Design. The captured movements were translated into graphic sequences that connect aesthetics, painting, and dance, demonstrating how the integration of tools and technologies can redefine the visual codes of contemporary design. These projects emphasize the potential of circular design and the synergy between materials and technologies, while addressing sustainability in both environmental and social contexts. Through hands-on experimentation and research, students are actively contributing to the development of innovative solutions that challenge traditional production models and contribute to a more circular, sustainable design ecosystem.

OPEN DISCUSSION

The paper emphasizes the crucial role of collaboration across different sectors, enhanced by the adoption of advanced technologies, to develop innovative and sustainable solutions in fashion and industrial design. The integration of recovery materials and waste with emerging technologies optimizes production processes and opens up new design opportunities to address environmental challenges. The synergy between design, material science, and technological innovation is vital for the future of industrial design and sustainable fashion. A key example highlighted is the combination of repair design with a regenerative approach, supported by research-action pathways. This synergy employs software and tools for



Fig. 04

analysing both qualitative and quantitative scientific data to configure context-specific solutions. Regenerative design approaches promote local self-sufficiency models, valuing both material and immaterial resources (Sbordone et al., 2022). The research conducted at TexLAB explores integrated solutions to develop products from locally available resources. Through collaboration with industrial partners, the project utilizes residues from agricultural, forestry, and algal biomass, contributing to the redefinition of supply chains in sectors such as textiles, bio-composites, nutraceuticals, and wellness. This approach applies and encourages bioeconomy at the local level, responding to sustainability needs. Design, as an engine of transformation, is based on durable strategies derived from practical experiences and integrated theories. This approach fosters a circular, regenerative, and interconnected economy, capable of promoting prosperity that is not limited to material wealth but extends to the creation of a satisfying and balanced life in harmony with the social and environmental context. Therefore, prosperity goes beyond economic growth and embraces collective well-being and environmental sustainability. In conclusion, a shift towards systems-thinking and

circular economies in design, supported by technology and collaborative networks, is fundamental for a sustainable future. By leveraging local resources and fostering cross-disciplinary cooperation, the design field can actively contribute to both ecological restoration and social equity. This vision not only advances environmental goals but also creates new pathways for social innovation, ensuring that the future of fashion and industrial design is both responsible and regenerative.

CAPTIONS

[Fig. 01] TexLAB Lifecycle Map. Life cycle assessment of laboratory experiences on biobased textiles. (Infographic reworked by Amato, 2022; TexLAB, 2022).

[Fig. 02] Hemp-Nettle Blending. Innovative configuration for apparel applications. (TexLAB, 2024).

[Fig. 03] Rethinking deadstock. Advanced pattern prototyping from co-creative recycling process (REMIDA Napoli, and TexLAB, 2022).

[Fig. 04] Cotton waste valorization. Sound-absorbing modular panels for indoor solutions. (TexLAB, 2024).

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SENSORIAL MATERIALS

SONIC PALETTE

AN EXPERIMENTAL EXPLORATION FOR INCLUSIVE FASHION PRACTICES

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Abstract

We have a palette of colors, but what if we take sounds as a starting point for designing practice? What could be a sonic palette for sonic wear? This paper introduces new ways of thinking with the body in time and space as a sonic composition. It presents experimental research on fabricating sonic material using 3D printing on textiles technique for developing different sonic expressions as musical notes. This experimental *Sonic Palette* is seen as a way of bringing awareness about otherness, and commonness with those with visual impairment while exploring alternative possibilities and unusual approaches to materials. *Sonic Palette* introduces a new experience of wearing, nonetheless, it suggests an experimental language, extended vocabulary, and expressions in the field of fashion and textile design. Aesthetics of interaction and experience rather than aesthetics of appearance propose considering garments as musical composition and musical instruments. The expansion of sensory plentitude and expressiveness of materials with non-visual, experience-based, and time-based expressions is an example of inclusive ways of thinking, designing, and presenting fashion for example for those with diverse visual abilities.

Keywords: *Experimental aesthetics, Sonic fashion, Sonic palette, Inclusive fashion practices, Alternative materials and design methods*

BACKGROUND

“Sometimes I want to avoid using my white cane as it has a negative association with regard to my blindness. Then I am wearing a polyester sport jacket and walking in the city; it makes a lot of sounds so I can echolocate. Or I am following a person with high heels and this person becomes my guide even without knowing it!”

From the interview with research participant, June 2017, Vilnius, Lithuania

FASHION ACOUSTICS

In the majority of fashion research, fashion is considered and approached from visual perspectives. Such aspects are generally over-represented

in mainstream perspectives on fashion. However, which other layers constitute identity? Although identity in fashion is visually dominated, sound adds another layer and can be considered to be another part of the construct of the self. If you close your eyes you can hear people talking, breathing, walking, etc. Fashion also comes into play: the bouncing of metal bracelets is audible as an arm moves, as are the zipping or unzipping of a synthetic sports jacket, electrostatic rasp of someone taking off a knitted sweater during winter, clacking of high heels and squeaking of sneakers (reference left blank for anonymous submission). The steps of individual people are identifiable aurally due to their gait. We seldom think about the ‘voice’ of materials and garments, and yet the diversity of

their sonic expressions is unique and inspiring. The sonic expressions created by brushing, rubbing, pulling, pressing, stretching, etc. fabrics provide a rich sound world that is capable of focusing our ear on a deep level of attention to detail (Beilharz & Vande Moere, 2008). “The squeaking of silk, the crackling of faille, the rubbing of wool, the purring of velvet, without mentioning the tinkling of embroideries are all different sounds made by fabrics, in movement” (Ibid., p. 112). The investigation into sonic expressions began with this potentially interesting area of material exploration moving towards the field of sonic fashion in order to find new research methods, suggest alternative approaches to fashion, and propose fundamental knowledge.

SOUND IN FASHION AND TEXTILE DESIGN

Research into sonic form and expression in the field of design demonstrates that sound is generally used in the context of industrial and product design; product sounds are often tackled within the fields of engineering and acoustics (Lemaitre et al., 2010; Özcan & Van Egmond, 2006; Zetterblom, 2008) or in the context of interaction design (Franinović & Serafin, 2013; Frauenberger & Stockman, 2009; Hermann et al., 2011). For a long time, sounds emitted by products have been regarded as noise, and therefore as undesirable product features that should be reduced or eliminated. The implications for sound design relate to the natural tendency of product designers to analyze the ‘sound problem’ in isolation from other product properties, leading to sound being considered mainly as a secondary quality in design processes (reference left blank for anonymous submission). Due to the fact that the visual aspects of a product are considered to dominate the communication of the desired product concept, sound is generally expected to fit the visual character of a product. In *Basic Semantics of Product Sounds* (Özcan & van Egmond, 2012), Özcan and van Egmond claim that designers lack tools with which to model sound. When sound is applied in the field of fashion design, it is usually in the context of smart textiles or soft wearables (Berglin, 2013; Dumitrescu, 2013; Tomico & Wilde, 2015) and used to provide an additional property in the form of digital/artificial sound. The embedding of sound-emitting elements in textiles/garments (Ma, 2017; Murray-Leslie, 2014; Paiva et al., 2015; Pesonen et al., 2015) is used in many research projects. Natural sounds (the sounds that

are inherent in the materials) are relatively rarely discussed in relation to fashion. In fashion theory sound is generally presented as an additional part of dress, as in the book *Geisha* (Dalby, 2008). In *Dress Sense: Emotional and Sensory Experiences of the Body and Clothes sound* (Foster & Johnson, 2007), Welters (Welters, 1995) dedicates a chapter to Greek dress, focusing not only on the visual but also on the sonic. In a chapter entitled *The Classification System of Dress* (Eicher et al., 2008), authors consider sound to be a component of dress. The text focuses on the sonic properties of dress and several examples are provided, relating largely to the sounds of steps in different footwear and the sounds of the body itself. The discourse on Sonic Fashion does not exist, it is a new discipline to consider for the education in the field of fashion. It is an interdisciplinary project that merges fashion design, sound phenomenology, and performance art into an experimental and unique discipline—Sonic Fashion.

SONIC FASHION

The artistic research project Sonic Fashion investigates and develops the foundations for the Sonic Fashion that is unique to the fashion field. The primary foundational theory on Sonic Fashion was introduced for the first time in the fashion field within the PhD research (reference left blank for anonymous submission). While developing this first primary theory for Sonic Fashion, the main focus was on developing alternative methods for introducing, designing and presenting sonic expressions for building the foundations for further research. To develop the mentioned methods, there were a series examples made of sonic garments and accessories that were assembled from different found materials. As the materials used for fashion are based on visuality, it was difficult to find textiles that would make sound, thus, alternative ones were used, such as materials for building and advertisement. It identified a gap in the field that could be filled with the new foundations on Sonic Textiles and Sonic Wear. Therefore, this research project puts the main focus on developing the original sonic textiles that would be later applied for designing sonic wear. By composing the sonic textiles into garments, the sonic silhouettes will be created as a music composition that is a novel approach to the dressed body.

The main contribution of this research project, such as the palette of sonic textiles,

vocabulary for sonic expressions, design methods and tools, will expand the knowledge in the fashion design field and even beyond it. This paper presents primary experiments and introduces them as sound-based thinking and designing practices and it works as a suggestion and alternative proposition for inclusive fashion and textile design practices. During the previous research, the project leader developed the foundational theory (reference left blank for anonymous submission), methods for designing with non-visual materials, a toolkit of sensorial objects—Sound to Wear, and the digital platform—Sonic Fashion Library, which all serve as a basis for the research project Sonic Fashion. The toolkit Sound to Wear was revised and several possible directions for this research were found, such as layering objects on each other, composing objects on the surface, using abrasive surfaces, and adding long bouncing details [Fig. 1]. Few tests were done with 3D printing, thus, showed a big potential for embedding the mentioned ideas for designing novel sonic textiles as the technology is flexible and suitable for developing various abrasive surfaces, designing shapes, choosing different filaments, and filling percentage of shapes—that all could influence the sounding expression. The 3D printing technology in the field of fashion is mainly used for the development of visual designs (Chan et al., 2020; Fanglan & Kaifa, 2021); 3D printing has not been used yet to create natural sounds with textiles in relation to sonic fashion, thus, it opens the potential for new application within technology. Therefore, the 3D printing on textiles technology was chosen as the main one for fabricating and developing sonic material that will suggest the Sonic Palette for creating sonic wear (Fig.01).

RELATIONS AND INTERACTIONS: ACTING BODY AND REACTING MATERIAL

In Sonic Fashion, the dressed body is considered to be a sonic form that consists of temporal properties and temporal composition. Looking at and listening to a body wearing high heels are fundamentally different experiences (reference left blank for anonymous submission). Thus, from an auditory perspective, the dressed body is understood as a dynamic, temporal form, rather than a static one, as it is in visual representation (e.g. photograph). The shift of focus—from visual to audial—thus constitutes a reorientation in terms of design thinking and design modes to ones based primarily on sound. Temporal-

ty and changeability over time and linear sequences in which an artwork/object enfolds over time are the main features with regard to composition and expression (Levinson & Alpers, 1991). In a worn sonic composition, just like with an instrument, different body acts result in different material sonic expressions. Hence, the movement of the body is a potential source for sonic expressions to happen. This ‘meeting point’ between an acting body and reacting material becomes the main focus for how the methodology on the sonic wear is developed. The relation of body-dress that is in focus for the investigation could be unfolded into a threefold interaction of moving-touching that results in sounding. These three different interactions – moving-touching-sounding – are the basis of ideating and fabricating the primary palette of sonic textiles (Fig. 2).

MOVING: HORIZONTAL, VERTICAL AND POINTAL

The relational interactions of body-dress could be described as re-action: the body movement activates: through this kinetic-tactile action — and the dress responds as a sound. There are various ways we interact with dress. The main wearing act in the context of the everyday performativity of a dressed body is walking, which means that sonic expressions are defined by vertical movements of the arms and legs. These movements occur in conjunction with a part on the opposite side of the body, in the words of Von Laban (1966, p. 21) — “contralateral”. As well, vertical movement includes lifting or bending the arm/leg which could result in sliding, or rubbing the materials of the dress. Horizontal movement involves the body parts moving along the horizontal axis, such as rotating head, moving arm(s) or/and legs horizontally, and rotating feet/foot. Pointal movement refers to the movement of joints that are rotation and bending-based and result in the tactile interaction of shaking, pressing, and squeezing material of the dress.

Figure 03 introduces an experiment with designed sound-tools worn on the body. Each sound-tool 1-5 has a different sonic expression and is designed for a specific body act. The experiment is based on analyzing the complexity of a sonic silhouette. This sonic complexity is exemplified by the designed sounding body-objects for specific actions: lifting and lowering the arm, walking, shaking, and rotating/swinging the head [Fig. 3a]. The image identifies the spatial



Fig. 01

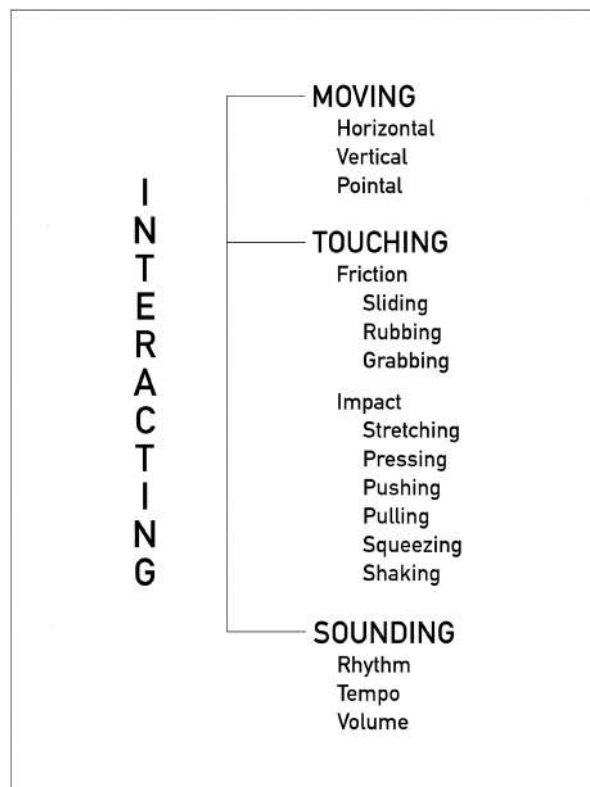


Fig. 02

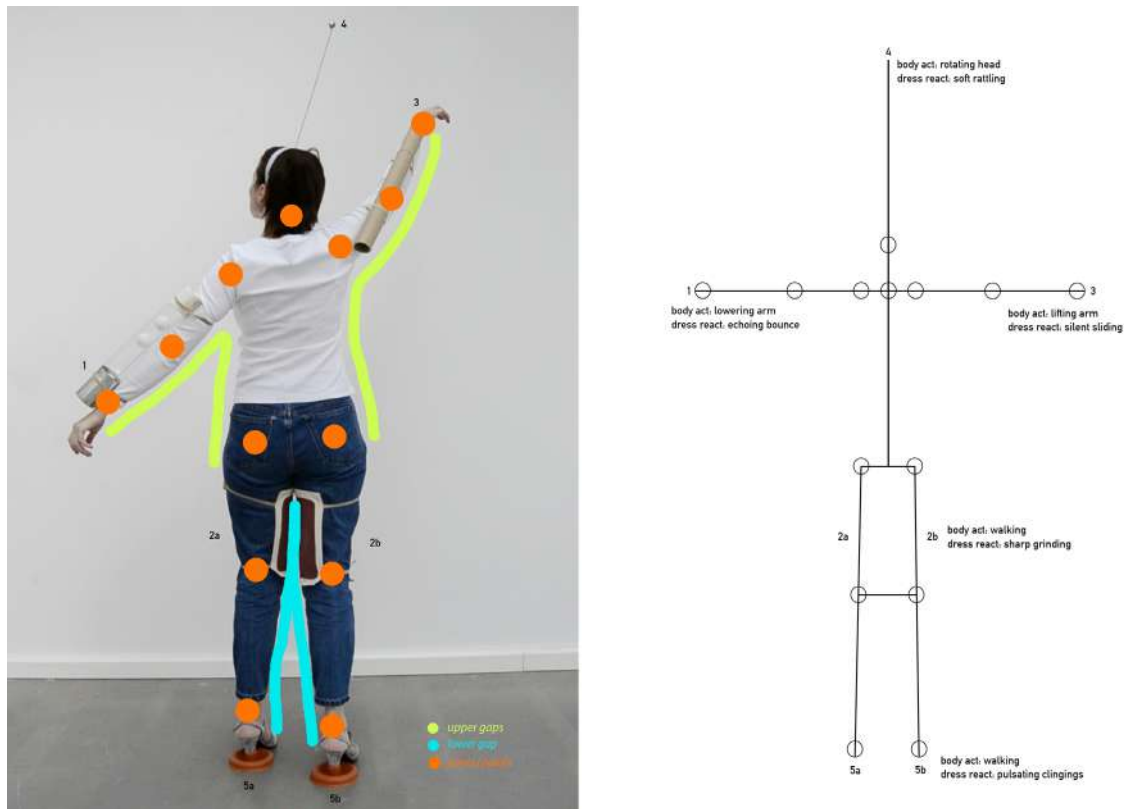


Fig. 03

relation of the location of the sound-tools that are activated through movement. The main ‘sound clusters’ are situated around the feet, “upper gaps” (space between the arms and waist), “lower gap” (space between the legs), and above the head. The exemplified sketch of sound embodiment suggests possible sonic expressions that could be designed in relation to movement and touch (body-to-material and material-to-material): rotating head will sound like a soft rattling, lifting or lowering the arm could result in silent sliding or echoing bounce, walking could elicit a sound of sharp grinding and pulsating clings (Fig. 3). The sonic expression of the moving body involves different tactile interactions, such as friction and impact and could be expressed differently over time, in different rhythms, tempos and volume. The tactile and sonic aspects are introduced in more detail in the following subchapter.

Touching: Friction and Impact

Many of the sounds we hear in the everyday world involve the friction of one material moving against or impacting another. Similarly, body movement results in contact sounds resulting from friction and impact. Sound is transformed in the same

way as material changes as it moves, depending on the kind of surfaces’ tactile-kinetic interactions that take place. The sonic expression of a surface varies if it is e.g. rubbed or squeezed. Therefore, the surface of a material is crucial to its sonic expression. Tapping an object, placing it against another, letting one fall—all of these actions involve impact sounds. Impacts are basic events in the sense that they are produced by a simple interaction of objects; combinations of impacts may produce more complex events such as footsteps or the bouncing noises of details. The interactions and materials that make up sonic events are relatively independent of one another: “The interaction type could be very different in sonic expression: hitting, tapping, scraping the same object could be different in relation to sound. [...] the series of impacts may be modeled as a continuous waveform describing the forces on the object”. (Gaver, 1993a)

The body-dress tactile interaction can be frictional and involve sliding, rubbing, or grabbing; meanwhile, the impacts on materials can contain stretching, pressing, pushing, pulling, squeezing, and shaking (reference left blank for anonymous submission). The previous study on everyday actions of wearing and (un)dressing demonstrat-

ed the main tactile interactions, such as sliding, rubbing, stretching, pressing, pushing, pulling, squeezing and shaking, which could be grouped into (i) friction and (ii) impact sounds and can be summarized as follows. (Reference left blank for anonymous submission).

The summarized tactile-kinetic interaction types during wearing:

Friction: sliding, rubbing, grabbing

- material-material interaction: sliding, rubbing;
- body-material interaction: sliding, grabbing.

Impact: pressing, squeezing

- material-material interaction: squeezing;
- body-material interaction: pressing, squeezing.

The summarized tactile-kinetic interaction types during (un)dressing:

Friction: sliding, rubbing, grabbing

- material-material: sliding, rubbing;
- body-material: sliding, grabbing.

Impact: pressing, squeezing, pushing, pulling, stretching

- material-material: pressing, squeezing;
- body-material: pressing, squeezing, stretching, pushing, pulling, shaking.

Sounding: Rhythm, Tempo and Volume

Sounding can be influenced by rhythm, tempo, and volume. In simple terms, tempo is how fast or slow a piece of music (in this case, the sound of material) is performed, while rhythm is the placement of sounds in time, in a regular and repeated pattern. Tempo generally is measured as the number of beats per minute, where the beat is the basic measure of time in music. Meanwhile, rhythm can be thought of as the pattern of sonic composition in time. Volume is the perception of loudness based on the intensity of a sound wave. The higher the intensity of a sound, the louder it is perceived and the higher the volume it has. Volume could be described by the loudest emitted sound—the true peak. These three main characteristics of sound are significant to mind when ideating and designing sonic textiles as it can differ and bring intriguing sonic expressions. When designing a sonic palette, designers could think about the pattern of 3D print as it would result in a different rhythm and, thus, the location on the body would inform the tempo of how the sound is ‘played’. Also, the volume could be designed while fabricating the 3D print, e.g. varying the size, thickness or/and length of the 3D printed structures.

SONIC PALETTE

3D printing on textiles for fabricating sound expressions is a new material experience that was not researched before. Designing with a new application of already existing technology allows the designer/researcher to define the applications through “unique user experiences, identities for materials and new meanings may be introduced” (Karana et al., 2015, p. 39). The investigation starts by developing textiles with a single sonic expression as small-scale samples. The 3D prints were designed by research project Sonic Fashion participant, textile engineer Dr. Razieh Hashemi Sanatgar by using the Rhino 3D design program and 3D printed with Prusa 3D printer. The tests were printed on the net-like textile with the intention that they would later be used as a textile for upscaled sonic garments. The examples were 3D printed with Polylactic Acid (PLA) filament and PLA composites. Polylactic Acid filament is a recyclable, natural thermoplastic polyester that is derived from renewable resources such as corn starch or sugar cane. The main geometric form – tube – was selected for the first examples for to make comparison and analysis easier.

The very first primary exploration for possible sonic textiles by 3D printing on textiles started with 5 different filaments: 1) PLA (Polylactic acid), 2) PLA with copper, 3) PLA with wood, 4) PLA with carbon, and 5) PLA with steel. Within the mentioned filaments the different density level of the tubes (the percentage of 3D print infill) was investigated while using 2 filaments: 1) PLA with copper and 2) PLA with carbon filaments.

Primary examples of sonic textiles:

Example 1: PLA with carbon, hollow tubes (0% infill);

Example 2: PLA, solid tubes (100% infill);

Example 3: PLA with carbon, solid tubes (100% infill);

Example 4: PLA with steel, solid tubes (100% infill);

Example 5: PLA with wood, solid tubes (100% infill);

Example 6: PLA with copper, hollow tubes (0% infill).

Three examples were sounding similarly and the other three tests were making different pitch sounds. The two chromatic tuners were used to test the sound frequency: Chromatic Tuner A (Fig. 1a, Chromatic Tuner A) and Chromatic Tuner

B (Fig. 1b, Chromatic Tuner B). The examples 1, 2 and 3 have different pitch: F#, G# and D#; the examples 4-6 have the same pitch: D#. As presented in Figure 4, example 1 and example 6 have the same geometry - tubes - and both 3D prints are hollow (0% of filling), however, the pitch is different (respectively F# and D#) due to the different components of the filament: example 1 was printed with the composite of PLA and carbon and example 2 was printed with the composite of PLA and copper. The density of the 3D print (percentage of infill) can affect the pitch of the sound as well examples 1 and 3 demonstrate it: both examples are printed with the same filament composite (PLA with carbon), the same geometry, but the musical note of the examples are different: example 1 is F# and example 3 is G#. Hence, the idea of creating sonic textiles that have various notes/pitches shows an exciting potential for the development of the Sonic Palette. The collection of various sonic textiles that sound differently could be potentially interesting for making a sonic garment as a sonic composition. The next step could be to try various shapes and density levels that could influence the sound of textiles. As well, these examples of a *monophonic expression* when the textile has one sound could be further developed into a *polyphonic expression* when several different sounds are composed onto one textile. The examples presented here are the primary examples of testing the idea of the Sonic Palette that will be further developed within the research project Sonic Fashion into Sonic Wear (Fig. 04).

CONCLUSIONS

The paper introduced the experimental approach to textile and fashion field while focusing on auditory qualities and aesthetics of design expressions. This kind of sonic-thinking is introduced by bringing in 'material thinking' (Karana et al., 2008), experience-oriented perspective, experiential interaction design (Su & Liang, 2013) and soma design methodology (Tsaknaki et al., 2019). It extends the expressiveness of materials in regards the multisensory expression: "soma design requires training your ability to aesthetically appreciate through all your senses, but also to imagine — through your senses, movements and material encounters — what could be." (Tsaknaki et al., 2019, p. 1237). This radical creative experiment challenges the field of fashion and textile design towards more inclusive design

practices at the expense of sensory plenitude. The cultivation of sensibility and inclusivity in fashion and textile design education suggests alternative approaches, design methods and original time-based expressions, such as sonic ones. There is a limitation regarding the fashion vocabulary as it is very based on the visual appearance. This experimental fashion aesthetics, which is based on interaction and experience rather than aesthetics of appearance, broadens the vocabulary by expanding it with sonic expressions and proposing the 'titles' of new 'colours' for fashion, for instance, soft rattling, silent sliding, echoing bouncing, sharp grinding, pulsating clings, etc. It opens up for a unique sonic vocabulary for fashion and textiles that is a significant contribution to the field.

Thinking and designing with sound proposes different design variables, such as symmetry/asymmetry, volume intensities (silent-loud), location of the sound in connection to the body part that will be moved, the directionality of sound, etc. There are various properties to think about when designing the sound, for example, the configuration of an object — its shape and size. Size determines the lowest-frequency vibrations that an object can make: large objects tend to make lower sounds than small ones. The shape of an object determines the frequency and spectral patterns produced (Gaver, 1993b). The internal structure of a material, e.g. density level has complex effects on its vibration, particularly in the temporal domain (Ibid.). When designing the pattern for the 3D sonic print it is important to consider the pattern of it as it influences the rhythm and tempo of the sonic expression. As well, the material of 3D print is significant for fabricating the designs: different composites of filaments will result in different sonic expression. All of these mentioned sonic properties introduce the potential ideas for design methods to evolve that would serve as a foundational practice for inclusive fashion design practices.

The primary study on Sonic Palette that is presented within this publication introduces the ideating process and proposes various design variables for designing with sound. The three main characteristics of sound (tempo, rhythm, volume) are significant to mind when ideating and designing sonic textiles as it can differ and bring intriguing sonic expressions. When designing a sonic palette, designers could think about the pattern of 3D print as it would result in a different

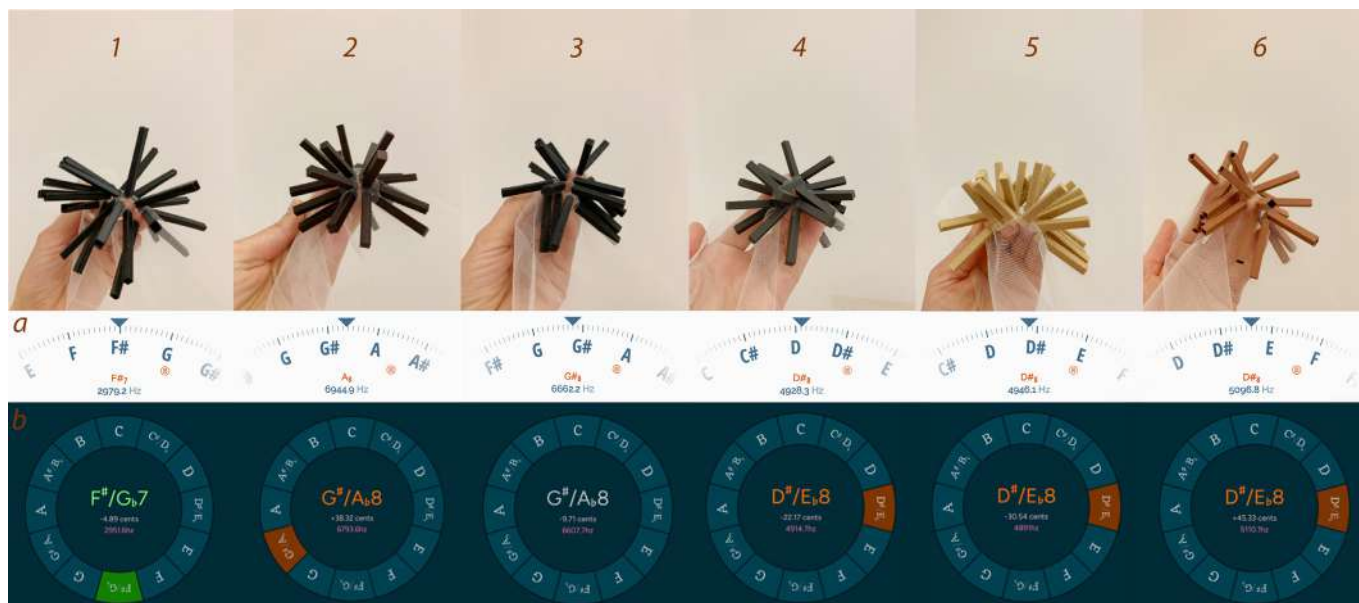


Fig. 04

rhythm and, thus, the location on the body would inform the tempo of how the sound is ‘played’. As well, the volume could be designed while fabricating the 3D print, e.g. varying the size, thickness or /and length of the 3D printed structures. Thus, the process of sound-based design thinking and ideating originates from the act of a moving body and reacting textile, as well as locating the sound on the body in relation to its activation form: e.g. horizontal sliding, vertical rubbing, pointal shaking, etc. This kind of ‘sonic-thinking’ introduces a unique way of exploring textiles and fashion and suggests new methods for designing garments as a sonic composition.

The research on Sonic Fashion is an example of how we as designers and design researchers/educators could train and expand our preconceptions of what dress could be, suggests new design methods, and broadens vocabulary for aesthetic expressions. While diving into this contrast dimension (from vision to sound) and expanding thinking and experiencing fashion through listening practices, e.g. through listening to sonic textiles, one becomes each time more sensitive for different sonic nuances. As Latour (2004) noted: “<...> the more contrasts you add,

the more differences and mediations you become sensible to.” By taking this radical approach to such a visual field as fashion, the aim is to encourage the students, peers, and design professionals to try different methods and more inclusive aesthetic expressions. An investigation into sonic expressions is seen as a disruptive fashion practice: it explores how critical fashion practices can construct more inclusive understanding and alternative creative practices. It is an experimental artistic example of the cultivation of sensibility and inclusivity in the field of fashion design and beyond it in order to develop the ideas of multi-faceted shared well-being. This paper introduces an alternative approach to fashion to think and design garments as invisible, time-and-interaction-based expressions while developing an alternative palette of sounds rather than colors. In this way, the aesthetic expressions are available to engage and experience for a broader community such as for those with visual impairment.

ACKNOWLEDGMENTS

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CAPTIONS

[Fig. 01] Vidmina Stasiulytė; Revising the Ph.D. research Sound to Wear toolkit for potential ideas for sonic textiles: a. layering objects on each other, b. composing objects on the surface, c. using abrasive surfaces, d. adding long bouncing details. Image credits: a. Jan Tepe, b. Vidmina Stasiulytė, c. Faseeh Saleem, d. Jan Tepe. PhD research funded by the European Union's Horizon 2020 Research and Innovation program under the Marie Skłodowska-Curie grant agreement No. 642328.

[Fig. 02] Vidmina Stasiulytė; Sonic design variables of kinetic-haptic-sonic interaction: moving, touching and sounding. (Stasiulyte, 2020).

[Fig. 03] Vidmina Stasiulytė; a) Analysis of relations between moving body and sounding material through an ensemble of dress/sound-tools, and b) a schematic representation of the body and dress (Stasiulyte, 2020).

[Fig. 04] Vidmina Stasiulytė (author), Razieh (3D designer); Research project Sonic Fashion, funded by The Swedish Research Council, grant agreement ID: 2021-01399; Image taken and compiled by Vidmina Stasiulytė.

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NATURE, WEAVE AND COLOR

PLANT RESOURCES IN THE SUSTAINABLE DESIGN AND MANUFACTURE OF ACCESSORIES FOR PROSPERITY FASHION

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Abstract

This article presents an innovative methodological alternative devised from both a technical and artistic approach, in order to offer a systemic response to sustainability in the fashion industry through the use of ecofriendly materials and techniques, inspired by artisanal tradition and knowledge of nature, on which research is carried out by determining and formalizing the final product. An analysis of natural fibers and pigments has been carried out, as well as experimental tests with chromatic treatment and plant printing techniques, such as “Ecoprint” and “Shibori”, which have resulted in the design and development of a tote bag model as a practical example. From these initial solutions, the project remains open to the incorporation of new patterns and traditional techniques, always respecting ecological processes. This initiative aspires to consolidate itself as a comprehensive sustainable fashion proposal that, since its inception, is committed to authenticity, aesthetics and respect for the environment.

Keywords: *Natural materials, Botanical dyes and textiles, Sustainability, Design, Handicraft*

INTRODUCTION

The history of natural fabrics and dyes is centuries old, being used and perfected over the years by our predecessors until the arrival of the Industrial Revolution. Since ancient times, colors have been used to enhance life, whether through art, jewelry, body paint, tattoos, or dyeing clothing. Colors served to indicate social status, protect against evil spirits, and provide pleasure. Dyes were derived from sources such as mollusks, lichens, insects, minerals, peat bogs, and plants (Flint, 2008). This era modified the processes, opting for more complex and polluting ones, changing natural fabrics and pigments for new materials of synthetic origin, with the aim of reducing costs. This change has had and continues to have adverse effects on

nature, especially on water resources, which are already scarce.

The present research developed in Spain at *Universitat Politècnica de València*, UPV, from the *Faculty of Fine Arts* and the *Art and Environment Research Center* within the unit: *Languages, Techniques and Pictorial Processes*, tries to offer within the field of fashion industry alternative techniques and procedures that increase eco-sustainability in its function.

This project devises and materializes a series of textile accessories made from ecological materials and processes. The interest in this topic arises from the need to look for sustainable alternatives in the production of products, which are in tune with the values of preserving and protecting

the environment and minimizing the impact that our products cause on the environment.

According to Mancuso (2017), plants have historically devised optimal solutions to many of the challenges faced by humans, encompassing aspects such as resource efficiency, energy autonomy, resilience, and complex adaptive strategies. Over millions of years of evolution, plants have fine-tuned their responses to environmental stressors, mastering ways to thrive in even the harshest conditions. Learning how and where to observe these natural solutions is essential, as they offer a wealth of knowledge that remains largely untapped by human innovation.

Mancuso encourages us to study these natural processes closely and to recognize that plants do not merely survive or adapt to their environment, but actively contribute to optimizing their ecosystems. Plants participate in a highly efficient resource management system, in which each component plays a role and nothing is wasted. They create a closed cycle in which nutrients are reused, waste is minimized and energy is maximized. By examining how plants achieve this level of efficiency, we can discover valuable strategies for addressing today's environmental challenges, especially in pollution management and waste reduction.

In parallel to the scientific-technical study, the suitability and usefulness of some plant fabrics and pigments is tested through various experimental experiments in the creation of sustainable fashion accessories, such as totebags.

These searches have demonstrated their benefits and processual characteristics, with the emphasis on artisanal production, using natural fabrics and implementing dyeing and vegetable printing techniques such as Ecoprint, Bundle Dye and Shibori. The confection, in turn, is configured as meticulous and personalized work, from the design of patterns to the execution of the sewing, practices that give each product inherent authenticity and uniqueness.

Now we are able to rediscover sustainable alternatives like those of our ancestors, without their costs increasing excessively, which also allows us to differentiate our products from those produced in series. This entity not only symbolizes a fashion proposal, but also aspires to merge contemporary aesthetics with artisanal tradition, presenting exclusive products that have in their entirety an essential consideration of respect for the

environment. An initiative that we have promoted through the creation of a series of totebags that address the distinctive essence of this collection and gives us the opportunity to introduce these manufactures to the market. The initial progress of this study is based on the ideas developed in a previous investigation, which explored the integration of natural pigments in artisanal textile printing processes. Pigments have started to be applied, and although it is still too early to draw definitive conclusions, preliminary results suggest that the use of these natural dyes could significantly reduce the environmental impact of fashion accessory production (Escandell, 2024).

In this way, the present work tries to contribute to defying the concept of "prosperity fashion" by integrating sustainability as a synonym for success, manifested through the revitalization of ancient dyeing techniques with natural pigments and the handcrafted creation of textile accessories.

MANUFACTURING PROCESS AND ETHICAL ASPECTS

Fashion, identified by the United Nations Conference on Trade and Development (UNCTAD) as the second most polluting industry after oil, faces an urgent need to integrate sustainable practices throughout its entire production chain. The textile process involves multiple stages, starting with the preliminary procurement of raw materials, which can be of two types: natural fibers, the more traditional ones, derived from plants and animals (such as cotton, wool, linen, and silk), or synthetic fibers, the more recent ones, produced through industrial processes using petrochemicals (such as polyester and nylon). The extraction of natural fibers, with its corresponding agricultural process, and the processing of synthetic fibers, which requires chemical manipulation, pose complex environmental challenges. Spinning and weaving the fibers involve different methods that affect the texture and strength of the resulting material (Manzano, 2014). Bleaching, necessary to remove the natural color of the fibers, often involves chemicals that require responsible management to prevent environmental harm. Similarly, the treatment and printing processes use natural or synthetic dyes that must be properly handled to minimize their impact on ecosystems (Smith & Block, 1982).

Regarding industrial approaches, "fast fashion" has contributed to increased production

and rapid obsolescence of garments, while “slow fashion” represents a sustainable approach aimed at product durability and quality. This model advocates for ethical practices and responsible manufacturing, promoting mindful and participatory consumption that takes into account the environmental impact throughout the value chain. Both models are immersed in the contemporary context of consumer habits, where “fast fashion” reinforces a consumerist and competitive system, while “slow fashion” offers a more deliberate and committed alternative that prioritizes sustainability.

This debate highlights the need to rethink current textile practices and suggests the possibility of a shift towards more sustainable and ethical alternatives. This shift involves not only reducing the production of new goods but also encouraging the creation of durable items, using quality materials and techniques that minimize environmental impact. In a scenario where fashion reflects not only trends but also ethical and environmental values, it is essential to understand the role these practices play in consumer purchasing decisions. According to the assessments in Megan Mary Adriana O’Driscoll’s thesis, the solution to the problem of fast fashion is to promote and create more ethical fashion initiatives:

To understand ethical fashion, one must learn the meaning of what the word “ethics” means. Ethics is based on well-founded rules of right and wrong that prescribe what humans should do, usually in terms of rights, obligations, benefits to society, equity, or specific virtues. The word “ethics” means that the product or service in question has been made with morals, people, and the well-being of the planet in mind. “Ethically made” fashion means made conscientiously. That is, the garment was made by people who enjoyed their work because it gave them a chance and their basic human rights were not abused. It means that the planet was considered, and best efforts are being made within the constraints to reduce the negative impact and create positive impact in some way (O’Driscoll, M. 2018, p. 15).

NATURAL COLOR IN THE TEXTILE PROCESS

This project presents an integrated proposal where several disciplines converge, as its approach considers the coexistence and interaction of various complementary facets, which will be detailed throughout the discourse. As emphasized, while

the historical use of natural dyes, refined over time by various cultures, dates back centuries, it eventually led to the creation of synthetic pigments. The transition to synthetic pigments in the 20th century was initially driven during the Industrial Revolution by growing demand and the need to optimize industrial processes, following the rise of the petrochemical industry (Cardón, 2007). Although this evolution brought economic and functional benefits, it also resulted in negative environmental consequences, affecting both water resources and other ecosystem components.

Societies worldwide have used natural pigments in cultural and commercial practices, making these elements an integral part of their identity. Notable examples include indigo, used in India for textile dyeing and spiritual practices (Flint, 2008), and carmine, derived from cochineal, used in pre-Columbian civilizations in Latin America, later becoming a prized resource for European colonizers (Cardón, 2007). In Europe, the *Rubia tinctorum* plant has been a significant source of plant-based pigments since the Middle Ages, while turmeric, native to South Asia, has been utilized in these regions not only for its chromatic properties but also for medicinal and culinary uses (Duerr, 2011). In such a way that only certain natural components possess dyeing properties, including flavonoids, carotenoids, anthocyanins, tannins, and betalains, which enable the absorption and reflection of different light wavelengths, producing a variety of colors (McLaughlin, 2014). Materials in the focus of this interest that have also been used in recent research from other areas of industry, such as modern food technology:

Recently, the food industry has increased the interest to replace the use of synthetic dyes with natural pigments such as betalains, which are mainly used for the red color they impart. In addition, betalains are substances that have antioxidant and anti-degenerative activity against various diseases. They are water-soluble nitrogenated pigments, betalamic acid derivatives: betacyanines (red-violet) and betaxanthines (yellow-orange). However, the use of said pigments has been restricted due to its instability to various factors, such as temperature, pH, light, water and enzymatic activity, as well as the presence of oxygen and / or metals. The aim of this review was to synthesize the advances on the stability of betalains in the presence of diverse physicochemical factors. (Flores Mancha, M. A. et. al. 2019, p. 318.).

Flavonoids, for instance, generate a wide range of hues from yellows to reds, while carotenoids, being lipophilic, produce intense colors that require more preparation for fixation on textile fibers (Britton, 2008). Tannins are known for their ability to bind to fibers and resist washing, responsible for ochre and brown tones (Petrovska et al., 2015).

In this research, the extraction of natural dyes begins with the collection of raw materials, an essential step that, as Talens (2011) explains, has been a vital practice throughout history. This process not only serves a functional purpose but also represents an act of preservation and a deep, emotional connection with nature. The selection of raw materials is highly influenced by the seasonality and environmental conditions, which play a significant role in determining the types of pigments that can be obtained.

In the case of natural pigments, the availability and quality of raw materials can vary greatly depending on the time of year. During spring and summer, fresh flowers and young plants are ideal for pigment extraction, as their vibrant colors are at their peak. The tender, delicate parts of the plant are harvested when they are most colorful, yielding dyes with bright and fresh tones. In contrast, autumn and winter are more suitable for collecting leaves, barks, and other plant materials that have surpassed their peak maturity. At this stage, these materials are often considered by-products or even waste, yet they provide deep, earthy hues, contributing to a more sustainable practice by utilizing what would otherwise be discarded.

Moreover, the diversity of plant species available for dye extraction is influenced by the specific regional climate and local environmental conditions. Each ecosystem offers a unique palette of plants, allowing for a broad spectrum of natural colors that reflect the distinctive characteristics of the surrounding landscape. The interaction between the plant's natural habitat and its pigmentation properties can lead to unique, location-specific dye profiles that are impossible to replicate with synthetic alternatives.

Extraction techniques are another critical aspect of this process, and they can vary depending on the type of pigment desired and the characteristics of the raw materials. Techniques typically involve dissolving the plant material in either cold or hot water, with each method producing distinct results. Our experimental approach,

using standardized tests, has shown that cold-water extraction tends to yield softer, subtler shades, preserving the delicate properties of the pigments. This method is particularly effective for more fragile plant materials, where heat could degrade the color compounds. On the other hand, hot-water extraction intensifies the color saturation and enhances uniformity when applied to fibers, creating vibrant and consistent hues. The application of heat breaks down the plant cell walls more effectively, releasing a greater concentration of pigments, which results in a richer, deeper color.

This comprehensive approach to material collection and dye extraction not only highlights the importance of understanding seasonal and regional variations but also emphasizes the need to choose appropriate techniques to optimize color yield and quality. By embracing these traditional, sustainable practices, we are able to connect with centuries of artisanal knowledge while also contributing to more environmentally friendly and resource-efficient methods. This aligns with a broader movement towards natural dyeing processes that respect the rhythms of nature and reduce our reliance on synthetic chemicals, ultimately offering a more harmonious and sustainable approach to textile production.

In these tests, techniques such as Japanese *Shibori* were used, which involves tying or folding the fabric to create patterns through dye resist (Wada, Rice & Barton, 2011), and the *Bundle Dye* method, which entails rolling plant materials into the fabric and applying heat to transfer pigments, yielding unique results (Behan, 2018). As seen in Fig. 01, several results of the *Bundle Dye* technique show onion and sumac print on cotton micro-corduroy.

To complement this proposal, the botanical printing technique or *Ecoprint*, derived from the *Bundle Dye* method, was employed, focusing on using flowers and leaves to transfer their natural pigments directly onto the fabric. This technique was included because it allows for the creation of personalized and sustainable textiles, promoting a meditative connection with nature and its cycles (Duerr, 2011). As seen in Figure 02, the left image shows the *Ecoprint* technique, while the right image depicts a hot dye bath with pomegranate peel.

Finally, it is important to emphasize the role of the *Ecoprint* technique in textile printing. Introduced by the artist India Flint, this method



Fig. 01

uses mordants like alum to fix plant colors onto fabrics, maintaining a respectful approach to natural resources. Wrapping the fabric with leaves and subjecting it to steaming allows for the unique transfer of colors and patterns, making it impossible to replicate exact results but enriching each piece with unique singularity (Flint, 2008). On the other hand, in connection with the research recent published by Bordacconi and Galbis on techniques and processes in sustainable artistic production from plant matter, materials of natural origin contain in their own formal and substantial essence a great evocative power to transmit artistic intuitions:

When natural substance becomes material for artistic practice, nature becomes a support and color, a matrix and instrument of its own representation. Matter for artistic practice and not material, deriving beyond this concept, these vehicles are the closest thing to the Aristotelian idea of matter as “mater” or mother, that from which something derives as the primary matrix of becoming (Irwin, 1996). Its plant origin presupposes a relationship with the environment, being the bearer of a history that recalls suggestions about its habitat and place

of origin, as well as its evolutionary process, the result of our use. In itself, its technical processing as an artistic substance contains a metaphorical meaning: from the raw material, which is also the element contemplated, the concrete image of a vision of the natural world and an emotional feeling in relation not only to the plant product, but also to the place lived and experienced, becoming its figurative synthesis (Bordacconi, E., & Galbis, A. 2024, p. 182).

As textile practices evolve, techniques like *Ecoprint* and other forms of natural dyeing offer sustainable solutions that not only preserve traditional craftsmanship but also enhance the connection with the environment. These natural dyeing techniques achieve unique colors on textile pieces, reflecting a commitment to sustainability and craftsmanship. Thus, the project not only meets aesthetic demands but also seeks to maintain a deep bond with nature and its renewable cycle, providing a viable alternative to highly polluting industrial processes. The project has successfully achieved its objectives, supporting a vision where each piece becomes a unique product, born from the commitment between aesthetics, sustainability, and ancestral knowledge.

SUSTAINABLE TOTE BAG COLLECTION

The proposal culminates in the development of a sustainable tote bag collection, distinguished by the application of artisanal techniques and the use of eco-friendly materials. Starting from an experimental approach, through various trials and adjustments, this project has successfully defined and consolidated a final product that meets both functional needs and current market trends in sustainability and aesthetics.

The design evolution began with experimentation on larger fabric formats, exploring different print combinations using natural techniques such as *Ecoprint* and plant-based dyes. Initial trials were fundamental in identifying the best material and technique combinations, offering a detailed understanding of how natural pigments react with different textile fibers. The use of leaves, petals, and bark in the printing process generated unique and organic patterns, each carrying significant aesthetic and symbolic value.

Further experimentation focused on creating patterns and initial prototypes, aiming for a versatile and accessible product design. The



Fig. 02

choice to create tote bags arose from evaluating the selected fabrics ability to provide the necessary structure. Although the simple bag format was preferred for its functional and visual appeal, the potential applications of these techniques in future research are broader.

Throughout this phase, small-scale prototypes tested various patterns and sewing techniques, refining details such as handle size and placement, as well as assessing fabric durability and finish. Challenges with material rigidity led to the use of interfacing for added structure. As seen in Fig. 03, a reversible variant was also developed, offering new possibilities in terms of functionality and aesthetics.

As seen in Fig. 04, the final collection consists of five tote bag models with a cohesive design focus on functionality and aesthetics. The color palette is achieved through natural dyeing processes using materials like pomegranate peel, logwood, cochineal, and Rubia tinctorum, imparting an organic and timeless hue to the designs, underscoring the commitment to sustainability and artisanal methods.

Ecoprint techniques are reserved for exterior elements, particularly pockets, adding a

distinctive touch to each piece. The layout of the prints is carefully considered to achieve visual balance, ensuring each tote bag has a unique identity without overwhelming the design.

Functionality features include quick-access exterior pockets and a drawstring closure system, enhancing both security and aesthetics. The collection embodies key concepts of sustainable design and textile craftsmanship, offering a final product that balances aesthetics and functionality.

CONCLUSION

This project demonstrates its innovative capacity, highlighting the development and application of advanced natural dyeing and printing techniques. The combination of traditional processes with contemporary methods has resulted in a collection that merges artisanal and modern finishes, yielding unique and distinguished designs. The commitment to sustainability has been a priority throughout the creative process, as reflected in the choice of natural pigments and the implementation of responsible and eco-friendly practices.

Research in this field has revealed the potential of sustainable methods, not only as a



Fig. 03



Fig. 04

response to the current environmental crisis but also as a way to revalue ancestral knowledge, granting it a relevant place in modern textile design. This integration of tradition and modernity reflects a growing trend in the fashion industry: the pursuit of more conscious and ethical practices that meet the demands of an increasingly informed and discerning consumer.

In summary, the development of this collection has not only met the stated expectations but has also exceeded the proposed challenges, making a significant contribution to both the field of textile design and the exploration of sustainable techniques. It has achieved a balance between aesthetics, functionality, and sustainability, setting a precedent for future initiatives that may explore similar paths and contribute to the development of more ethical and conscious textile design.

The contributions of the congress seemed excellent to us, demonstrating their transversal value and their ethical and aesthetic commitment. The quality and depth of the presentations, combined with the relevance of the topics addressed, have made this gathering an essential space for reflection on the future of fashion. The effort of the organizers to bring together top-level experts is truly admirable, fostering such a valuable dialogue around sustainability, innovation, and the evolution of the sector. Without a doubt, the ideas and perspectives shared at this congress will continue to resonate and contribute to the development of a more conscious and prosperous industry.

CAPTIONS

[Fig. 01] Ecoprint and color bath. Personal archive.

[Fig. 02] Onion and sumac print on cotton micro-corduroy & bundle dye. Personal archive.

[Fig. 03] Design and result of a reversible tote bag with uniform color and eco-print. Personal archive.

[Fig. 04] Final collection of tote bags featuring eco-print and color bath. Personal archive.

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NEXT-GEN FUR DESIGN

PRIORITISING MATERIAL PROPERTIES

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Abstract

Fur, valued for its various natural qualities, has historically been a staple in fashion, often signifying status. However, traditional animal-based fur is a controversial material increasingly subject to governmental and organisational bans. Alternatives include synthetic and next-gen materials. Although synthetic fur is more sustainable than animal fur regarding carbon footprint and animal welfare, it still contributes significantly to environmental issues, including microplastic pollution. Next-gen furs are animal- and petrochemical-free alternatives. However, their success is challenging to compare with synthetics due to their natural properties and the substantial time and financial investments already made in the latter. Based on traditional secondary research employing a 'capture-edit-search' approach, this investigation explores the potential of defining material properties to be prioritised or avoided when designing a next-gen fur. Starting from an analysis of the traditional material's properties, the attributes commonly associated with animal-based fur are explored to help formulate strategies to consider when designing next-gen alternatives. As demonstrated, it is unlikely that a next-gen replacement for animal fur will fully replicate the material's characteristics. However, in a design-driven transition, knowing what to avoid is as important as knowing what to achieve. Therefore, establishing honest design priorities could contribute to a more prosperous fashion future.

Keywords: *Next-gen textiles, Textile production, Material design, Design research, Circular economy*

INTRODUCTION AND CONTEXT

Unlike other animals, humans create their clothing, symbolising their deep connection with the natural world (Kwasny, 2019, p. 1). Fur, valued for its various natural qualities, has historically been a staple in fashion, often signifying status (Faiers, 2020, p. 82). However, traditional animal-based fur is now closely linked to animal welfare concerns (Bijleveld et al., 2011) and is increasingly subject to governmental and organisational bans (Fur for Animals, n.d.). Alternatives include synthetic and next-gen materials (Gladman et al., 2024). Although synthetic fur is more sustainable than animal fur in terms of carbon footprint and animal welfare (Bijleveld, 2013), it still contributes significantly to environmental issues, such as microplas-

tic pollution, which is particularly damaging to ecosystems like coral reefs (Huang et al., 2021). To address this, innovators are developing next-gen furs free of animal products and petrochemicals (Material Innovation Initiative & Mills Fabrica, 2021). However, the success of next-gen materials is challenging to compare with fossil-based ones, not only due to the inherent properties of the raw materials but also because of the substantial time and financial investments already made in the latter (Lee et al., 2021). Additionally, there is a significant gap between the number of innovations in next-gen fur compared to other traditional animal-based materials like leather, which could be an advantage for next-gen fur innovators (Rawling et al., 2024). This disparity may be due to the complex range

of properties needed for a next-gen material to be a viable substitute for animal or synthetic fur (Gladman et al., 2024).

Hasling & Bang (2015) discuss associative meanings and their impact on designing new materials that embrace aesthetic, technical, functional, and sustainable concerns because materials' physical and social worlds are equally important. While the first is more technical and related to material performance, the second is abstract, created through interaction and experience-based but also essential to the success of a material. Hasling & Bang (2015) also propose a model that outlines materials' attributes split into five groups that range from physical properties to experiential characteristics, including compositional properties, technical properties, sensorial attributes, associated characteristics, and emotional characteristics. Compositional properties cover the natural qualities of the material (e.g. at a molecular level); technical properties cover production processes; sensorial attributes refer to subjective perceptions promoted through interaction with the material; associative characteristics are self-explanatory and cover the associations promoted by a material, including previous experiences; and emotional characteristics relate to emotions, negative or positive. Though subjective, perceptions about a material are important in defining its personality (Ashby & Johnson, 2014). With the understanding that the properties of materials — particularly fur — should be viewed as a gestalt, including the emotions they evoke, waiting for a perfect next-gen replacement could result in a significant loss of valuable research time. This research aims to assist next-gen fur innovators in developing strategies that prioritise honest material goals by emphasising that in a design-driven transition, knowing what to avoid is as important as knowing what to achieve (Tonkinwise, 2014). Thus, next-gen materials should be appreciated for their own unique potential rather than merely as substitutes (Carole Collet, cited in Trinquier, 2024).

METHODOLOGY

To begin this research, it was important to build a foundational understanding of the aims of the scientific study of materials - material science - which is to “understand the fundamental origins of material properties, and, ultimately, to manipulate them” (Ashby & Johnson, 2014). Typical methods used to guide material selection in product design

are selection by analysis, synthesis, similarity, and inspiration (Ashby & Johnson, 2014). Considering that selection by similarity consists of looking for alternatives that mimic the traditional material in ‘all important respects, except, of course, the reason for wishing to replace it’, Ashby & Johnson (2014) propose employing a ‘capture-edit-search’ approach, which starts by mapping the properties of the traditional material, followed by editing constraints and priorities, to search for satisfactory alternatives later. To start this ‘material editing’ process, the designer should ‘capture’ the material’s properties to then ‘edit’ them. This led to the employment of traditional secondary research to define qualities commonly associated with animal-based fur and fur alternatives and the factors that disconnect or connect consumers, which was achieved by reviewing relevant academic papers and grey literature, including fashion websites and online articles to include different points of view on fashion trends concerning animal-based fur and fur alternatives. To build a foundational knowledge of animal-based fur, the book *Fur: A Sensitive History* was essential (Faiers, 2020). In the book, Faiers discusses the material’s long history, associated properties, controversy, and cultural importance, including its association with status, fashion, art, and politics (2020). Concerning fur alternatives, this study highlights current synthetic and next-gen materials. In the case of next-gen fur’s potential and expected properties, reports focused on next-gen materials published by the Material Innovation Initiative were of extreme value (Gladman et al., 2024; Rawling et al., 2024; Material Innovation Initiative & Mills Fabrica, 2021). For instance, in a report entitled *‘What Makes Fur, Fur?’*, Gladman et al. (2024) explore the potential benefits of designing a next-gen fur and the current market gap the material is placed at. Supported by an iterative process, through a literature review, findings were synthesised to map attributes commonly associated with animal-based fur and possibly help material innovators establish priorities (to achieve or avoid) when designing next-gen fur alternatives.

PRIORITISING MATERIAL PROPERTIES

Based on the ‘capture-edit-search’ approach (Ashby & Johnson, 2014), the first step was to conduct a study of the properties of animal-based fur and create the material’s ‘own vocabulary’ based

on the most common words used to describe it (Ashby & Johnson, 2014; Rognoli & Parisi, 2021), which led to the definition of thirteen themes (see Figure 01). These themes, covering physical and abstract attributes, are open to the designer's needs and their research findings and interpretation. Still, they can serve as a guide to help material innovators define and group material properties to prioritise (and potentially achieve or avoid) when designing next-gen fur. The themes, which will be individually explored throughout this section, include: application, appearance, natural properties, attributes related to culture, production, construction, finishing, and maintenance, as well as end-of-life, impact, price, market/industry, and alternatives.

When designing a next-gen material, the application can be defined at the start (Rawling et al., 2024), or later, based on the properties achieved throughout the material's creation (Rognoli & Parisi, 2021). For this investigation, the application is the starting point due to its great importance in the establishment of priorities. For instance, a next-gen fur intended to be applied on handbags does not need to provide the traditional material's thermal-related attributes.

APPLICATION

Fur can be applied to a diverse range of products, including garments, accessories (Stansfield, 2015), furniture (Faier, 2020, p. 188), footwear (Matthews, 2020), and even toys (Steiff, n.d.). *"Anything cloth can do, fur can do wittier"* (Jacques Kaplan, 1968, cited in Faier, 2020, p. 58). For instance, the fur coat (Faier, 2020, p. 119) and the beaver hat are some of the most significant fur products in the history of the material, especially due to associated ecological, economic, and political consequences (2020, p. 114). Still in fashion, fur coats were once essential for human survival due to the material's thermal attributes (Faier, 2020, p. 82), and even though advances in living conditions reduced the need to wear fur indoors, the social use of fur-based garments was already an established status symbol (2020, p. 100).

APPEARANCE

Each animal species presents specific hair properties mainly due to the hair composition, arrangement, colour, and structure (Meyer et al., 2002). In addition, the structure of fur stimulates sensations of infiniteness due to the absence of demarcation lines (Faier, 2020, p. 119). Techniques

such as intarsia can produce artificial patterns (Faier, 2020, p. 144). Concerning colour, fashion trends affect preferred furs (Faier, 2020, p. 91). During the 1920s, as a celebration of the advances in synthetic dyes, colourful furs became a trend (Faier, 2020, p. 134). Soon, colours became a means of disguising the real as fake with the rise of anti-fur campaigns (Faier, 2020, p. 135). Additionally, the tail, commonly used to embellish garments, "by its very structure is an extension that is simultaneously independent of and integral to the body" (Faier, 2020, p. 110).

NATURAL PROPERTIES

Fur is a natural material composed of skin and fibre (Rawling et al., 2024); however, synthetic finishings added to the material affect its degradation (Debeer, 2018). It also combines three hair types: underfur, awn hair, and guard hair; each with a specific function (Faier, 2020, p. 16). A clear difference between human hair and animal fur concerns follicle concentration. For example, while humans present an average of approximately three hundred follicles per square centimetre, chinchillas present about twenty thousand. Humans grow one to three hairs from each of those follicles, while chinchillas grow fifty to one hundred hairs (Faier, 2020, p. 16). Moreover, animal-based and synthetic fur can usually get wet without promoting any damage to the material (Gladman et al., 2024). Apart from being one of the most thermal-insulating animal-based materials, fur is also naturally flame retardant, which usually exempts the material from standard flammability testing requirements (Gladman et al., 2024).

CULTURE-RELATED

Human behaviour results from a person's values, which are composed by their personality and the society and culture they are exposed to (Rokeach, 1973). The relationship between humans and fur is ancestral; research demonstrates that fur clothes became a part of human history, likely during migration from Africa to Europe and Asia due to the colder climates encountered (Kittler et al., 2003). To survive, humans wore and mirrored animals (Kwasny, 2019, p. 5); so, it incites proximity, simulating transferring the animal's characteristics to the wearer (Faier, 2020, p. 52). For instance, the Yupik women in the Arctic justify wearing beautifully decorated furs 'so that the animals can see them' (Kwasny, 2019, p. 8). Moreover, fur has been historically used to

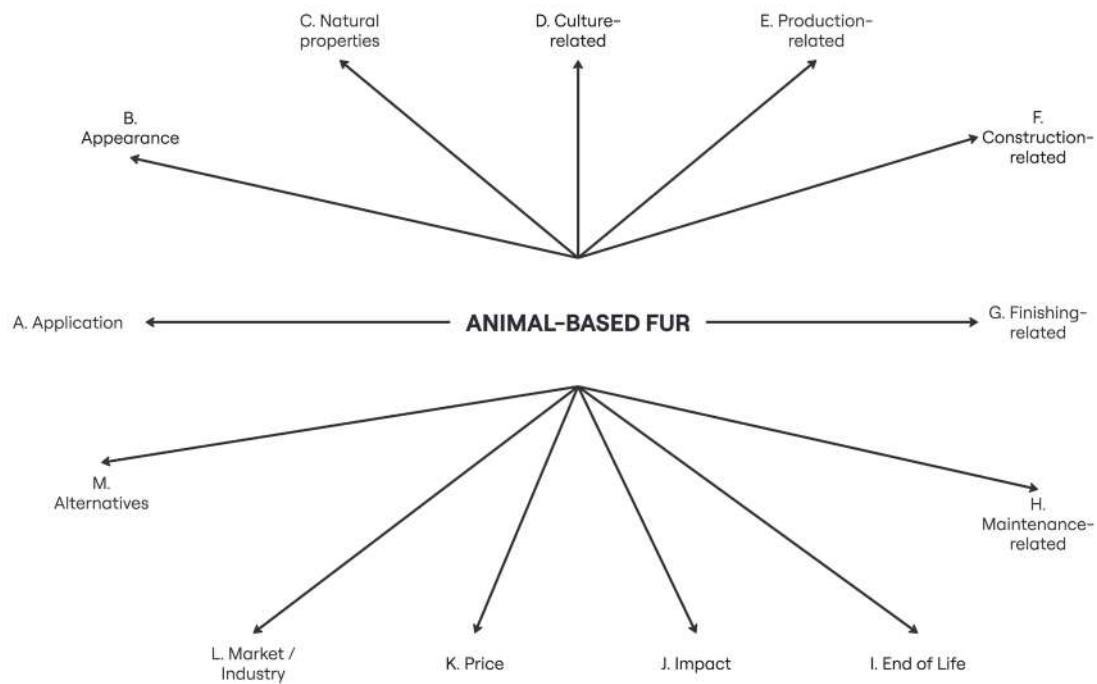


Fig. 01

demonstrate high status through portraits (Faier, 2020, p. 93), and even today, ermine-lined robes are still worn during British kings and queens' coronations (Taylor, 2024). In the Bible, fur clothing represents Adam and Eve's transition from 'holy innocence to sinful knowledge' in Genesis (Faier, 2020, p. 88). For black communities, especially African-American consumers, it is a 'vestimentary mechanism of affirmation' (Faier, 2020, p. 74), often portrayed as a symbol of success for rap music (Faier, 2020, p. 77). Just wearing fur may already feel like a promotion as it usually instigates perceivers' curiosity concerning how the wearer sourced the material (Taylor, 2024). In addition, there is a strong connection between fur, fashion and film (Faier, 2020, p. 135) due to the material's ability to 'transport its fashionable wearers to imagined spaces' (Faier, 2020, p. 120); it is 'what stars wear' (Faier, 2020, p. 77). Even Cinderella's shoes might have been originally made of fur because the similarities between the French words *vair* (squirrel) and *verre* (glass) may have caused a mistranslation that incorrectly defined the material (Faier, 2020, p. 117). Fur also incites a 'primitive sexual intensity' (Faier, 2020, p. 133) that relates it to fetishes such as for

pubic hair (Faier, 2020, p. 176). Additionally, fur as a material can be perceived as relatively sustainable since it makes sense to use every part of the animal, including its skin; however, as highlighted by Ramchandani & Coste-Maniere (2017), killing animals for their fur cannot be considered sustainable, especially from the perspectives of ethicality and morality.

PRODUCTION-RELATED

The most significant steps in the production of fur involve slaughtering animals, skinning, and further material processing, such as dyeing or bleaching (Ramchandani & Coste-Maniere, 2016). Additionally, not only the animals that will be skinned must be raised but also other animals that are needed to become their food, such as fish and chickens. For instance, according to Bijleveld et al. (2011), minks are bred for approximately eight months. This process is inefficient since producing one full-length coat consumes approximately fifty-five mink, demanding almost three tonnes of feed (Bijleveld et al., 2011; Gladman et al., 2024).

CONSTRUCTION-RELATED

Skilled fur garment production has historically been a small-scale, labour-intensive process and even though the invention of the sewing machine in the nineteenth century facilitated the production of clothes, making fur clothes still requires a series of high-skilled manual processes that cannot be substituted by mechanical means (Faiers, 2020, p. 142). Such employment of handcrafted traditional techniques in making fur garments is one factor that influences the high cost of fur as a material (Ramchandani & Coste-Maniere, 2016). Fur sewing machines also differ from standard ones; instead of moving vertically, the needle moves horizontally to form a strong chain-stitched seam (Faiers, 2020, p. 143).

FINISHING-RELATED

Prior to being applied to fashion products, animal-based fur requires extensive processing, treatments, and finishing, which involve using electricity, transportation fuel, and toxic chemicals, which sometimes even exceed regulations (Bijleveld et al., 2011). Fibre finishes can be classified based on their nature, mode of action or achieved results, including basic/routine finishes, functional finishes that alter appearance, and functional finishes that alter performance, such as antipesticide and antimicrobial finishes (Sekhri, 2022).

MAINTENANCE-RELATED

The fur's surface enables repairs, which are only visible on the reverse if unlined (Faiers, 2020, p. 154). However, animal fur is a high-maintenance material and specialised cleaning is always recommended (Gladman et al., 2024). Consequently, fur garments can be perceived as the opposite of fast fashion, as they not only last a much longer time but also in regard to their model of service and aftercare (Faiers, 2020, p. 226).

END OF LIFE

Animal-based fur is a natural material (Popescu & Hoecker, 2007) that is part of nature's carbon cycle, which refers to the natural activity of carbon exchange involving the atmosphere, oceans, and land (Ghiat & Al-Ansari, 2021). However, its production and finishing may involve toxic substances that affect its natural biodegradation (Bijleveld et al., 2011; Debeer, 2018). If properly maintained, fur garments can last for decades (Pologeorgis Furs, 2022). However, at the end of life, even though fur garments can be turned into

other products (Ramchandani & Coste-Maniere, 2016), most end up in landfills (Gladman et al., 2024).

IMPACT

Fur is an extremely controversial material (Gladman et al., 2024) often associated with environmental and ethical concerns, including animal welfare (Bijleveld et al., 2011). Thus, it is subject to specific legislation and several bans, classified as either governmental or organisational, that promote full or partial bans on fur sales or fur production (Fur for Animals, n.d.). Additionally, fibre shedding from textiles naturally occurs during various stages, including production (Cai et al., 2020), use (De Falco et al., 2020), maintenance (Mahbub & Shams, 2022), and end of life (Zhang et al., 2021). While fibres from animal-based fur could theoretically be considered biodegradable and natural, synthetic finishes alter their natural properties and affect the material's degradation (Debeer, 2018). When compared with cotton, polyacrylic, polyester (virgin and recycled), and wool fabrics, the production of mink fur presents the highest carbon footprint, and it is also likely to promote freshwater and marine eutrophication (Bijleveld et al., 2011).

Apart from constant exposure to toxic chemicals involved in the production of fur, workers involved in 'authorised killing practices' have been reported to be more likely to present mental health issues, especially anxiety and depression, as well as support violent behaviour, which often leads to the employment of negative habits (e.g. substance abuse) to cope with the workplace-related stressors (Marchand, 2007; Slade & Alleyne, 2023). Regarding environmental risk, animal fur is rated high in a recent report investigating opportunities to reduce the impact of textile-based goods purchased by the city of New York prepared by the Local Law 112 Task Force (Gabriel et al., 2024). The risks associated with animal-based fur include animal cruelty and slaughter, deforestation, carbon dioxide emissions, water intensity, land use, eutrophication, forced labour/worker exploitation, and toxic chemical exposure. The report also covers synthetics, such as acrylic fibres, and associates them with several environmental risks, including microfibre pollution and limited end-of-life solutions. In addition, fur farming can be considered a public health risk (Warwick et al., 2023).

PRICE

Seidu et al. (2024) examined sustainable material innovations in a circular fashion, finding that cost is a primary consideration for consumers when selecting bio-based materials or recycled clothing. Consequently, being part of the luxury market segment, fur holds greater potential to achieve price parity with next-gen alternatives (Gladman et al., 2024). In addition, considering that producing one kilogram of mink fur (equivalent to eleven mink) demands over five hundred kilograms of feed (Bijleveld et al., 2011), a rise in feed costs could potentially impact the production cost of fur (Ramchandani & Coste-Maniere, 2016). Fur products are also usually not a good investment and start to depreciate after being bought, losing up to 25% of their value per year (Gladman et al., 2024).

MARKET/INDUSTRY

The sale of raw pelts typically occurs through auction houses, often close to fur-producing areas; however, before being sent to auction houses, animals are skinned, stretched and dried (Ramchandani & Coste-Maniere, 2016). The fur dressing trade is overseen by the International Fur Dressers and Dyers Association (IFDDA) (Copenhagen Fur, n.d.). Like international agreements and institutes, such as the Fur Institute of Canada, fur federations work to promote a more ethical and sustainable industry and often incentivise new designers to use animal-based fur by supplying them with the material (Ramchandani & Coste-Maniere, 2016). In 2014, the International Fur Federation valued global trade at over forty billion dollars; in 2019, it was estimated at twenty-two billion dollars, which represents a forty-five per cent decrease (O'Connor, 2021).

ALTERNATIVES

Synthetic fur fibres are usually made of fossil-fuel-derived polymers like polyester, acrylic, and modacrylic (Gladman et al., 2024). By mimicking natural fibres, the petrochemical origin of synthetics, which is responsible for their successful properties, is usually forgotten when garments are worn (Stanes & Gibson, 2017), especially considering that the density of synthetic fur can be very similar to that of natural fur (Bijleveld et al., 2011). At the expected pace, the global market size of synthetic fur is estimated to grow at a Compound Annual Growth Rate (CAGR) of almost 18.92% from 2024 to 2028, representing a significant

growth of USD 184.2 million (Technavio, 2024). Since animal-based and synthetic fur are associated with environmental and ethical concerns, next-gen fur aims to solve these issues by offering high performance through animal- and petrochemical-free alternatives (Gladman et al., 2024). Some of the earliest known alternatives to animal-based fur include a woollen-cloth hat found in Denmark, attributed to a Bronze Age warrior, dating back to 1365 BCE (Faïers, 2020, p. 151), and a 'fake leopard skin' found in Tutankhamun's tomb, which included supplies for his journey to the afterlife (Faïers, 2020, p. 200). These fur alternatives were likely considered expensive due to the intricate skill and significant time required for their production; instead of merely mimicking fur, they celebrate fur's potential to be reinterpreted into a new, skilful expression (Faïers, 2020, p. 151). Hence, from this perspective, fur substitutes do not need to be direct replacements but can be used honestly and hold a unique value.

NEXT-GEN FUR SUGGESTIONS

Based on the findings outlined throughout this section, the initial map (Fig. 01) was expanded (Fig. 02) to demonstrate how establishing themes can be helpful to group and visualise the material's main attributes. This is where the 'edit' stage of the capture-edit-search (Ashby & Johnson, 2014) approach starts. The aim is to define which elements should be avoided, possibly achieved or 'neutral' areas of opportunity. The latter are neither negative nor positive but offer opportunities for material innovators. For example, a material's carbon footprint can be considered an area of opportunity because a material will always have a carbon footprint, but there might be room for improvement (Liu et al., 2023). To visualise this process, each 'attribute' was coloured, as shown in Figure 03. Green represents attributes to possibly achieve, red represents attributes to avoid, and yellow represents 'neutral' areas of opportunity. When designing next-gen fur, it is essential to consider both the aesthetic and tactile qualities of the traditional animal-based material (Gladman et al., 2024). While not emphasising warmth could make the next-gen alternative less seasonal, an additional benefit could be the ability to replicate animals not typically available, such as polar bears (Gladman et al., 2024). In addition, since animal fur is high-maintenance, next-gen materials could be designed to reduce care requirements

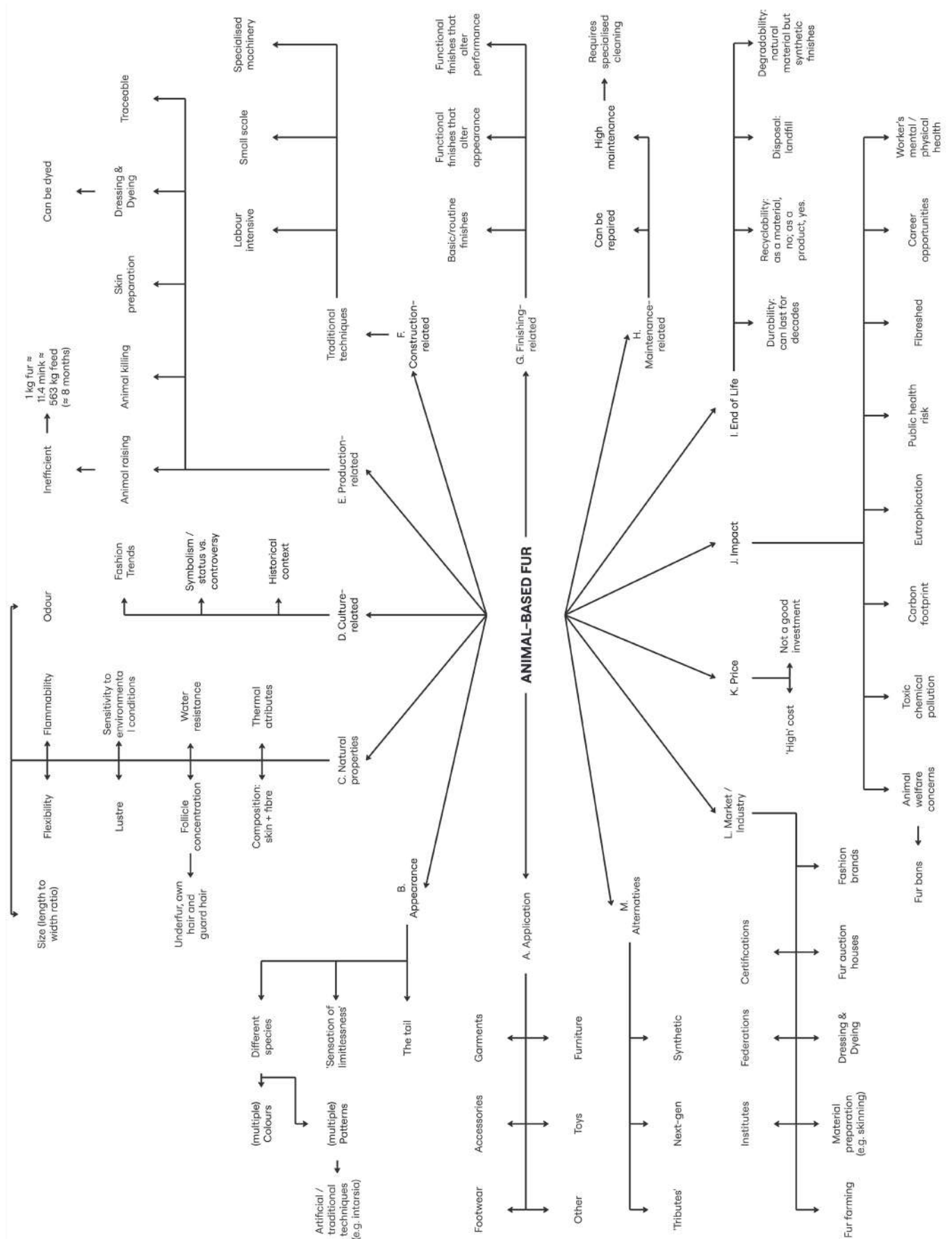


Fig. 02

or necessitate specialised care like the incumbent (Gladman et al., 2024). Given next-gen fur's diverse potential applications, including home goods, fashion accessories, and children's toys, brands must support innovators, define potential uses, and determine which properties to prioritise (Rawling et al., 2024). For scalability, it can be helpful to identify suitable manufacturing partners to ensure material properties align with manufacturing and garment use standards. Early selection of cut-and-sew factory partners can also be an advantage to ensure the textile can undergo traditional construction processes effectively (Gladman et al., 2024).

DISCUSSION

As an example (Fig. 04), a next-gen fur material in which the hair is replaced by hemp fibre and the 'skin' is made of bacterial cellulose could present several advantages including a biodegradable 'skin and fibre' structure. Other benefits could cover workers' mental and physical health, as well as the material's reduced carbon footprint, animal welfare concerns, and the impact related to fibreshed, which are the main challenges associated with animal-based fur and synthetic fur alternatives (Alevato et al., 2024). If applied to handbags or similar accessories, thermal attributes should not be required. Additionally, the market/industry stakeholders would include hemp farmers and kombucha breweries rather than fur farmers and pelt skinning companies. Concerning the price, by being part of the luxury market segment, fur holds greater potential to achieve price parity with next-gen alternatives, which can be an advantage (Gladman et al., 2024). However, other challenges (similar or not to the traditional material) could emerge, such as the material's odour (one of the main challenges associated with bacterial cellulose concerns its acidic smell (Wang et al., 2011), legislation (due to links to marijuana, special licenses that allow hemp cultivation are usually still required (Dhondt & Muthu, 2021)), and finishing (it is possible to produce hydrophobic bacterial cellulose 'with minimal quantities of hydrophobic agents' (Araujo et al., 2015)). In addition, certain attributes such as the material's durability, which is seen as positive when analysing animal-based fur, could become questions or areas of concern in regards to next-gen alternatives. For instance, even though such a material could present a series of advantages, a bacterial cellulose and hemp fibre-based handbag will likely have a shorter durability than an

animal-based one. This highlights that comparing the impact of traditional materials as opposed to next-gen ones is a complex challenge because it still seems unlikely that next-gen feedstock could provide all the physical advantages of traditional materials. Thus, due to the complexity of this problem, it becomes necessary to overcome the counterintuitiveness of this non-linear calculation (Langhe et al., 2017) and appreciate next-gen materials for their unique potential (Carole Collet cited in Trinquier, 2024) rather than waiting for perfect replacements.

CONCLUSION

As this research demonstrates, it is unlikely that a next-gen replacement for animal fur will fully replicate all the characteristics of the natural material. Therefore, it is crucial to establish honest design priorities to ensure continued progress in the next-gen materials industry. Waiting for a perfect replacement could result in a significant loss of valuable research time. By emphasising the idea that in a design-driven transition, knowing what to avoid is as important as knowing what to achieve (Tonkinwise, 2014) and that next-gen materials should be appreciated for their unique potential rather than merely as substitutes (Carole Collet cited in Trinquier, 2024), this research seeks to assist next-gen material innovators in developing strategies that focus on attainable material properties. This approach could help accelerate the growth of the next-gen materials industry, contributing to a more prosperous fashion future.

ACKNOWLEDGEMENTS

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CAPTIONS

[Fig. 01] Thirteen themes covering physical and abstract attributes associated with animal-based fur that can guide material innovators to define and group material properties to prioritise (and potentially achieve or avoid) when designing next-gen fur (Author/designer: Isabella Alevato).

[Fig. 02] The thirteen themes associated with animal-based fur are expanded, highlighting their main attributes based on secondary research findings (Author/designer: Isabella Alevato).

[Fig. 03] To visualise the process, each 'attribute' was coloured as illustrated; green represents (positive) attributes to possibly achieve, red represents (negative) attributes to possibly avoid or areas of concern, and yellow represents 'neutral' areas of opportunity (Author/designer: Isabella Alevato).

[Fig. 04] As an example, attributes that could possibly be related to a next-gen fur alternative composed of bacteri-

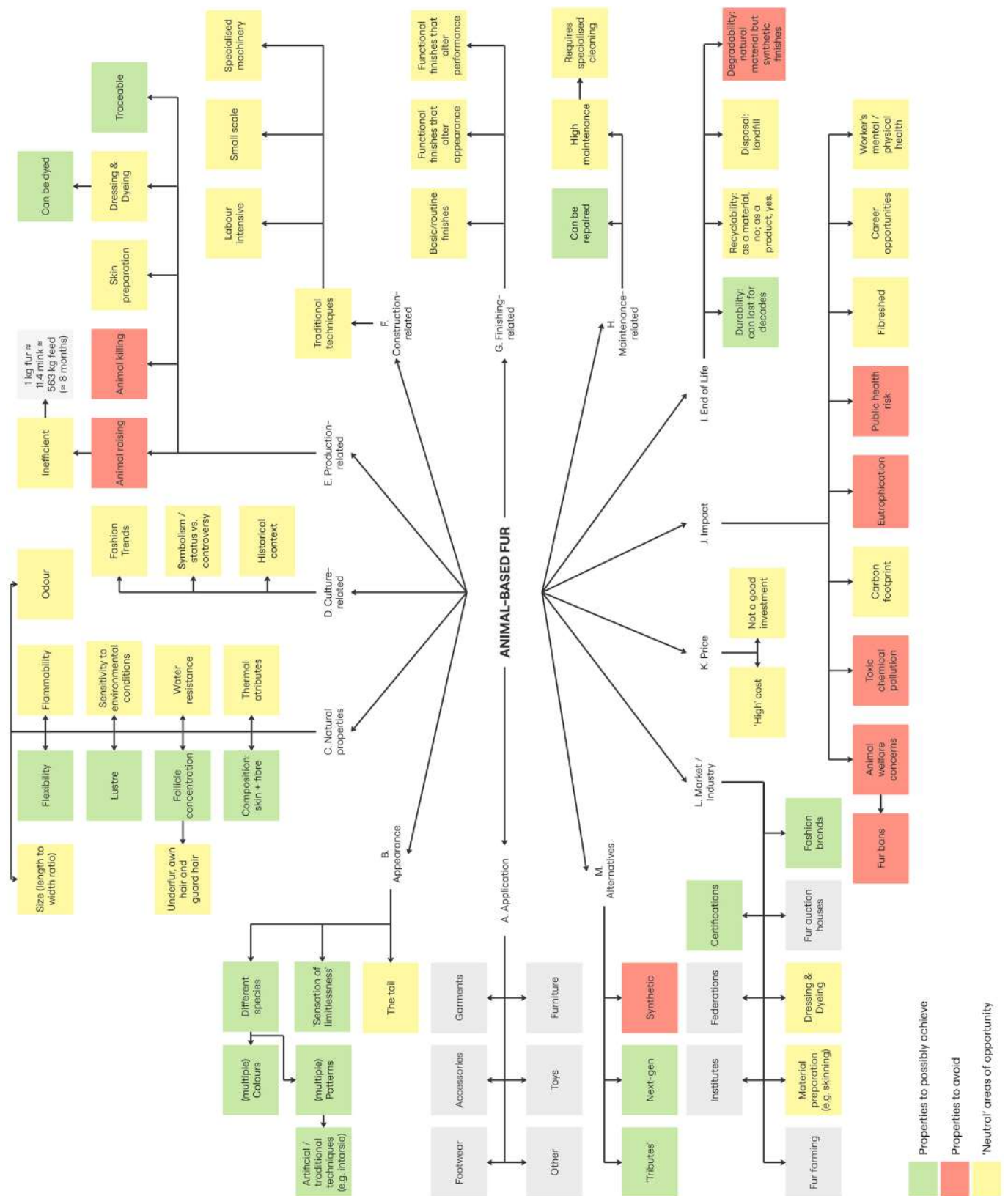


Fig. 03

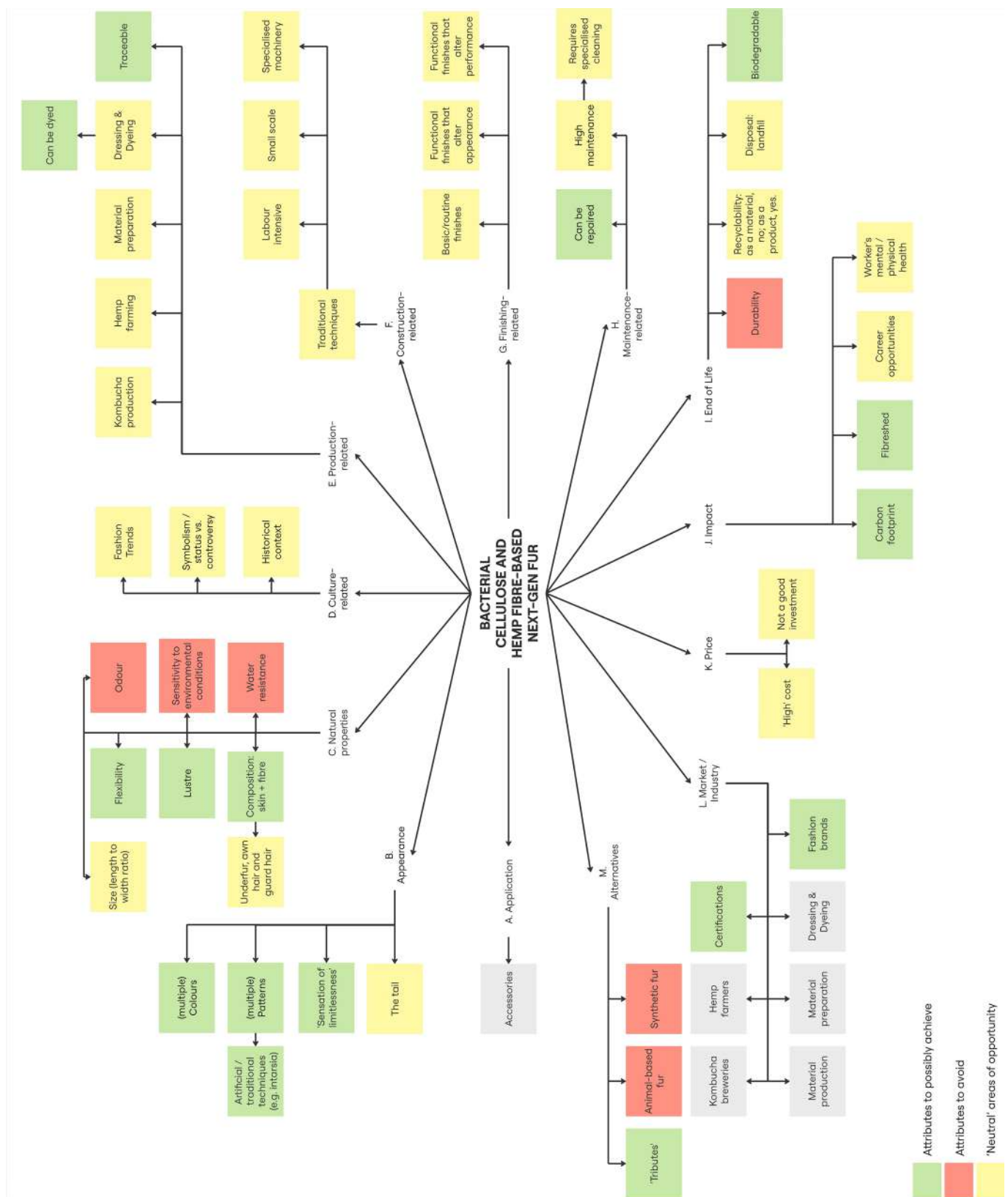


Fig. 04

al cellulose and hemp fibre highlight both advantages and new challenges that could emerge if compared to traditional materials; green represents (positive) attributes to possibly achieve, red represents (negative) attributes to possibly avoid or areas of concern, and yellow represents 'neutral' areas of opportunity (Author/designer: Isabella Alevato).

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ANALYZING SUSTAINABILITY IN FASHION THROUGH BIO-SYNTHETIC MATERIALS

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Abstract

The environmental consequences of the fashion industry are undeniably severe and contribute to environmental pollution and degradation in many ways. While sustainability discussions are continuing, new material trends are emerging and the source, production process, and experience of these materials also affect the fashion industry. Synthetic biology is a promising tool combining bio-design and bioengineering. This new bio-synthetic approach offers an innovative path toward ethical and clean fashion production by transforming microbes or bacteria into “living factories” that produce sustainable materials. However, a broader evaluation is required to grasp the full potential and ethical challenges, especially regarding the commodification of living organisms for mass production. It is imperative that research be conducted to assess the environmental, social, and economic impacts of bio-synthetic materials, particularly in the context of the “living factories” concept. Considering the ethical risks of exploitative practices and the need for transparency, this study examines bio-synthetic applications in fashion, their impacts on sustainability, and their implications for planetary well-being.

Keywords: *Sustainability in fashion, Planetary well-being, Bio-synthetic materials, Living factories, Ethical practices*

INTRODUCTION

The environmental consequences of the fashion industry are extremely severe, straining the planet and contributing to environmental pollution and degradation. The extensive supply chain in the fashion industry has many negative impacts such as water and energy use, chemicals, water and air pollution, microplastics, and waste. Such impacts push the planet to its limits, harm its well-being, and adversely affect human well-being both socially and economically (Jacometti, 2019).

The pressing necessity to confront the environmental and social consequences of the fashion industry underlines the potential of prosperity fashion to establish a regenerative approach. This concept advocates a model that

respects ecological limits and emphasizes responsible production, prioritizing the well-being of the planet and societies over profit (Badhoutiya et. al., 2023).

Integrating technology into biology plays a crucial role in contributing significantly to the well-being of the planet by creating new opportunities for sustainable fashion, increasing productivity, and reducing waste. Synthetic biology facilitates the enhancement and regulation of characteristics and functions within complex cellular matrices by developing standardized frameworks that enable the production of desired materials (Gallup et. al., 2021).

In contrast to conventional synthetic processes that rely on petrochemicals and

energy-intensive methods, bio-synthetic materials can be produced controlled, and resource-efficient. However, unlike traditional design materials, biological entities have their intrinsic properties and responses, making prediction and standardization difficult in practice (Frow & Calvert, 2013; O'Malley, 2009), and also raising complex ethical concerns regarding the commodification of living organisms and the need for transparency to maintain ethical standards in production.

The emergence of bio-synthetic materials signifies a potential transition towards a more sustainable and ethical fashion industry. However, without critical reflection, these innovations may perpetuate the exploitative practices that the concept of sustainability seeks to address. This represents a gap in both the literature and discussions surrounding their applications.

This study aims to examine the current status of bio-synthetic materials to advance a more sustainable and ethical fashion industry. In particular, the study objectives include (1) exploring the bio-synthetic materials and the concept of *living factories* in fashion, and its impact on sustainability; (2) analyzing the ethical considerations around commodifying living organisms, particularly when scaled for mass production.

LITERATURE REVIEW

There is a significant negative impact of the fashion industry on ecosystems and human societies in terms of greenhouse gas emissions, pesticides, microplastics released from synthetic fabrics such as polyester, exploitation of fresh water, air pollution, and disruption of the environment (Hibberd, 2019). The linear production model adopted by fast fashion points to systematic problems in the industry and highlights the necessity for the implementation of more sustainable practices that prioritize resource efficiency and waste reduction (Chen et al., 2021). For the fashion industry to meet the requisite climate targets, a reduction in resource use of between 75% and 95% from current levels is necessary (Sharpe et al., 2022). The fast fashion industry places a significant burden on the environment through the extraction of vast quantities of resources to manufacture garments (Ellen MacArthur Foundation, 2017; ETC/CE Report, 2023/5). Global fiber production has increased exponentially over the past two decades, reaching 58 million tonnes in 2000, and is projected to reach 147 million tonnes

by 2030 (Textile Exchange, 2023). The majority of these fibers are synthetic, comprising 63% of the total (Ellen MacArthur Foundation, 2017). The increased and unsustainable production and use of materials have stimulated the growing demand for more responsible alternatives in the fashion industry. This has led to the development of new materials and the re-evaluation of existing ones (McNeill & Venter, 2019).

The production of fibers for use in the manufacture of garments represents the primary source of environmental damage within the supply chain (Moazzem et. al., 2022). Plant-based fibers, including organic cotton, bamboo, hemp, jute, and ramie, and animal-based fibers and materials, such as wool are increasingly being acknowledged as environmentally friendly alternatives in sustainable textiles. Although natural fibers have typically been regarded as sustainable in the context of fashion, the advent of heavy industrialization has introduced a degree of uncertainty regarding the sustainability of natural materials (La Rosa & Grammatikos, 2019; Zhao et al., 2021).

Synthetic biology is emerging as a promising solution in this context, as defined by the European Commission in a 2005 report "*Synthetic biology is the engineering of biology: the synthesis of complex, biologically based (or inspired) systems that display functions not found in nature*" (European Commission, 2005). In alignment with this view, Calvert (2010) suggests that synthetic biology offers an alternative means of production through the transformation of biological organisms that produce materials, which includes the construction of completely novel biological entities, and the re-design of already existing ones. This innovative approach not only employs the potential of biological systems to address environmental challenges but also enables the creation of high-performance materials that align with sustainability goals. Bio-synthetic materials are derived from a bio-based, renewable source and are employed as replacements for traditional synthetic materials due to their performance and technical properties (Textile Exchange, 2022). Nevertheless, they are synthesized or engineered with the intention of replicating the properties of synthetic polymers or other materials with specific functional characteristics (Collet, 2018). In contrast to conventional techniques, bio-synthetic materials have the potential to significantly reduce water and land usage, as well as minimize carbon emissions,

through the utilization of renewable biological resources (Redford et al., 2019).

The fashion industry is increasingly adopting bio-synthetic materials as a sustainable alternative to traditional textiles. To gain a deeper comprehension of the extent and future possibilities of these materials, it is essential to first establish a clear understanding of the conceptual framework surrounding the term 'bio' and its associated contexts.

Figure 01 categorizes bio-synthetics as a subset of biomaterials, highlighting their origin from biological systems and their engineered properties designed to replicate or improve upon conventional materials. Bio-synthetics are further subdivided based on production methods, such as fermentation, microbial synthesis, or bioengineering of renewable biomass (Biofabricate and Fashion for Good, 2020). Within this framework, "living factories" are defined as the use of living organisms such as bacteria, fungi, algae, or yeast as bio-fabricators of materials. In Figure 1, the intersection between bio-fabrication and bio-synthetics is highlighted in green to emphasize their convergence within the conceptual framework.

Fish (2013) discusses the concept of "living factories" as a means of utilizing biological processes as a source of production. In contrast to conventional organisms, transgenic beings are engineered to perform tasks that they would not naturally undertake, thus positioning them as self-acting machines that transform raw materials into valuable products. Originating in the fields of pharmaceuticals and food, these developments have progressed to the re-engineering of yeast, bacteria, and other cells to produce plastics, biofuels, and textiles, resulting in the creation of living factories that are more cost-effective, straightforward, and environmentally friendly than traditional industrial methods (Eisenstein, 2016). The concept of living factories is in line with Callot's (2021) framework for designing with living which includes "nature as a co-worker" and "nature as a hackable system". Working with organisms to develop materials, designers adopt a collaborative approach in practice, embracing the concept of 'living factories' that function as production units. Moreover, by modifying or reprogramming organisms, they are now capable of functioning as "factories" adapted to produce specific outputs without depleting ecosystems (Callot, 2021). Production methods of bio-synthetic materials vary with the focus

of living factories including utilizing bacterial fermentation, plant extraction, chemical synthesis, and controlled cultivation of fungal structures, each offering distinct benefits and challenges (Daukantienė, 2022; Saha et al., 2020). An increasing number of major textile and fashion brands are incorporating bio-synthetic materials into their sustainability initiatives, offering environmentally friendly alternatives to conventional synthetic and natural materials. Adidas, Stella McCartney, Nike, Balenciaga, and The North Face are among the leading brands investing in this technology. However, critical environmental considerations include the consumption of resources, the emission of greenhouse gases during the production process, and the biodegradability of the end products. To fully realize the potential of bio-synthetic materials, it is essential to address several challenges, including scalability, cost competitiveness, material performance, consumer acceptance, and ethical considerations.

METHODOLOGY

This study employs a qualitative review and analysis to examine recent developments in bio-synthetic material applications within the fashion industry, with a particular focus on the interpretation of living factories. To evaluate the application of bio-synthetic materials in the fashion industry, six initiatives and their applications were selected and analyzed in terms of functionality, sustainability, and scalability. Emerging patterns and gaps in the literature and practice were discussed, particularly regarding the environmental, social, and ethical dimensions of these applications. A critical evaluation framework was applied to assess the ethical and social implications of biosynthetic materials, with particular attention to issues such as commodification and potential exploitation.

OVERVIEW OF BIO-SYNTHETIC MATERIAL APPLICATIONS IN FASHION

Currently, a range of materials in the fashion industry is being developed from a catalytic transformation of biomass or fermentation of living microbes, bacteria, or yeasts. Some examples included in this research for our analysis are: (1) Mylo by Bolt Threads another leather alternative that is crafted from mycelium, (2) Spiber Inc.'s Brewed Protein designed to replicate the properties of natural proteins like silk and keratin, (3) Modern

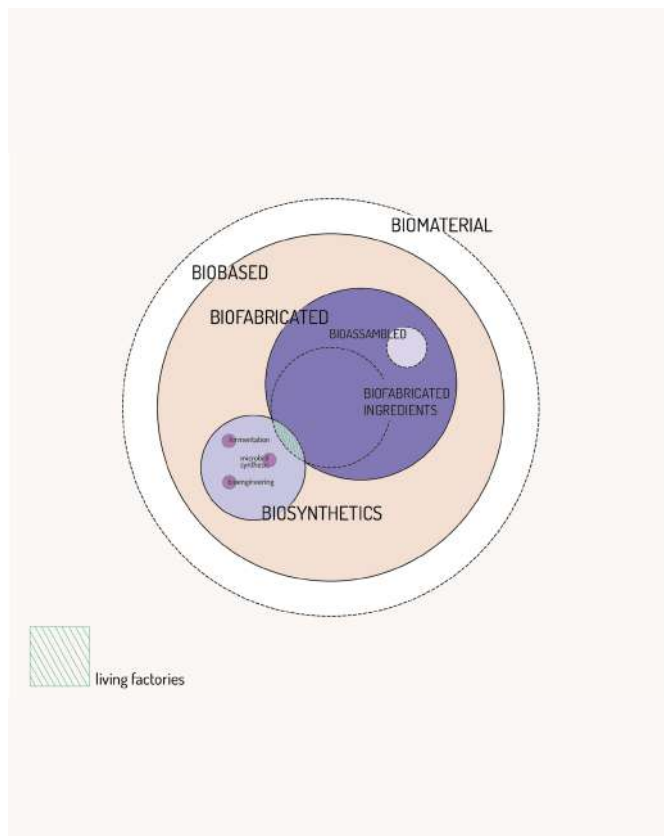


Fig. 01

Meadow's Bio-VERA a leather alternative powered by Bio-Alloy, a blend of plant-based proteins, (4) Modern Synthesis' Microbial Textiles created by harnessing sugar-eating bacteria to produce nanocellulose, (5) Oxman's O° which utilized PHA-bacterially produced thermoplastic polymers, (6) Pneuma's OXYA a living textile fiber embedded with microalgae and performs photosynthesis. The first three examples demonstrate higher technological maturity and scalability. They are already used in commercial applications and have collaborations with major textile and fashion brands. In contrast, the other examples are more recent research-focused projects.

Table 01 provides a summary of the key bio-synthetic material innovations by living factories concept, which will be analyzed in this section. The table presents their specific functionalities, sustainability attributes, and scalability potential.

(1) *Mylo by Bolt Threads*, represents a significant advancement in the field of bio-synthetic materials, utilizing mycelium, the root-like structure of fungi, as a raw material. Mylo is composed of 85% mycelium derived from fungi

and 15% lyocell, a regenerated cellulose fiber, and is finished with a water-based polyurethane (PU) coating that enhances its durability (Pariti et al., 2024). The process begins with the cultivation of the mycelium within a controlled environment. As the mycelium grows, it transforms into a dense and interconnected network of fibers, which serve as the base material. This phase is conducted with the aid of molds or trays, to ensure uniformity in dimensions and thickness, thereby reducing the quantity of material that is wasted. Once the mycelium mat has reached full growth, it is harvested and cleaned to remove any remaining substrate. It then undergoes environmentally friendly tanning and finishing processes (Vandelook et. al., 2021). The entire process is efficient, typically completed within weeks, and has a minimal environmental impact (D'Olivo & Karana, 2021). The combination of a rapid production cycle, chemical-free processing, and waste minimization positions Mylo as a novel bio-synthetic material (Jhanji, 2022). The scalability of Mylo is dependent upon two key factors: firstly, the efficient production process employed in its manufacture; and secondly, the sustainable resource inputs utilized (Baars et. al. 2024). The utilization of renewable agricultural by-products, including sawdust and corn stalks, as raw materials ensure a cost-effective and abundant supply of raw materials (Rathinamoorthy et. al., 2023). Furthermore, minimal water and energy requirements facilitate large-scale production, rendering it both economically and environmentally sustainable (Pariti et. al., 2024).

Collaborations with prominent brands such as Stella McCartney (i.e. bags), Adidas (i.e. Stan Smith sneakers), and Lululemon (i.e. yoga bags) have integrated Mylo into existing supply chains, thereby encouraging market adoption. (Yadav et. al., 2024). Nevertheless, challenges such as the current high cost of production in comparison to traditional leather require sustained investment in advanced bio-fabrication facilities, modular systems, and automation to enhance capacity and reduce costs (Nithyaprakash et. al., 2020).

Bolt Threads has encountered difficulties in continuing production of Mylo, a synthetic spider silk material, due to a combination of economic challenges, inflation, and a paucity of funding opportunities, despite having received \$300 million in investments. While some major brands had adopted Mylo, the company experienced challenges in scaling up production on a commercial scale.

Example	Functionality	Sustainability	Scalability
Spiber Inc's Brewed Protein™	Durable, flexible, and strong protein polymers used in textiles, medical devices, aerospace; mechanical properties modifiable for specific applications.	Mitigates fossil fuel reliance, reduces greenhouse gas emissions, decomposes naturally, and prevents microplastic pollution.	High initial production costs; improvements needed in fermentation efficiency and feedstock diversification to compete with petrochemical materials.
Modern Meadow's Bio-VERA™	Durable, breathable, and flexible bio-synthetic material suitable for clothing and interior applications with customizable textures and colors.	Minimizes greenhouse gas emissions, water, and energy consumption; fully renewable Feedstock and solvent-free processes.	Ready for commercial production with capacity to produce 500,000+ square meters annually; supported by partnerships and collaborations.
Mylo™ by Bolt Threads	Flexible, durable bio-synthetic leather alternative from mycelium, incorporating advanced finishing for enhanced functionality.	Reduces water and energy use, avoids harmful chemicals, uses agricultural waste, and integrates waste-derived raw materials.	High production costs compared to traditional leather; requires investment in modular bio-fabrication systems and scaling automation.
Modern Synthesis' Microbial Textiles	Lightweight, strong microbial textiles grown directly into shapes using bacterial fermentation and robotic weaving techniques.	Fully biodegradable, eliminates textile waste through precise growing methods, integrates with circular economy models.	Resource-intensive fermentation processes limit scalability; requires engineering solutions and advanced bioreactors for higher efficiency.
Oxman's 0°	Single-material 3D-printed biodegradable shoes tailored for diverse applications like athletics and ballet, using advanced robotic fabrication.	Uses renewable PHA-based materials, incorporates timed decomposition for environmental reintegration, reduces manufacturing waste.	Resource-intensive fermentation processes limit scalability; requires engineering solutions and advanced bioreactors for higher efficiency.
Pneuma's OXYA™	Photosynthesis-enabled textiles that produce oxygen, sequester carbon dioxide, and actively enhance environmental health during use.	Captures and stores carbon dioxide, reduces greenhouse gases, promotes air quality, and utilizes microalgae in a biopolymer matrix.	Requires controlled conditions for photosynthesis; exploring partnerships with architectural firms for innovative applications.

Tab. 01

Consequently, the company has redirected its focus to its other flagship product, b-silk (Halliday, 2023).

(2) *Spiber Inc.'s Brewed Protein* represents an innovative bio-synthetic material obtained through microbial fermentation processes utilizing plant-based sugars as raw materials (Ferreira et. al., 2023). By employing genetically modified microorganisms, Spiber Inc. synthesizes protein polymers from plant-derived sugars that exhibit analogous characteristics to those of natural proteins, such as silk and keratin (D'Olive & Karana, 2021). These polymers display remarkable tensile strength, flexibility, and biocompatibility, making them suitable for a diverse range of applications in textiles, medicine, and aerospace (Rouse & Van Dyke, 2010). To meet the requirements of a variety of potential applications, for instance, the mechanical properties of proteins (elasticity, durability, etc.) can be modified, thus facilitating their utilization in textiles, medical devices, or composite materials. A significant benefit of this biological approach is that it mitigates the reliance on fossil fuels and considerably reduces greenhouse gas emissions compared to conventional synthetic material production (Oh et. al., 2021). A life cycle analysis demonstrates that the manufacture of Brewed Protein results in significantly lower emissions of greenhouse gases than the production of nylon or polyester (Lips, 2021). Furthermore, its capacity to decompose naturally after its life cycle serves to minimize environmental degradation by preventing the pollution of microplastics that are associated with persistent synthetic polymers (Tachibana et al., 2021). The scaling up of production to compete with petrochemical counterparts remains a significant challenge, largely due to the high costs associated with initial production (Breslauer, 2024). However, innovations in fermentation efficiency and feedstock diversification have the potential to overcome these barriers. For example, important commercial collaborations such as The North Face's "The Earth Hoodie," a fleece made with Brewed Protein fiber, have demonstrated the potential for sustainable clothing (Chow, 2022). Furthermore, collections designed using Brewed Protein fiber were launched in 2023, including those from The North Face, Goldwin, Nanamica, and Woolrich (Goldwin, 2023).

(3) *Modern Meadow's Bio-VERA* is a bio-synthetic technology crafted using Modern Meadow's Bio-Alloy technology, a blend of plant-based proteins and bio-based polymers that

mimics the functional properties of proteins, and by integrating this membrane technology with a fully renewable material derived from post-consumer car tire feedstock (Nutley, 2023). This material has a wide range of applications in the textile and fashion industries. Especially in the context of clothing, the material offers a sustainable alternative, exhibiting features such as high durability, breathability, and flexibility (Harrell, 2024).

Bio-VERA requires less greenhouse gas emissions, water, and energy consumption than traditional leather and synthetic materials. It is anticipated that Bio-VERA will become a more widely used material in the future, with new textures and color options, integration with smart textiles and wearable technologies, and the creation of sustainable innovations in fashion and other industries (Modern Meadow, 2023). Modern Meadow has recently announced that it is prepared to commence commercial production of Bio-VERA and can produce over 500,000 square meters of Bio-VERA per annum (Bringle, 2024). Additionally, in a press release, Modern Meadow announced its collaboration with Earthletica, a green-tech activewear brand, to create the Bronte Jacket, named in honor of swimmer Bronte Campbell OAM (PR Newswire, 2024).

(4) *Modern Synthesis' Microbial Textiles* can be compared to the traditional practice of weaving, involving the growth of bacteria-based material around a pre-designed "warp" structure. This structure is crafted using robotic yarn or fiber placement. The bacteria effectively form the "weft", producing a strong and lightweight bio-synthetic material that eliminates waste by enabling pieces to be grown to precise shapes, much like 3D printing (Textile Technology, 2022). The process draws inspiration from the natural behavior of *K. rhaeticus*, a bacterium renowned for its capacity to produce nanocellulose (Raru et. al., 2023). These fibers form a dense, interconnected network that can be directly shaped during production by controlling the parameters of the fermentation process, including the composition of nutrients, temperature, pH, and oxygen availability (Madhu & Chakraborty, 2017). This enables the creation of tailored textile properties, including thickness, texture, and flexibility, without the necessity for post-processing steps that are typically required in conventional textile production (Girard et. al., 2024). The production process is distinctive in that it eliminates the necessity to spin fiber from raw

materials as well as for cutting and sewing excess material, which is a common source of textile waste (Morgan, 2023). As fully biodegradable materials, microbial textiles naturally decompose at the end of their life cycle, thereby integrating seamlessly into circular economy models and avoiding the microplastic pollution associated with synthetic fibers (Nayak et al., 2024).

Despite the sustainability advantages of microbial textiles, scaling up production to meet global textile demand presents a significant challenge, given that the fermentation processes involved are slower and more resource-intensive than conventional methods (Katyal et al., 2023). Therefore, Modern Synthesis is investigating methods to enhance the scalability of this process. Strategies include the engineering of bacterial strains to facilitate accelerated growth or achieve elevated yields, the design of more efficient bioreactors for large-scale production, and the utilization of cost-effective feedstocks such as agricultural waste (Modern Synthesis, n.d.). Although the company's most well-known product is the prototype sneaker, called 'This is Grown', produced by Jen Keane, the founder of Modern Synthesis, in 2018, the company is continuing its commercialization efforts with \$4.1 million in funding by 2022 (Marston, 2022).

(5) *Oxman's O°* integrates the disciplines of material science, architecture, and biology to develop a system whereby materials and structures are produced through biological processes rather than manufactured (Harrell, 2024). *O°* is founded on the principles of Material Ecology, a design philosophy coined by Neri Oxman that incorporates natural processes into the creation of materials and structures (Oxman, 2020). A fundamental aspect of *O°* is growth-based manufacturing, which entails the utilization of biological techniques such as microbial growth and mycelium cultivation for the generation of materials, as opposed to the conventional reliance on industrial synthesis (Saunders, 2024). The material is derived from polyhydroxyalkanoates (PHAs), an organic, bacterially sourced thermoplastic material that has been identified as a sustainable alternative to petroleum-based plastics. The PHA-based material is combined with cutting-edge manufacturing techniques, including hot melt spinning, 3D knitting, and 3D printing (Boissonneault, 2024).

As an example of a product, *O°* shoes are crafted from a single biomaterial, in contrast to

traditional footwear, which is composed of over 40 distinct materials and processes, including cutting, sewing, and gluing (Oxman, n.d.). The construction of each shoe entails the creation of a fundamental base layer, which is crafted from PHA fibers and knitted into a flexible sock-like structure (Oxman, n.d.). Moreover, the characteristics of the material can be modified during the manufacturing process to suit a range of applications, including footwear for athletic activities and ballet slippers (Chen, 2024). The natural biodegradability of PHAs in marine and soil environments prompted Oxman to incorporate timed degradation characteristics into *O°*. This approach, which may be described as "programmed decomposition," encourages users to consider carbon sources and environmental processes, including the requisite time, location, and conditions for the material to return to the ecosystem (Saunders, 2024). The utilization of renewable raw materials facilitates the implementation of scalable, localized production processes with a carbon-neutral or carbon-negative footprint. Notwithstanding the persisting challenges associated with scalability costs and PHA production optimization, the material's unified approach and the growing consumer demand for sustainable products position it on the path to commercialization.

(6) *Pneuma's OXYA*, a bio-synthetic material that represents another approach that incorporates photosynthesis into textiles. The integration of microalgae into textiles enables the *OXYA* material to consume carbon dioxide and release oxygen, thereby transforming garments and household items into living systems that contribute to environmental health (IndieBio, n.d.). The *OXYA* process involves the integration of a diverse range of microorganisms, including algae, fungi, and bacteria. The microorganisms are selected for their capacity to convert sunlight and carbon dioxide into oxygen and biomass, thereby actively sequestering atmospheric carbon into stable forms that contribute to long-term storage. Furthermore, they enhance the material's capacity to capture carbon throughout its active lifespan by increasing its biomass (In-na, 2022). The biopolymer matrix is designed to provide the necessary support for the metabolic activity of these microorganisms, enabling them to survive for up to six months under controlled conditions while maintaining efficient photosynthetic and carbon capture performance (Ayyanar et al., 2023). The optimiza-

tion of light exposure and nutrient supply enables the microorganisms within OXYA to engage in maximal photosynthesis, thereby facilitating the improvement of air quality and the reduction of greenhouse gasses. This approach is intended to provide both immediate and ongoing environmental benefits.

In its initial collaboration with a prominent New York-based architectural firm renowned for its signature projects, including the High Line and MoMA, Pneuma seeks to develop pioneering applications, particularly in the domain of interior textiles with OXYA (Newsfile Corp., 2024).

DISCUSSION

The implementation of bio-synthetic materials in the fashion industry offers a transformative opportunity to address the environmental and social challenges associated with traditional textile production. Nevertheless, it is imperative to subject these technologies to rigorous examination concerning their scalability, transparency, and ethical implications. One of the principal advantages of bio-synthetic materials is their capacity to supplant resource-intensive and environmentally deleterious processes with more sustainable alternatives. Materials such as Spiber's Brewed Protein, Modern Meadow's Bio-VERA, and Bolt Threads' Mylo exemplify the versatility and innovation within this field. The production of these products involves processes such as microbial fermentation and fungal cultivation, which not only result in a reduction of greenhouse gas emissions but also contribute to the minimization of waste through the incorporation of renewable feedstocks. Furthermore, the capacity of bio-synthetics to decompose naturally addresses the urgent issue of microplastic pollution associated with conventional synthetic textiles. Nevertheless, the extent to which these materials can replace traditional materials depends on their ability to be produced on a larger scale while maintaining affordability and reducing their environmental impact.

Notwithstanding the promise of these innovations, significant gaps in transparency present an obstacle to a comprehensive evaluation of their true sustainability. It is imperative that these processes are transparent to establish credibility and ensure that claims of sustainability are substantiated. For instance, this study encountered limited accessibility to detailed information regarding the production protocols,

resource inputs, and waste management strategies associated with Modern Meadow's Bio-VERA and Pneuma's OXYA. Moreover, although bio-synthetics are typically promoted as environmentally friendly, comprehensive life cycle assessments are essential to evaluate their environmental benefits in comparison to conventional materials such as polyester or leather. In the lack of such data, there is a risk of perpetuating an unsustainable system under the guise of innovation.

The ethical considerations are of equal importance in the discussion of bio-synthetic materials. The utilization of genetically modified organisms in textile production raises concerns regarding the commodification of living systems, particularly when scaled up for mass production. Although technologies such as living factories, which utilize organisms such as bacteria, fungi, and algae as material producers, are commended for their innovative approach, they also serve to merge the distinctions between the natural and industrial realms. Such commodification risks reducing living organisms to mere tools of production, which may in turn encourage exploitative practices. Furthermore, uncertainty persists regarding the long-term sustainability of engineered organisms within production systems. Key considerations include the methods of maintenance, control, and disposal at the end of their life cycle.

The scalability of these technologies is also a challenge. While some materials, such as Spiber's Brewed Protein, show potential for large-scale production, others, such as Modern Synthesis' Microbial Textiles and Oxman's O°, remain experimental or niche due to limitations in cost efficiency and production speed. Investments in advanced bio-fabrication facilities, raw material optimization, and automation will be crucial to overcome these barriers.

CONCLUSIONS

The technologies of bio-synthetic materials investigated in this research are related to living factories, employing biological processes to address critical environmental concerns, including carbon emissions, water pollution, reliance on fossil fuels, and microplastic waste. This research highlights some studies and examples of bio-synthetic materials that have been developed as fashion products.

Although interest in these new materials is steadily growing, the market for them remains

predominantly niche at this stage. To drive broader adoption, further research is essential, including rigorous assessments to demonstrate that these novel processes and materials indeed have a lower environmental impact compared to existing alternatives. Equally important are studies addressing the challenges of scaling these technologies including economic feasibility.

From a political and systemic perspective, critical questions also arise. One of the most pressing is whether these innovations will genuinely contribute to a sustainable transformation or merely reinforce the unsustainable practices of the current system. Addressing these uncertainties requires a holistic approach that integrates environmental science, policy-making, and systemic change to ensure that these technologies align with broader sustainability goals.

Further work is required to overcome these challenges and facilitate the transformation necessary to establish a fully sustainable and ethical fashion industry. Systematic research is essential to evaluate the environmental, social, and economic impacts of bio-synthetic materials, especially within the framework of the “living factories” concept.

CAPTIONS

[Fig. 01] Classification of bio-synthetics (Adapted from Biofabricate and Fashion for Good, 2020, p.6) and positioning of living factories.

[Tab. 01] Categorization of bio-synthetic material examples.

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CULTURES

FROM FLASHES TO LIFECYCLES

HOW AGE-DIVERSITY CAN FEED PROSPERITY FASHION

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Abstract

Production and marketing of fashion are organized into very short cycles of substitution with overconsumption of styles, attention and people. Collections are short-lived, and the window exposing models is soon closed. Revitalization and replacement go hand in hand, but the couple seems to become increasingly out of time and at odds with a new cultural awareness calling for restructuration, holistic views and regenerative practices for a common good (Buckton et al., 2023). Naturally, for the industry's changes to appear as authentic, they need to include the practise of marketing. For this purpose, this article will contribute to defining the concept of prosperity fashion from an interdisciplinary perspective by untangling the narrow visual marketing narrative intertwining fashion and youth and exploring the possibilities for widening the scope to including mature people as an integral, aesthetic part of fashion branding. Furthermore, it will suggest central discursive building blocks in the aesthetic construction of the industry's position as part of a natural world of longer and more natural lifecycles.

Keywords: *Age diversity, Fashion, Branding, Aesthetics*

INTRODUCTION

In fashion newness triumphs and youth is branded as an asset, while the loss of capital connected to age has spread from the social to the financial domain. The idea of fashion as a source of renewal is still strong (Dichter, 1985), and a central part of the narrative remains young and characterized by swift replacements. Media debates revolve about the unhealthy state of the hectic rate in renewal of products, but fashion marketing continues to march to the drum presenting tomorrow with great urgency. But what will it take to transform the fashion narrative to a breathable state, to prolong the spans and open the circles with inclusivity? From a communicative perspective, the question is, how can aesthetic age-diversity branding

contribute to constructing a new identity for the industry towards prosperity fashion with a cultural and narrative turn away from the traditional GDP-thinking?

With a point of departure in the social and cultural significance of youth's predominance in fashion, the article will identify the aesthetic markers of age in terms of the traditional narrative of maturity and fashion's understanding of beauty, value and age. It will investigate research on the mature crowd in terms of identity construction, lifestyles and attitudes towards fashion, and reflect on the different levels of integration of the aesthetic capital of age into fashion pointed out by Bøileregauge (2020) as well as marketing's effect on identity formation (Schroeder & Borgerson, 2004).

This will lead to the article's purpose of reframing the existing branding narrative in a new holistic approach where the connotations of aesthetics of age becomes a value enhancing the understanding of fashion as a contributor to prosperity from a more diverse perspective.

Consequently, the article explores how an inclusive representation can develop visual narratives of age-diversity and full life courses of models as parallels to what may be called full life courses of garments. The outcome suggests a range of potential discursive building blocks in the aesthetic construction of a new position for the industry, where it subscribes to a natural system of longer lifecycles rather than an endless series of flashes in terms of seasons and moments in youth. The article rests on interpretative work with a selective review of material and feeds into the development of prosperity fashion by its contribution with a framework and discursive platform. The interdisciplinary perspective of the article is based on a foundation of social constructionism as presented by Giddens (1991) with reflexivity as a central property. The visual branding discourse of fashion is viewed as aesthetic bricks in the construction of meaning with the narratives forming self-identity for the industry and its customers alike, and this approach allows deliberations of mechanisms at different levels.

THE TRADITION OF DISPOSABILITY IN A CHANGING MARKET CULTURE

Even though fashion is the protagonist for change, some areas seem to form an exception, since in its presentation the newer focus on longevity appears to be reserved to discourse about garments. Youth has been the main presenter of fashion for so many decades, that it can be regarded as a norm. The Guardian reports that the recent usage of older models was short lived, and that age-diversity is back to the situation of the 90s. It describes the industry's demand for the young, skinny and tall, and refers to the unease in the use of older models who were either too exposed, too covered or stereotyped as being eccentric (Hill, 2023). Vogue.com also discusses the youth focus of the industry with its practise of recruiting models often not old enough to drive a car into a profession of revolving doors and a culture of disposability. The habit of continuous casting of new and

young talents requires replacement of models at a high rate. It creates an industry where news is made by headlines announcing that models under 16 will not be hired for work where they represent adults. In a wider perspective, the practice of the youth obsession is also linked to the pressure on grown customers to maintain an adolescent look (Okwodu, 2019). It seems that the culture of disposability engenders a range of problematic mechanisms both in terms of work continuity, employment possibilities and by creating an exceptionally narrow source for identification.

The continuous replacement of models and the short narratives they inhabit also prompt contemplations of the practise foundations and a search for main elements used to communicate this celebrated life stage. A central characteristic in the presentation of youth is smoothness, and this has developed into a beau idéal in commercial photography. Iqani (2012) traces the idealization of smoothness back to Burke's description of beauty in 1756 and follows its historical development of social status and evaluations of skin. Developing a typology, she outlines the connotations of smoothness as civilization, culture, safety and a refined state as opposed to roughness connoting danger, wilderness and the unrefined. The two sets of connotations appear to match the social perceptions of young and mature skin – in other words youth and maturity. Illustrations of the wanted and the avoided cultivated through centuries and refined by visual marketing. However, not everybody continues to identify with the traditional prescriptions.

Scholarly work presents interesting findings in contrast to fashion's branding's landscape of youth and considers the state and potential of the mature market. It seems that mature people are not as disengaged in fashion as the stereotypes prescribe. Sadkowska et al. (2017) found that men enjoy their engagement with fashion increasingly as they age, but still Eser (2024) notes that that 70% of the world's models are under the age of 25. Susan Douglas observes that older women reinvent what it means to be older while they challenge the traditional invisibility (Bennett, 2019). In addition, it appears that the fashion-conscious segment often have younger cognitive ages, and they have different value orientations combined with an eagerness to try new products (Nam et al., 2007). Combined with an increasingly older demographic, where the 50-55-year-olds are the

largest population group in Europe, the market is shifting in size, culture and mood but the industry most often sticks to its younger guns in marketing despite the wider implications of this practise (Eurostat, 2020).

THE CULTURAL SIGNIFICANCE OF YOUTH'S PREDOMINANCE IN FASHION MARKETING

Marketing carries a responsibility far greater than merely communicating the seasonal trends. Naturally, this so also for fashion marketing. Borgerson and Schroeder (2005) discuss how marketing functions as a representational system producing meaning outside the scope of what is being promoted. They draw attention to the effects of the representational conventions in the ways marketing illustrates not only products but also people and identities, how it rests on contexts of cultural meanings and thus become cultural texts. It is particularly relevant to notice their stipulation that marketing images often replace personal experience and construct a fictive "reality" with substantial authority. In that light, the much-advertised business of fashion can be considered a major contributor to general perceptions with its marketing communication displaying a narrow range of models while leaving others out. Here it is important to remember that omissions communicate values, and that also underrepresentation fuels social stereotypification. Moreover, studying Borgerson and Schroeder's considerations on how the status of human beings is determined by visual markers such as gender or skin colour, brings the state of fashion branding to mind. With its very young population, the "reality" presented teaches the lesson that being fashionable is reserved to youth residing at the top of the culturally defined hierarchy. As being fashionable is also an indication of status, the inherent argument is that fashion is a closed circle for people exhibiting the social capital of youth.

Furthermore, Borgerson and Schroeder highlight the subjectivity of visual representation and urge further research into the complex world of commercial image-executives. That area is discussed with The Aesthetic Production Model giving an overview of the host of actors in the production of fashion images (Bøilerehaug, 2023). In addition to the complexity of the production chain, it also identifies the many different industries and professions active in the process which

suggests a shared tendency value to a visually narrow culture. The uniform culture is representing fashion for individual consumption where consumers go through phases of tacit interpretation and are unconsciously influenced as pointed out by Schroeder and Borgerson (2004). In other words, they consume the material of an industry promoting a tight circle marked by hierarchical practices of exclusion and very short life cycles.

In addition to the social and cultural impact on consumers' self-identities, the short timespan for models representing fashion appears in stark contrast to the industry's newer claim of durability of its products in style and fabrics. With these contrasting signals continually emitted, the authenticity of the sustainable efforts appears flawed and what is more, they may be intended for a market of the past. A market which disregarded the mature segment and assumed that they had faded while dreaming of their remote youth, and a market with structures requiring substantial revision and re-thinking.

TOWARDS A NARRATIVE OF AGE IN A PERSPECTIVE OF PROSPERITY FASHION

For fashion to regain its attraction and strengthen its authenticity, a more varied visual marketing narrative reflecting the vision of the regenerative perspectives with the qualities of high diversity, agency for humans and continuous reflexivity is needed (Buckton et al., 2023). The narrative must be redesigned to distance itself from promoting longevity only in garments, while rapidly replacing young models thus mirroring how consumers constantly update their fashion items. The speed and short timeframes of production and marketing alike continue subscribing to the themes of youth and novelty with little acknowledgement of the state of the outside world and its people.

A visual fashion narrative reflecting the visions of prosperity fashion embraces a number of conditions and recent characteristics of mature people. The more varied and comprehensive aesthetic marketing narrative needs to communicate an understanding of age, maturity and what they imply. A selection of studies in this area informs the revision and development of a narrative away from the stereotypical perceptions of maturity by a range of pertinent findings.

Departing from the chronological age categorizations, the mature and elderly group is

most often counted from 65 years and onwards (Berg & Liljedal, 2022). Generational categorizations are frequently referred to in public, but the media also report on people in their middle years feeling much younger than their chronological age. They use headings like “60 is the new 50” and even with subtitles like “- according to science and the 60-year-olds” (Alpanés, 2024). Although age is related to time, the meaning of it is socially and historically established (Catterall & Maclaren, 2001), and consequently also fashion plays a part in its formation.

The internal construction of self-identity as related to age is represented by the notion of cognitive age which is the self-perceived or subjective age of a person. Interestingly, research has labelled a relevant sub-group of these as the cognitively young elderly consumers, characterized as being active and closely related to the modern consumer (Szmigin & Carrigan, 2001). Berg and Liljedal (2022) discuss the importance of looking beyond the exterior and the large groups according to age, explore consumer identities and describe them with a view to consumer culture and identity. Studies to that purpose have also identified the sub-culture of the new-age elderly. They exhibit the characteristics of having different values from the traditional part of the elderly group and to have a keen interest in personal challenges, novel experiences and new information (Sherman et al., 2001). Similarly, Givskov and Nybro Petersen (2018) refer to a new aging due to increasingly older demographics and the growth in Western consumer-cultures. They identify ageing as a cultural field and describe it as a social and fluid space; a view which allows negotiation and more individual identity constructions.

Exploring the identity construction and consumption motivations of older adults through storytelling, Fregolente and Junqueira (2019) point to the relevance of examining older adults in the context of the time and life circumstances they have. By doing that, a perspective of process is maintained as opposed to regarding mature age as a destination. The personal continued process also seems to be reflected in a set of their findings showing that their respondents valued knowledge and education, exhibited no aversion to technology and wished to part of present society and culture. Even though the respondents were socially and financially affluent, the findings still spark interest since they counter the prevailing

stereotypes of mature people and indicate a profile different from the more traditional one. Additionally, Rocha et al. found that the mature consumers do not change their juvenile-like attitudes or look to the attitudes of previous generations concerning their fashion consumption (2015). Furthermore, the cohort of mature women interviewed in by Phillips (2022) concerning their preferences in advertisements presenting women, stress the themes of being authentic, age-appropriate and attractive. In their view, attractiveness goes beyond looks of realistic mature women and add characteristics of intelligence, confidence and happiness. Rounding off the characteristics of the mature people as identified in research, it seems pertinent to mention their attitude to their own signs of maturity – the way they look. The signs of age are mostly avoided by fashion marketing but editing these away may be a misinterpretation of what the market wish, since less than 3% of Mair and Cili’s 40-89 years old respondents informed that they wore make-up to look younger (2016). However, as already reported by The Guardian, constructing a narrative of age-diversity in fashion is still not a customary exercise, and approaching the prosperity fashion narrative, discussions of existing marketing examples may educate the further development.

A central trait in fashion images is the endeavour to construct cool. Jerslev (2018) outlines cool as marked by an aesthetic of aloofness and individual rebellion among other characteristics. She draws attention to the inference by Pountain and Robbins (2000) that cool is not a question of age but an attitude which can be appropriated by all generations. An often-mentioned advertisement displaying the new cool is the Céline ad from 2015 by Juergen Teller displaying the writer and icon Joan Didion. Even though Didion is a celebrity and consequently has a different publicity status, the ad still displays her age as an element of distinction and by that communicates another narrative of age than the stereotypical version. Different ways of displaying age in fashion are also discussed by Bøilerehaug (2020) with her identification of three levels in the construction of age. In her analysis of how age is applied in SoMe branding, she finds that the aesthetic character of age varies when it used as an aesthetic intensifier, an element of distinctive cool or as a celebration of the aging body to the point where it becomes part of the brand’s capital. Consequently, age is not found to have one single aesthetic character in the analysis, but the integra-

tion of age as aesthetic capital is still common for the international fashion brands analysed.

The above range of scholarly findings contribute to a more nuanced and detailed comprehension of mature identities, lifestyle and relationships to fashion. When contrasted to the traditional narrative of maturity they appear to constitute a leap forward, and when regarding them as a revision and further development of the traditional understanding of maturity, their identification forms the framework of discursive building blocks of in the new aesthetic maturity

construction as presented in Table 01.

Table 01 displays the range of discursive building blocks identified in the selected literature and examined above. The table shows the new key elements in relation to age together with the markers of youth and the stereotypical perceptions of age as found by Bøilerehaug (2024) in her elaboration of skin structure connotations, their perceived values and position in marketing. With its overview the table presents informed components for an aesthetic narrative of age-diversity rather than an exclusion of one group at the

Framework of discursive building blocks for the aesthetic construction of the age-diversity in a prosperity fashion perspective

Youth	Traditional maturity	Prosperity maturity
Attraction	Retrospection	Experience
Desirability	Loss	Curiosity
Social status	Decline	Age-independent self-identity
Seduction	Stagnation	Continuous development
Fertility	Self-deterioration	Vibrance
Refined state	Obsolescence	Contribution readiness
Luxury	The past	Openness towards new designs
Gain	A celebration	At ease with own appearance
Development		Younger cognitive age
Progress		Intelligence
Marketability		Confidence
The present		Happiness
The future		Activity
		Modern
		Personal challenges
		New experiences
		New information
		New knowledge and education
		Wishing to be part of the present
		Young-minded fashion consumption attitudes
		Authentic, age-appropriate and attractive
		Distinction
		An aesthetic intensifier
		An element of cool
		A celebration

Tab. 01

expense of the other. Consequently, the framework subscribes to the prosperity fashion qualities of high diversity, agency for humans and continuous reflexivity with purpose and contents alike (Buckton et al., 2023).

The three life stages of the building blocks reveal the sharp contrast between the positive aspects of Youth versus the negative aspects of Traditional maturity. However, the generally haralading depiction of Youth is in opposition to numerous surveys elsewhere stressing its problems and fragile state far from the marketed youth glamour (World Economic Forum). Another notable contrast made evident by the framework is the inherent perception of destination in Traditional maturity versus the signals of process in Prosperity maturity.

Relating elements of the framework to the contextual state of affairs, for example Vibrance and Wishing to be part of the present are reflected in statistics and needs for new marketing practise alike. The State of Fashion 2025 report informs that the Silver Generation aged over 50 accounted for 25% of the global population in 2020, and it calls for their activation by brands (Balchandani et al.). Besides, the report recommends identification of inter-generational customer segments on values rather than the traditional marketing approach. Finally, the report finds that half of the women in their 50s are more style-conscious than when in their 20s, and at EU-level the mature crowd prioritizes product value 25%points above the average. This development appears somehow encompassed in the Burberry Christmas 2024 campaign where the elderly couple, Drs. Herschel and Lilly Stoller were cast for their love and constant use of the brand (Veitch, 2024). Also Valentino has used mature models on their catwalks. When presenting its AW 2022 collection, the brand was praised for its numerous mature models. A similar cast was used by designer Alessandro Michele showing his spring 2025 debut couture collection for Valentino while commenting on the cast with the remark: "Time provides grace" (Cartner-Morley, 2025). The boldest mature cast however was seen at the Italian brand Sunnei's catwalk exclusively showing models at the age of 50 and older in their SS2025 presentation (Ahluwalia & Rhodes, 2024). The brand thus highlighted both Vibrance and Participation in the present in practise (Fig. 01).

The proposed framework can be

implemented in the industry structures in a number of ways. As a first step towards increased age diversity, catwalk casts can be published in overviews of age diversity in each major fashion city similar to the Vogue Business size inclusivity reports (Maguire & Shoaib, 2024). As a second step, fashion weeks can implement diversity requirements as part of their policies. To broaden the implementation, a third step have to include diversity programmes in the supply chain of models beginning with the modeling and influencer agencies, the casting agencies and the fashion brands. Naturally, the state of fashion age diversity needs to be monitored also in communication from organizations and media since mediatization of events, campaigns and business news plays a part in displaying a wider scale of diversity cues. Regular publication of such state-of-affairs surveys can support development of the fashion industry in a more sustainable direction on the social parameter of age diversity.

Concerning the terminology of the framework, applying the term aesthetic rather than just visual allows an extra dimension in the discussion and application of the framework and its building blocks. Whereas the term visual may appear more straightforward, aesthetic invites contextual contemplations. The present definition of aesthetic regards objects not only by their function, but also objects for sensory experience by means of their shape, material, texture, and potential meaning and rests on the work of Folkmann and Jensen (2017). Consequently, the objects are considered together with the contextual forces creating meaning. The contextual and reflexive perspectives are also inherent in the present discussions, and it matches the approaches towards connotations and understandings of texture and age by Iquani (2012) and Bøilerehaug (2024) forming the sources informing the basis of Table 01.

CONCLUSION

The article set out to contribute to defining the concept of prosperity fashion from an interdisciplinary perspective. Looking into the intertwined visual marketing narrative of fashion and youth, Okwodu's observations on disposability and the habitual casting of young fashion models (2019) inspired the examination of the connotations of smoothness and texture as illustrated by Iqani (2012). Juxtaposing these observations with



Fig. 01

scholarly work on the mature crowd's self-identities, lifestyle and attitudes to fashion gave a view into the gaps between the narrow practices, the stereotypes and the new realities. The discussion of marketing's effects on identity formation (Schroeder & Borgerson, 2004) contributed with contemplations regarding the disparity between the fashion industry's claim to sustainability by marketing of long product lifecycles and its continuous flashing of young replaceable models.

The potential in including mature models as an integral, aesthetic part of fashion branding was explored by an examination of research on age concepts and the implications of cognitive age and its sub-categorisations. The themes of continued process in life (Fregolente & Junqueira, 2019) and the mature cohort's positive attitudes towards their own appearance were some of the observations sustaining the new narrative of age-diversity. Furthermore, the building blocks of the suggested narrative framework were based on the characteristics of cool as laid out by Jerslev (2018) and by the three levels in the construction of age in fashion branding (Bøilerehaug, 2020).

Consequently, the range of aesthetic

building blocks were based on research relevant for considering the age concept and on the industry's and the mature market's perceptions of it. Additionally, the deliberations were reflected in research in the social and cultural implications of marketing. Implications affecting both consumers and the fashion industry's reputation negatively. On that basis, the building blocks present an opportunity for the industry to anchor its narrative in the prosperity fashion qualities signalling diversity, agency for humans and continuous reflexivity (Buckton et al.) as they reflect the new old and welcome them in the circle of doers rather than onlookers.

DISCUSSION

Strengthening the fashion industry's position as part of a natural world of longer and more natural lifecycles appears urgent. A new aesthetic narrative of age-diversity and full life courses of models as a parallel to the sustainable claim can be a first step in the right direction. However, research can also move further ahead and illuminate fashion's way to doing good in a wider branding scale, since its present culture may have more impact than previously examined. In a wider perspective, the fashion industry's omission or scarce representation of mature models may have negative consequences also on the omitted segment. In this respect, the work on identity formation in terms of age-identity and subjective well-being by Westerhof and Barrett (2005) is worthy of mention. If regarding the omissions of mature fashion models as tacit stereotypification signalling that mature people cannot pass the value threshold, the practice forms an obstacle to the mature crowd's potential self-enhancing strategy and their difficulties with preventing internalization of ageist stereotypes. Mature people are found to feel younger than their actual age but what is more, their age identity is significantly related to their subjective wellbeing, and subjective wellbeing has been found higher for people not internalizing stereotypes. Consequently, further research into the effects of the invisibility of maturity on the mature cohort and their wellbeing can be illustrative for the industry in its endeavours to become more sustainable also from a social perspective.

Prosperity fashion and the worldview in Buckton et al's vision of a Regenerative Lens, with the qualities of wellbeing, high diversity and continuous reflexivity, can inspire further develop-

ment of the narrative of age-diversity in fashion marketing. A regenerative design with a holistic perspective on fashion branding is needed for integrating people and nature in terms of natural processes as the course of life is. The perspective of lifelong human agency must be clearly communicated in fashion to make it reflect and further cultural and social diversity. It calls for an industrial engagement in repeated experimentation and increased awareness of the building blocks of the aesthetic construction of age diversity for the industry to move towards a position where its fame is not only connoted to well-dressed but also to wellbeing.

CAPTIONS

[Fig. 01] Sunnei faces SS25. With kind permission from Sunnei.

[Tab. 01] The framework of discursive building blocks for the aesthetic construction of the age-diversity in a prosperity fashion perspective. Inspired by Iqani (2012) and Bøilerehaug (2024).

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FROM WASTE TO WEALTH

REDEFINING PROSPERITY IN FASHION.
HARNESSING COLLECTIVE
INTELLIGENCE FOR ENVIRONMENTAL
AND SOCIAL IMPACT

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Abstract

The fashion industry is under increasing pressure to reconcile economic growth with environmental responsibility. This paper examines the 2024 Tanween Sustainable Fashion Challenge, organized by Ithra and supported by Vanina as the knowledge partner, as a case study for advancing regenerative practices in the sector. The challenge invited designers to transform undervalued local materials into luxury fashion items, using a framework rooted in the quintuple helix model to facilitate collaboration among industry, academia, government, society, and environmental stakeholders. The six-day design challenge employed agile methodologies, integrating charrette and sprint formats to enable rapid prototyping and interdisciplinary teamwork. Participants developed innovative material processes, linking ecological responsibility with cultural heritage. In the post-challenge phase, an extended network of expertise and collective intelligence was mobilized to support the winning proposal, ensuring its progression from concept to prototype through advanced material development. This paper explores the challenge's structure, its hybrid models for fostering innovation, and its integration of cultural dimensions. By embedding global expertise into local contexts, the initiative demonstrates how collective intelligence, cross-sectoral partnerships, and a glocal approach can redefine prosperity. It positions fashion not only as a tool for ecological stewardship and sustainable development but also as a medium for cultural engagement and systemic transformation in the pursuit of regenerative practices.

Keywords: *Sustainable Fashion, Upcycling, Regenerative Design, Collective Intelligence, Glocal Frameworks*

INTRODUCTION

The global fashion industry is grappling with escalating environmental and social challenges, including waste generation, unsustainable resource use, and significant carbon emissions (Niinimäki et al., 2020; Ellen MacArthur Foundation, 2017).

While fashion encompasses the broader cultural, social, and economic systems related to dress and identity, luxury represents a distinct segment within this system, traditionally associated with exclusivity and resource-intensive practices. In response to growing sustainability pressures, the notion of luxury is increasingly being reinterpreted to emphasize ecological responsibility and sustainable production practices (Adigüzel & Donato, 2021).

Addressing these challenges requires approaches that move beyond isolated efforts and foster systemic change. Cross-sector partnerships and collective intelligence are increasingly recognized as critical to advancing sustainable innovation (Carayannis et al., 2012; Fletcher & Tham, 2019).

This paper examines the 2024 Tanween Sustainable Fashion Challenge as a case study to explore the intersection of design, sustainability, and cultural heritage. By focusing on the transformation of undervalued local materials into luxury handbags, the challenge highlights how regenerative practices can contribute to redefining prosperity in the fashion sector. The study provides insights into the processes, partnerships, and methodolo-

gies that support sustainable innovation, bridging ecological responsibility with cultural engagement.

CONTEXT AND BACKGROUND OF THE CASE STUDY

The 2024 Tanween Sustainable Fashion Challenge, organized by Ithra (The King Abdulaziz Center for World Culture), is part of the Tanween initiative—a series of yearly activities and conferences addressing global and local issues through design innovation (Ithra, 2023). Rooted in the goals of Saudi Vision 2030, the initiative aims to foster economic diversification, cultural enrichment, and sustainable development.

In 2024, the Sustainable Fashion Challenge was particularly framed around the design of handbags, guiding participants to explore waste-to-luxury practices within a focused product typology. This direction reflected strategic considerations, allowing for the demonstration of material innovation, craftsmanship, and narrative integration within the constraints of a six-day intensive format.

Supported by Vanina, a Beirut-based fashion brand with expertise in upcycling undervalued and discarded materials to raise environmental awareness and engage with cultural contexts (Hayek, 2022), the challenge exemplified a collaborative, transdisciplinary approach to sustainable innovation. Vanina's knowledge served as a foundation for participants to transform agricultural byproducts, industrial remnants, and natural resources into luxury accessory prototypes. This local-global collaboration was later extended through a network of experts, including Ibdā as the production partner, to transition the winning proposal from concept to implementation.

This case study serves as a framework for understanding how design challenges can enable ecological and cultural sustainability in fashion, offering a scalable model for fostering systemic change through collective action.

RESEARCH PURPOSE AND METHODOLOGY

This study aims to explore how the fashion industry can achieve impact-driven value through sustainable, collaborative practices, thereby redefining notions of prosperity in ways that benefit both society and the environment.

The study has several key objectives:

- To examine the role of collective intelligence in sustainable fashion and investigate how

cross-sector collaborations, facilitated through the quintuple helix model, support innovation.

- To evaluate the efficacy of dual-partnership models (knowledge and production partners) in turning conceptual ideas into functional, high-quality prototypes within sustainable fashion.
- To assess the influence of risk-taking and experimentation themes, such as “Fail Forward,” on redefining prosperity by valuing process over immediate commercial outcomes.
- To analyze how waste-to-luxury practices within design challenges generate both environmental and social impact, transforming undervalued materials into new forms of value.
- To investigate the integration of cultural and regional identity in sustainable fashion, focusing on how local heritage can add cultural significance to sustainable design.
- To assess the long-term impact and legacy of such regenerative practices in fashion, considering continued research, media interest, and the potential for replicating this model to foster industry-wide change.

The research employs qualitative methods, including participant observation, in-depth interviews, and the analysis of design documentation and final prototypes, providing insights into design processes, partnership dynamics, and cultural influences on outcomes.

Author's Disclosure:

The author is a co-founder of Vanina (knowledge partner), a founding partner of Ibdā (production partner), and a faculty member at DIDI, co-curating the challenges. While this provides insider knowledge, potential biases are mitigated through structured methodologies and reference to independent sources.

The partnerships between Ithra, Vanina, and Ibdā were initiated through mutual professional networks, rooted in aligned values around sustainability and innovation. Each partner benefited from expanded knowledge exchange, exposure to new audiences, and opportunities to advance material experimentation, while costs primarily involved dedicating human and logistical resources toward project realization.

AN IMPACT-DRIVEN PARTNERSHIP FRAMEWORK

To address complex environmental and social challenges, the 2024 Tanween Challenges adopted

a collaborative approach rooted in interdisciplinarity and cross-sectoral engagement. The following sections delve into key dimensions of this initiative, examining its cross-disciplinary and cross-sectoral frameworks, the role of collective intelligence, and the scalable systems that enabled its outcomes.

A CROSS-DISCIPLINARY APPROACH: SYNCHRONIZED COMPLEMENTARY IMPACT-DRIVEN EFFORTS

The Tanween Challenges, part of Ithra's initiatives, were established in 2019 to address global issues through design innovation, aligning with Saudi Vision 2030's goals of economic diversification, cultural enrichment, and sustainable development (Ithra, 2023). Rooted in creativity and collaboration, these challenges embody Ithra's mission to bridge cultural heritage with future-oriented design practices. Over the years, the program has expanded into diverse fields such as sustainable fashion, architecture, and data visualization, demonstrating how interdisciplinary design can address complex environmental and social challenges.

In its fifth year, the Tanween Challenges 2024 embraced a theme-based approach, aligning all four challenges with the conference theme, Fail Forward. This framework encouraged risk-taking and framed failure as a critical step in innovation. Rooted in a manifesto advocating for a shift from human-centered to life-centered design, the challenges prioritized solutions that benefit all forms of life (Hayek & Daneluzzo, 2024). The program facilitated interdisciplinary collaboration across Sustainable Fashion, Architecture, Urban Design/Public Furniture, and Data Visualization by integrating synchronized schedules, shared workspaces, and joint jury sessions, creating opportunities for creative cross-pollination and collective innovation.

A CROSS-SECTOR APPROACH: ADOPTING THE QUINTUPLE HELIX INNOVATION MODEL

The 2024 challenges adopted the quintuple helix model (Carayannis et al., 2012), integrating five core sectors—industry, academia, government, society, and the environment—thereby fostering a comprehensive approach that leverages collective intelligence and a wide range of expertise. Each sector contributes unique resources, knowledge, and perspectives, enhancing the overall impact of the participants' work:

- **Industry:** Represented by Vanina, an internationally-distributed fashion brand from Beirut, the fashion industry offered expertise in sustainable design practices. As the knowledge partner, Vanina provided specialized guidance on transforming undervalued materials into high-quality fashion items.
- **Academia:** Two faculty members from the Dubai Institute of Design and Innovation (DIDI) served as curators for the four 2024 Tanween Challenges, incorporating an academic perspective and research-based methodologies into the structure.
- **Government:** The King Abdulaziz Center for World Culture (Ithra), a division of Saudi Aramco—majority-owned by the Saudi Arabian government—organized the challenges as part of its cultural mandate. Ithra's initiatives align with Saudi Vision 2030, supporting economic diversification, cultural enrichment, and sustainable development.
- **Society:** Challenge participants were drawn from the local community, representing a diverse array of disciplines, backgrounds, and regions throughout Saudi Arabia. This diversity ensured that the projects reflected a range of perspectives and regional identities (Tab. 01).
- **Environment:** Environmental responsibility was a core focus of the Tanween Challenges, which invited participants to utilize locally sourced organic and waste-based materials, such as agricultural by-products and industrial remnants, to embed ecological considerations into their designs (Tab. 02).

By employing the quintuple helix model, the Tanween Sustainable Fashion Challenge, along with the other Tanween initiatives, established a collaborative ecosystem connecting these sectors, enabling a holistic approach to innovation and fostering interdisciplinary engagement.

A GLOCAL APPROACH: KNOWLEDGE EXCHANGE, CAPACITY BUILDING, AND COLLECTIVE LEGACY

Dual Partnership Model: Knowledge Partner and Production Partner

A key feature of the Tanween Challenges is the dual-partnership model, pairing knowledge partners with production partners to bridge ideation and implementation (Ithra, 2023).

- **Knowledge Partners:** Selected internationally for their specialization in specific design approaches, they provide specialized insights and guide

Overview of Participant Disciplines, Skills, and Regional Representation

Participant	Discipline	Education	Skills/Expertise	City	Province/Region
Participant 1	Interior Design	Bachelor's in Interior Design	Conceptual design, rendering, project management	Riyadh	Riyadh Province
Participant 2	Graphic Design	Bachelor's in Graphic Design	Branding, visual identity, digital illustration	Al Khobar	Eastern Province
Participant 3	Architecture	Bachelor's in Architecture	Sustainable design, urban planning	Dammam	Eastern Province
Participant 4	Product Design	Bachelor's in Product Design	Furniture design, prototyping, 3D modeling	Jeddah	Makkah Province
Participant 5	Engineering (Undetermined)	Bachelor's in Engineering	Technical innovation, CAD modeling	Riyadh	Riyadh Province
Participant 6	Fashion Design	Bachelor's in Fashion Design	Sustainable fashion, pattern making	Abha	Asir Province
Participant 7	Architecture	Bachelor's in Architecture	Digital fabrication, parametric design	Makkah	Makkah Province
Participant 8	Fashion Design	Bachelor's in Fashion Design	Digital drawing, trend analysis, circular economy	Riyadh	Riyadh Province
Participant 9	Fashion and Textile Design	Bachelor's in Fashion and Textile Design	3D design, sewing, innovative textile solutions	Jazan	Jazan Province

Note: This table represents a subset of the 18 participants involved in the challenge. The full cohort encompassed diverse disciplines - including engineering, art, product design, and architecture - and spanned various cities and provinces across Saudi Arabia, reflecting a commitment to regional and interdisciplinary inclusivity.

Tab. 01

participants, sharing knowledge accumulated through years of work across different localities. In the case of the Sustainable Fashion Challenge, the input of Vanina as a knowledge partner, sharing its proprietary waste-to-luxury methods (Hayek, 2022), provided participants with foundational knowledge in impact-driven fashion, demonstrating the transformation of local, discarded materials into marketable luxury products.

- *Production Partners:* Selected locally or regionally, they offer resources and manufacturing capabilities, enabling participants to translate concepts into prototypes by providing access to advanced production and manufacturing capabilities. Typically, production partners are secured ahead of the challenge to ensure alignment with the conceptual and technical requirements of the projects. However, in this particular case—given the experimental and open-ended nature of the challenge—it was decided not to secure a production partner in advance. This approach allowed for greater flexibility in exploring innovative directions during the challenge.

After the winning proposal was selected, the complexity of translating the concept into a viable prototype highlighted the need for specialized expertise. As a result, the Ibdå collective was brought in as a production partner to handle the critical research and development (R&D) needed. Their involvement provided the technical support required to overcome challenges and ensured the successful realization of the participants' ideas.

This adaptive strategy illustrates how the dual-partnership model can be modified to address the unique demands of experimental challenges, balancing the need for conceptual exploration with the practical requirements of implementation. Applied across the Tanween Challenges, this model integrates international expertise with local resources, fostering an environment conducive to innovation while simultaneously strengthening local capacity.

Hybrid jury model: global online and in-person local experts

The Tanween Challenges employed a hybrid jury model, combining in-person local experts with online global participants. This panel included specialists in sustainable fashion, material innovation, and cultural heritage from academia, industry, and cultural institutions, offering a

comprehensive assessment of the projects. The jury evaluated not only the design and aesthetic qualities of each project but also their alignment with sustainable practices and cultural relevance. Their feedback provided valuable insights, guiding participants to understand the broader impact of their work while ensuring objective and well-rounded evaluations.

A GROUP-FORMING APPROACH: FLUID TEAMS AND SCALABLE SUPPORT STRUCTURES

Fluid team building systems

- *Theme-based teaming:* Participants were organized into interdisciplinary teams representing diverse regions and backgrounds, which enriched the design process by incorporating varied perspectives and cultural insights. Team formation took place on day 2, following the presentation of the initial sprint's outcomes—moodboards and research findings. This fluid, impact-driven team-forming approach prioritized the alignment of project directions over affinities, fostering teams that could adapt and evolve as the project progressed.
- *Evolution of team compositions:* team compositions continued to evolve even after the challenge concluded. For instance, the Naseem team, which initially comprised four members, transitioned to three by the end of the challenge, with two participants subsequently expressing interest in co-founding a startup or brand based on their project. The third team member opted to continue as an advisor, indicating a fluid, adaptable approach to team roles that extended beyond the immediate challenge.
- *Project-based stakeholder outreach:* Through strategic outreach, the challenge facilitated connections between participants and potential future partners relevant to each project's focus. For example, Muatah (Fig. 04) was connected with a local date production company to explore the use of date by-products. This approach established a pathway for each project to develop meaningful industry relationships that could support continued growth and real-world applications beyond the challenge.

Material	Type	Waste Status	Notes	Proposal
Camel Fur	Biological	Waste (usually burnt)	Triggered by a participant's memory of camel hair burning on her father's farm, highlighting its underutilized potential.	Lohab
Sand	Mineral	Waste (extracted during camel hair cleaning)	Collected as a byproduct of cleaning camel fur; repurposed for integration into material composites.	Lohab
Fish Scales	Biological	Waste (byproduct from fishing industry)	Merged with salt to create a biomaterial designed for complete dissolution in seawater.	MRG
Sea Salt	Mineral	Waste (from desalination process)	Challenging due to its hydrophilic nature, requiring innovative material-binding techniques.	MRG
Palm Fiber	Biological	Waste (byproduct of date palm agriculture)	In Saudi Arabia, date palm fibers, known locally as "الليف", are often considered agricultural waste. The country, being one of the largest producers of dates, generates substantial amounts of this byproduct annually. Traditionally, these fibers have been discarded or burned, leading to environmental concerns. However, recent studies highlight the potential of date palm fibers for various applications, including bioethanol production and sustainable material development. (Al-Rajhi & Abdelghany, 2023)	Muatah
Date Kernels	Biological	Waste (byproduct of date processing)	Represents cultural significance and abundance in Saudi agriculture.	Muatah

Tab. 02

Material	Type	Waste Status	Notes	Proposal
Leftover Fabrics	Biological/ Mineral	Waste (collected from tailors and designers)	Incorporated for texture and layered aesthetics.	Safouna
Pomegranate Skins	Biological	Waste (food industry byproduct)	Processed for bio-leather production, adding vibrant natural colors and aromatic properties	Naseem
Tangerine Peels	Biological	Waste (food industry byproduct)	Combined with other citrus for aromatic and durable material creation.	Naseem
Lime Peels	Biological	Waste (food industry byproduct)	Adds unique texture and citrus-based fragrances. Seasonal. Linked to traditional customs.	Naseem
Mango Pulp	Biological	Waste (non-commercialized produce)	Sourced for its aromatic properties, color, flexibility and durability in bio-material production.	Naseem
Lavender Buds	Biological	Commercialized	Used for aromatic properties, reflecting local ecological richness.	Naseem
Green Pumpkin Pulp	Biological	Waste (non-commercialized produce)	Represents seasonal abundance and versatility in material creation.	Naseem

Tab. 02

Scalable custom support systems

- *Mentorship*: During the 6 days of the challenge, the knowledge partner, represented by its co-founder, provided mentorship to the teams. This was supported by the challenge leader from the Ithra Idea Lab team, with the support of a senior mentor – also from that team. After the challenge, weekly meetings, both in-person and online, with the knowledge partner and the challenge leader, provided ongoing guidance and mentorship.
- *Support of Ithra's Idea Lab*: Ithra's Idea Lab offered resources, coordination, and expert input to facilitate the challenge as well as post-challenge development. For example, the Idea Lab offered access to the participants to a biomaterials workshop.
- *Support of External Experts*: As highlighted in the previous section, the winning team, MRG, required additional expertise for material development in the post-challenge phase, as the concept was promising but difficult to implement, according to the jury and Ithra Idea Lab team. To address this, Ithra invited Ibdå to join as an R&D-focused production partner, to help translate the concept into a working prototype. Ibdå further contributed by assigning specialists, showcasing the role of collective intelligence in advancing the challenge's goals.

Each team was thus a microcosm of collective intelligence, integrating participants with diverse areas of expertise and regional backgrounds, which is shown to facilitate cross-pollination of ideas and enhance innovation potential (Levine & Moreland, 2004; Woolley et al., 2010). This diversity underscores the value of a collaborative, interdisciplinary approach, aligning with findings that suggest innovation often emerges from blending different perspectives in team environments (Johnson, 2010).

Framed under the challenge's overarching 'Dare to Fail' title, aligned with the 'Fail Forward' theme of the conference, the experience reflected the inherent uncertainties of experimental design, with participants navigating evolving team dynamics, material development challenges, and the complexities of translating concepts into viable prototypes.

A CROWD-SOURCED APPROACH: AUGMENTED COLLECTIVE INTELLIGENCE MODELS

Artificial intelligence (AI) tools supported the creative processes of the challenge teams. Vizcom, an AI-based tool, was used to transform early sketches into digital renderings (Vizcom Technologies, Inc., 2024), incorporating visual elements derived from preliminary material experiments. This collaboration between the teams and AI facilitated a blend of human creativity with machine-generated refinement, drawing on a collective intelligence embedded in Vizcom's datasets of prior works. While AI-generated imagery typically raises ethical concerns regarding ownership, accountability, and social impact (Franzke et al., 2023), these issues were mitigated here. The AI outputs were created using original sketches and reference images from the teams' physical experiments, thus preserving the uniqueness of their contributions while enhancing them through AI assistance (figure 1b). This approach aligns with the concept of Augmented Collective Intelligence, where AI acts as an enabler of human creativity (Woolley et al., 2010).

In addition, in the post-challenge development phase, the teams tapped into collective intelligence through online platforms like Materiom, which provides open access to recipes and research on sustainable materials (Materiom, 2024). By using Materiom, participants gained access to a global network of sustainable material innovations, allowing for environmentally responsible design exploration based on established research. This combination of AI support and open-access platforms expanded the teams' capabilities in sustainable material development and design.

AN AGILE DESIGN INNOVATION FRAMEWORK

CHALLENGE TIMEFRAME AND STRUCTURE

The six-day Tanween Challenge followed a structured, high-intensity format inspired by the charrette model, which combines rapid prototyping and interdisciplinary collaboration to tackle complex problems (Lennertz & Lutzenhiser, 2006). Each day of the challenge was organized as a single-day sprint, borrowing from the Agile methodology (Schwaber & Sutherland, 2017) and adapted for swift progress through iterative cycles.

Each day functioned as a focused sprint with an action-oriented verb guiding its theme (Tab. 03), incorporating a mix of lectures, tutorials, working sessions, discussions, and presentations. This combination of activities provided participants with theoretical insights, practical guidance, and collaborative feedback, facilitating rapid development and iterative refinement of their concepts within the structured yet fast-paced environment of the Tanween Challenge.

The six-day structure was fast-paced yet systematic, enabling participants to progress swiftly from conceptualization to prototyping. Day 1 (Re-value) focused on research and the identification of undervalued materials, exploring their transformative potential. Day 2 (Conceive) introduced moodboards and initial material testing, emphasizing the integration of local crafts and modern technologies. By Day 3 (Materialize), teams were actively creating digital models and physical prototypes, supported by tools such as 3D printers and laser cutters. Day 4 (Refine) emphasized detailed renderings, technical drawings, and sourcing strategies. Day 5 (Strategize) introduced branding, cost positioning, and market communication, culminating in Day 6 (Present), where teams pitched their concepts to a jury, showcasing their journey from initial research to early-stage prototypes.

This approach ensured that participants could explore innovative solutions while managing the constraints of time and resources. The iterative, sprint-inspired framework supported the dynamic and collaborative nature of the Tanween Sustainable Fashion Challenge, demonstrating how rapid iteration can drive impactful outcomes within interdisciplinary contexts.

This six-day journey was preceded by a carefully planned pre-challenge phase, which laid the groundwork and established the themes, and followed by a post-challenge phase, culminating at the conference. The paragraphs that follow analyze the pre-challenge and post-challenge phases, extracting key insights on preparation, execution, and strategies for sustaining influence beyond the initial event.

PRE-CHALLENGE RESEARCH, PREPARATION, AND DECISION MAKING

The pre-challenge phase involved participant selection, team formation, and briefings to establish a shared vision and methodology. This stage began with drafting the design brief and assessing

the feasibility of achieving the ambitious goal: transforming waste materials into a luxury handbag concept within six days. Aligning with the 2024 Tanween Conference theme, Fail Forward, which emphasized risk-taking in the design process, the Ithra team embraced this high-risk challenge. They believed that the true impact extended beyond creating marketable products, focusing instead on raising awareness and fostering local knowledge about regenerative possibilities within the fashion industry.

After finalizing the brief, the team sourced local organic and discarded materials as primary resources, supplemented by sustainable materials like vegan leathers and regenerative textiles. Accessories such as metal handles, chains, and ropes were also procured to support prototyping. The workspace, equipped with tools like 3D printers, laser cutters, and sewing machines, was carefully organized to facilitate rapid hands-on development, drawing on lessons from previous challenges.

POST-CHALLENGE PROJECT DEVELOPMENTS AHEAD OF THE TANWEEN CONFERENCE SHOWCASE

Initially, only the winning project was intended for the Tanween public conference showcase. However, given the successful outcomes of all proposals (Fig. 01, Fig. 02, Fig. 03, Fig. 04 illustrate some of the outcomes), Ithra, together with the knowledge partner, chose to mentor all interested teams, offering them the chance to further develop their concepts for exhibition at the conference. After the challenge, the challenge leader and the knowledge partner, now acting as mentors, convened with all participants to set a structured plan of action. Through this ongoing mentorship and planning process, three concepts—MRG, Naseem, and Muata’—were ultimately selected for exhibition. The paragraphs below detail the development of the Naseem and MRG projects and extract findings from all teams in the post-challenge phase, highlighting key challenges for long-term continuation and solutions set forth.

The Case of Naseem: From Prototype to Venture

Naseem’s development was characterized by a passion-driven, self-led approach. The team underwent voluntary reshuffling to ensure alignment and commitment among its members,

Day	Action-Driven Theme	Activities	Focus
Day 1	Re-value	Research boards	Devalued Materials, Crafts & Visual Heritage
Day 2	Conceive	Concept & material samples	Moodboard, Material Tests, Concept & Visual Narrative
Day 3	Materialize	Prototypes & models	Digital Models, Physical Prototypes, Sketches and Files
Day 4	Refine	Renders & details	Detailed Renderings, Technical Drawings, Manufacturing Manuals
Day 5	Strategize	Collection & brand	Collection Architecture, Brand Identity, Costs & Positioning
Day 6	Present	Showcase & pitch	Rehearsal, Jury Presentation

Tab. 03

ultimately enabling the project to move forward with a dedicated focus.

The Case of MRG: From Concept to Prototype

The MRG project involved a challenging task that required advanced expertise in biomaterials. Ibda, as the production partner, facilitated over 90 trials and material experiments in a specialized lab to develop the custom material needed for the concept’s realization.

Challenges for Long-Term Continuation

Several obstacles emerged during the post-challenge phase. A lack of specialized expertise hindered progress in material development, as some projects required advanced R&D capabilities in biomaterials and sustainable practices. Additionally, logistical challenges arose from the geographical dispersion of team members and their

professional commitments, which limited their availability for collaboration.

Solutions Set Forth

To overcome these challenges, collaborations with R&D experts and specialized labs played a pivotal role in addressing technical complexities and advancing prototypes. Furthermore, team restructuring was facilitated voluntarily, allowing projects to continue with aligned and dedicated members, ensuring the continuity and development of the concepts.



Fig. 01



Fig. 02



Fig. 03



Fig. 04

LONG-TERM MULTI-LAYERED LEGACIES

The following paragraphs investigate the impact of the challenge by analyzing its different long-term outcomes.

DISSEMINATION OF IDEAS

The challenge itself served as a critical platform to expose participants and their communities to alternative approaches to fashion prosperity. It emphasized upcycling undervalued materials by turning waste to luxury, and identifying local cultural heritage—shared through a mix of lectures, tutorials, experiments, and discussions.

The dissemination continued through press coverage, social media posts, videos, and interviews. At the Tanween Conference, prototypes of three projects (MRG, Naseem, and Muatah) were showcased, engaging an interdisciplinary audience of diverse backgrounds. Additionally, the knowledge partner delivered a talk, sharing behind-the-scenes insights into the challenge, highlighting the pre- and post-challenge processes, and emphasizing the potential of sustainable practices in redefining fashion. The Tanween Challenges Legacy section also presented outcomes from previous years, underscoring the long-term impact and commitment to project implementation beyond the prototype stage. For instance, the outcome of a previous fashion challenge—a handbag made of kombucha leather—is now available for purchase, demonstrating how concepts developed during the challenges can evolve into market-ready products. This legacy highlights the sustained efforts to advance the projects, ensuring their continued relevance and impact.

RE-VALUATION OF UNDERVALUED MATERIALS AND WASTE

Participants uncovered a variety of undervalued local materials, offering insight into Saudi's specific ecological and cultural resources. This included agricultural byproducts, industrial remnants, and natural materials that could be reimaged for fashion applications (Tab. 02). Although the transformations remained at a prototype stage, they demonstrated significant promise for material innovation and redefined the potential of fashion in a local and sustainable context, as highlighted by the jury's feedback and evaluation.

MATERIAL INNOVATION AND WASTE-TO-LUXURY PROCESSES

The Tanween Sustainable Fashion Challenge supported the creation of innovative sustainable materials that addressed key challenges in fashion production (Tab. 04).

MRG introduced a sea-sourced binder developed by the Ibdā team, functioning as a biodegradable resin-like material. This material provided an alternative to synthetic and bioresins, the latter being odor-free but non-biodegradable. By combining scientific research and artisanal testing, MRG demonstrated how materials could address environmental challenges while leveraging local ecological resources.

The MRG, Muatah, and Naseem projects emphasized the act of designing as integral to material remediation. Instead of sourcing pre-existing sustainable materials, designers engaged in a closed-loop process, from sourcing raw byproducts to cleaning, processing, and forming the bags directly through the material transformation process. For example, Muatah's work with palm fibers and date seeds required cleaning, polishing, and shaping these materials into both structural components and decorative elements, creating a seamless connection between material innovation and design.

This approach underscores the importance of integrating design with material development, fostering a holistic process that not only creates sustainable products but also enhances the environmental and cultural value of local resources.

REVISITING AND COMMUNICATING CULTURAL IDENTITY

The projects reflected a deep engagement with Saudi Arabia's cultural and ecological heritage, creating materials and designs that reconnected with local stories, practices, and landscapes. By linking materials to personal and regional narratives, these projects demonstrated how design can serve as a bridge between cultural storytelling and sustainable innovation. The key cultural inspirations, materials, and approaches are summarized in Table 05.

The integration of cultural diversity into sustainability frameworks extends beyond material innovation to carry a political dimension, reinforcing regional identities and resisting the homogenizing forces of globalization. The projects developed through this challenge demonstrate how local heritage can drive sustainable innovation, merging

Material	Properties	Standard (Non-Sustainable) Alternatives
MRG’s Sea-Sourced Binder	Biodegradable, clear, resin-like adhesive made entirely from sea-based materials; binds fish scales and salt while addressing salt’s hydrophilic nature.	Traditional bioresins: odor-free but not biodegradable. Synthetic resins: durable but derived from petroleum and non-biodegradable.
Naseem’s Aromatic Bio-Leather	Biodegradable, leather-like material with rich sensory properties, including regional aromas and textures.	Animal leather: durable but resource-intensive and unethical to some. Synthetic leather (e.g., PU or PVC): often non-biodegradable and toxic.
Muatah’s Palm Fiber Composites	Combines the flexibility of leather when wet and rigidity of wood when dry, allowing moldable applications.	Conventional leather: non-biodegradable and resource-intensive. Wood composites: require synthetic adhesives, adding environmental concerns.
Muatah’s Date Seed Beads	Durable, natural, and biodegradable beads derived from agricultural byproducts (date seeds).	Acrylic, glass, or synthetic beads: visually appealing but resource-heavy, non-biodegradable, and often energy-intensive to produce.

Tab. 04

material exploration with cultural storytelling to foster more pluralistic, resilient, and regenerative models of design that reflect the richness of Saudi Arabia’s natural and cultural landscapes.

NEW VENTURES

The challenge nurtured entrepreneurial potential, with Naseem evolving into a startup that offers a collection of goods celebrating the colors, aromas, and textures of organic leftovers from different provinces. Supported by Ithra’s Idea Lab and the knowledge partner, Naseem refined its prototypes and developed a comprehensive business plan.

NEW COLLABORATIONS

Following the review of the challenge outcomes, other institutions, such as the Saudi Fashion Commission, expressed interest in collaborating on future fashion challenges, according to interviews with the Ithra team and program leader. This engagement underscores the potential of fashion

as a tool for fostering impact-driven, cross-sector collaboration, drawing together stakeholders from industry, public institutions, and academia around shared sustainability goals. The positive reception of the challenge outcomes thus acted as a catalyst for future partnerships, positioning fashion as a strategic platform for generating meaningful social and environmental impact.

CONCLUSION

The Tanween Sustainable Fashion Challenge 2024 highlights the importance of collective intelligence and cross-sector collaboration in advancing sustainable practices within the fashion industry. Through its glocal framework—bridging local material exploration with global dissemination—the challenge demonstrated how localized efforts, when combined with interdisciplinary expertise, can contribute to systemic innovation. By integrating methodologies such as charrettes and sprints, participants were able to address ecological and

Project Name	Arabic Meaning	Materials Used	Cultural Connection	Sustainability Approach
MRG (مرج)	"To merge/coexist"	Fish scales, salt – along with custom-developed sea-sourced binder	Saudi Arabia, the largest country without rivers, relies heavily on its seas for fresh water. The project draws inspiration from Alkhobar's deep connection to marine life and its seas. Reflects the Quranic verse: مَرَجَ الْبَحْرَيْنِ يَلْقِيَانِ (الرحمن: يَلْقِيَانِ * بَيْنَهُمَا بَرْزَخٌ لَا 20-19) [“He released the two seas, meeting side by side; between them is a barrier [so] neither of them transgresses.” (Surat Ar-Rahman: 19-20)]	Sea-sourced biodegradable (made with bi-products of sea-based industries: water desalination and fishing industry) material dissolving back into the sea
Muatah (معطاه)	"The giver"	Palm fibers, date seeds	Rooted in memories of family date farms	Upcycling agricultural byproducts
Lohab (لوهب)	"Gift of joy"	Camel hair, desert sand, desert plant (Hiram)	Inspired by camel farming heritage, desert ecosystem, and the ancient joy of camel births	Reviving overlooked resources like camel hair and connecting materials to natural cycles
Naseem (نسيم)	"Breeze"	Tangerine peels, pomegranate skins, lavender buds, etc.	Embodies regional diversity and personal sensory memories of Saudi's provinces	Transforming food waste into aromatic bioleather

Tab. 05

cultural challenges in a structured, fast-paced environment, producing actionable outcomes.

The challenge's significance extends beyond the prototypes developed. It fostered knowledge-sharing and capacity-building, facilitated through the involvement of partners like Vanina and Ibdā. These collaborations emphasized the role of cross-disciplinary networks in supporting local initiatives and demonstrated how the exchange of knowledge across regions can create opportunities for sustainable innovation. Furthermore, the engagement of academia, industry, and government sectors reinforced the value of integrated approaches in addressing complex environmental and social issues.

By encouraging a shift from human-centered to life-centered approaches, the 2024 Tanween challenges underlined the need to align design practices with regenerative methods. Initiatives like Tanween illustrate how fashion can raise awareness about ecological challenges, celebrate cultural heritage, and enable sustainable development through structured, collaborative models. This approach is essential for fostering long-term systemic change in response to the pressing challenges of today.

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Sustainable Fashion Challenge Challenge:

- **Ithra Team:** Ruba Mohammed (Challenge Leader), Maha Alghamdi (Senior Mentor).
- **Knowledge Partner:** Vanina, co-founded by Joanne Hayek and Tatiana Fayad.
- **Production Partner:** Ibda (ibda.co), led by founding partners Joanne Hayek and Dr. Raffi Tchakerian, supported the MRG project from concept to prototype with the help of design associates Leen Ghosheh and Nour Alhammawi.
- **Challenge Participants:**
 - **MRG Team:** Ebaa Altaweel, Ghayda Alnasser, Rawan Alsaalem
 - **Naseem Team:** Albatoool Almuhanha, Anwar Alsafwani, Fatima Nammi, Haifa Aldaham.
 - **Naseem Venture:** Anwar Alsafwani, Haifa Aldaham.
 - **Muatah Team:** Nora Alghaihb, Rawan Alqahatani, Sara Alawad.

- **Louhab Team:** Amani Alamoudi, Mudhy Alhassoon, Rawabi Alotaibi.
- **Safouna Team:** Amjad Alqahtani, Amal Almazed, Moadah Alomran
- **Jury Members:** Dr. Andra Clitan (DIDI faculty), Emilie Duval (Former DIDI faculty), Razan Alissa (Lead Creative Programs Developer, Ithra), Shahd Wazani (Senior Program Developer, Ithra).

CAPTIONS

[Fig. 01] The MRG Concept and Prototypes: (a) non-bio-degradable initial concept prototype using resin with salt and fish scales - courtesy of MRG team; (b) AI-generated images of the MRG concept – courtesy of MRG Team; (c) and (d) MRG prototypes presented at the conference, featuring a custom-developed sea-sourced bioresin that merges the fish scales with the salt, and can dissolve back in the sea – courtesy of the Ibda team.

[Fig. 02] Naseem: (left) developed materials: names and early trials; (right) raw materials: location in Saudi Arabia, season and sourcing mode. Courtesy of Naseem team.

[Fig. 03] Lohab: (left) winter season early prototype woven using Camel fur; (right) summer season early prototype developed with sand. Courtesy of Lohab team.

[Fig. 04] Muatah: (left) bucket bag crafted using wasted palm fibers; (right top) mini bag crafted using date seeds turned to beads; (right bottom) map of variety of date types found in Saudi Arabia according to the regions. Courtesy of the Muatah team.

[Tab. 01] Overview of Participant Disciplines, Skills, and Regional Representation.

[Tab. 02] Materials used in Tanween Sustainable Fashion Challenge proposals.

[Tab. 03] Daily agenda of the Tanween 2024 Sustainable Fashion Challenge (synthesized version).

[Tab. 04] Materials developed during the challenge: properties and conventional counterparts.

[Tab. 05] Cultural connection and sustainability approach of four of the proposals.

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PROBLEMATIZING FASHION SUSTAINABILITY

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Abstract

Business author John Elkington's key assumptions, presented in his 1997 work *Cannibals with Forks* - the multiple perspectives view, global data and future-oriented temporality - continue to inform mainstream fashion sustainability today. If fashion is to move beyond a singular profit-driven vision toward shared well-being, the research community needs to increasingly steer studies toward using reflexive approaches, by actively mobilizing and problematizing existing frameworks, not aiming to subvert or debunk or to vindicate or defend our normative point of view, but to critically problematize it. In this article, problematization methodology is used to identify and challenge the assumptions underlying Elkington's work and contemporary fashion sustainability research. By analyzing this seminal text the article contributes to the critical problematization of design disciplines, fashion sustainability in particular. Retaining hope and moving toward *prosperity fashion* in its true sense calls for dialectically questioning and unravelling one's own position, and scrutinizing and reconsidering some commonly held assumptions. This will enable us to make space for different positions and lines of thinking, which are desperately needed in fashion research.

Keywords: *Fashion research, Fashion sustainability, Problematization, Methodology*

INTRODUCTION

This article contributes to the discussion on the role of technocentric and market-led solutions and problem framings on issues concerning fashion sustainability (Biely & Chakori, 2025; Fletcher & Tham, 2015; Fletcher & Grose, 2013; Grose, 2017; Union of Concerned Fashion Researchers, n.d; Williams, 2024; Özdil & Konuralp, 2024); and how the current private governance model addressing climate change transforms crisis into opportunity (Aronczyk, 2023; Bernstein, 2002; Klein, 2007; Mirowski, 2013). At the same time, it aims to offer some practical, useful perspectives that can enable us to take steps beyond the industry-dominated and developmentalist conceptions of fashion sustainability.

The aim of problematization methodology is to generate novel research questions through a dialectical interrogation of one's own familiar positions, other stances, and the literature domain targeted at assumption challenging (Alvesson & Sandberg, 2013). This has been suggested as an alternative to the established ways of generating research questions using the gap-spotting method. Alvesson & Sandberg (2011) argue that gap-spotting leaves the assumptions underlying the existing literature unchallenged when formulating research questions. Thus, it reinforces rather than challenges influential theories (ibid.). In this study, the problematization of mainstream fashion sustainability also draws on the understandings of postcolonial and decolonial perspectives

(e.g., Allen, 2016; Bhambra & Holmwood, 2021; Liboiron, 2021).

The purpose of this text is to illustrate how problematization methodology can be used to generate research questions from a body of technologically focused environmental literature called *Bright Green Discourse*, which enjoys an influential position in design disciplines, as noted by White et al. (2017). The target of problematization here is business author John Elkington's body of work, more specifically, his text entitled *Cannibals with Forks* (1997). Elkington's work is based on corporate-led consensus-seeking through incorporating "multiple perspectives" into sustainability, legitimated by the categories of global data and future-oriented temporality.

The idea of multiple perspectives is not problematic in itself: it promotes interdisciplinary and intercultural competences, addressing the challenges encountered by local and planetary sustainability (UNESCO, 2012). Rather, the concern here is the ways in which the Bright Green Discourse has come to define the mainstream European fashion research on sustainability issues over the past thirty years, such as the multiple perspectives view used in the discipline. By problematizing the concepts and categories that are defined by this discourse, we are taking part in the task of unlearning the assumptions of European modernity and adopting a stance of modesty, not superiority, toward our own moral certainties (Allen, 2015).

By renewing - and not rejecting - this context with the Bright Green Discourse, I argue for a dialectical interrogation, to revive European fashion research in a way that will stimulate critical dialogue and open the discipline to learning from others.

METHODOLOGY

Problematization is an important and widely used component in design disciplines. The learning concept of double-loop learning questions the underlying assumptions, goals and norms and is well-known within design and design education. Double-loop learning regards change first and foremost as a learning process. It was developed in 1978 by scholars in the science of education, Chris Argyris and Donald Schön. Schön also worked with reflective practice, equally influential in the domain of design. His reflection-in-action model (1991) builds upon practitioners' disciplinary knowledge,

reflecting on their way of thinking, which places them in a particular situation. The recognition that it takes effort to arrive at an understanding and to formulate how the problem may be seen, is called "problematization" in design (Nielsen, 2020).

To illustrate the use of problematization methodology in fashion sustainability research, this text builds upon the work of previous authors. It follows the six problematization principles outlined by Alvesson & Sandberg (2013): (1) identifying a domain of literature, (2) identifying and articulating the assumptions underlying the domain, (3) evaluating these assumptions, (4) developing an alternative assumption basis, (5) considering it in relation to its audience, and concludes with (6) evaluating an alternative assumption basis.

Although this text is built on these methodological steps, the process of problematization can follow a variety of methods. Alvesson & Sandberg (2013, p. 72) stress that problematization methodology is not about adhering to strict protocols or guidelines, but about expressing and encouraging a certain intellectual attitude and ambition.

IDENTIFYING A DOMAIN OF LITERATURE FOR ASSUMPTION-CHALLENGING INVESTIGATIONS

Environmental thinking on the potentially abundant futures surrounding the concept of *sustainability* is a central theme in design disciplines. To illustrate the problematization methodology of Alvesson & Sandberg (2013) in the context of fashion research and the subject matter of sustainability, the chosen domain here is *Bright Green* literature, which offers technologically focused and design-oriented visions of the future (White et al., 2017:182). In the book *Environments, Natures and Social Theory* (2017), White et al. observe that Bright Green thinking enjoys a hegemonic status across design disciplines, and includes works by authors such as Paul Hawken, Hunter Lovins, Amory Lovins (e.g., *Natural Capitalism*, 1999), Michael Braungart, and William McDonough (e.g., *Cradle to Cradle*, 2002).

The focus of this article is the work of the above-mentioned authors' coeval and peer, business writer and entrepreneur John Elkington. His long-standing connection to design disciplines began with *The Green Designer* exhibition at the Design Council in London in 1986. His texts

exhibit the core tenets found in mainstream sustainability thinking: technological innovation, the multiple perspectives view, and future-oriented thinking. Elkington's writings form a timeline for the increasing need to reframe the ethos of "sustaining" as ideas of "regeneration". His works include: *The Green Capitalists* (1987), *The Green Consumer Guide* (1988), *The Breakthrough Challenge* (2014), *Green Swans: The Coming Boom in Regenerative Capitalism* (2020), and *Tickling Sharks: How We Sold Business on Sustainability* (2024).

In 1997, John Elkington published the book *Cannibals with Forks*, which introduced some of the main ways and assumptions with which trust in corporations facing environmental accountability is created. The umbrella term is called "sustainability", and the concepts that define the related ideas are accounted for in a framework called the "triple bottom line". The triangulation of the perspectives in turn are famously called "people, planet & profit". This idea is visually illustrated as three equally sized interlocking circles, representing the social, economic, and environmental dimensions of sustainable development that triple bottom line thinking incorporates.

Today, contemporary approaches to sustainability would argue that Elkington's approach is a version of "weak" sustainability that focuses on only the total value of the aggregate stock of capital, ideally increasing it (Hartwick, 1977; Solow, 1986). Thus, contemporary approaches would not consider his works central in the research and development of environmental problem-framing and fashion sustainability.

In this article, I draw upon newly understood histories of the development of sustainability associated with recognizing the role of public relations (PR) as that of an epistemic community and a technology of legitimacy (Aronczyk & Espinoza, 2021). I argue that Elkington's work is part of this newly recognized canon, and that the concepts, categories, and assumptions introduced in *Cannibals with Forks* continue to underlie our understanding of mainstream sustainability in design disciplines today.

Examples of Elkington's thinking can be seen in the many iterations of the win-win (-win) propositions related to environmental problems in fashion research and in the reframing of sustainability to *regeneration and of people, planet & profit to responsibility, resilience & regeneration*. His

thesis is based on corporate-led consensus-seeking through the incorporation of multiple perspectives into sustainability, legitimated by global data and future-oriented temporality. These are all strategies introduced by Elkington in 1997, which continue to frame mainstream sustainability and sustainable fashion research in the 2020s.

IDENTIFYING AND ARTICULATING THE ASSUMPTIONS UNDERLYING THE CHOSEN DOMAIN OF LITERATURE

The most prominent assumption underlining Elkington's argument on sustainability in *Cannibals with Forks* is the need for stakeholders' mutual interest or mutual understanding of the goal of sustainability. On a historical timeline, this coincides with a move away from environmental protection toward sustainable development, promoting market mechanisms over strict regulations (Bernstein, 2002).

The shift to mutual understanding that Elkington suggested in 1997 positions industrial knowledge on environmental issues in parallel with that of scientific communities. This epistemic position, Elkington suggests, is legitimized by increased engagement with the public and the creation of "multi-way active dialogue" with a wide range of stakeholders (Elkington, 1997, p. 172). The formulations of this consensual knowledge in fashion sustainability research are most typically win-win(-win) propositions that guarantee a favorable outcome for everyone involved; as well as research framings with a triple helix model of innovation, combining seemingly balanced interactions among university, industry and government. These shifts in industrial knowledge were institutionalized in the 1992 Earth Summit in Rio de Janeiro. This is what political scientist Steven Bernstein has called "the compromise of liberal environmentalism", treating scientific and economic ideas as equal epistemic communities (2002, p. 125); and what sociologist Leslie Sklair calls "the corporate capture of sustainable development" (2019).

Communicating through consensus-seeking strategy and using a multiple perspectives approach to reasoning, makes sustainability a common project of progress: a shared responsibility and future vision of abundance of corporations and their stakeholders. However, the position

of corporations as problem-framers in sustainability transitions merges. Elkington writes: “Companies able to engage their stakeholders with a clear vision of their shared future and, in the process, to outperform their competitors against the triple bottom line will be much better placed to win people’s hearts and minds — along with their money” (Elkington, 1997, p. 38).

This assumption regarding consensus on a shared project of progress is reinforced by two other assumptions presented by Elkington: the idea of global data as a tool for sustainability, and a temporality set in the future. On the basis of triple bottom line theory, Elkington assumes that it is possible to gather global environmental and social data from the supply chain. Controlling the data of newly globalized supply chains transparently becomes a priority in his thesis of triple bottom line thinking. The goal of transparency throughout supply chains is also risk management: In a world that Elkington calls a “high-visibility environment” and an “X-ray environment”, companies can no longer be sure that their actions in globalized supply chains will go unnoticed.

Lifecycle thinking and techniques to assess the benefits, costs and impacts of products, processes and systems have been introduced to measure the dimensions of the environmental and social aspects of production (Elkington, 1997: 212). Lifecycle thinking also becomes one of Elkington’s entry points into design disciplines. As lifecycle thinking becomes integrated into the product development process, it becomes used for “designing for sustainability” (Elkington, 1997, p. 210). However, more than contributing to the science community, Elkington (1997, p. 169) is interested in how to translate this newly acquired data on supply chains to engage with the public’s emotions and perceptions on legitimating corporate environmental behavior.

Another assumption that supports the consensus position on corporate actions concerns the temporalities of sustainability. Elkington suggests a shift from the “wide view of time”, according to which events are mostly influenced by what is happening now, to “a long view of time”, which claims that today’s concerns and challenges originate from the past (Elkington, 1997, p. 250). He sees that the wide/long divide in corporate planning can help recognize and move beyond “corporate blind spots” (1997, p. 259). In other

words, with scenario-planning as a tool, the focus would shift from “doomsday scenarios” to “how we can shape and harness the dreams and ambitions of ordinary citizens to the sustainability crusade” (Elkington, 1997, p.45). Scenario-planning, systems thinking, modeling, and futures research thus help companies move from plans to more strategic actions and communication on future premises and speculation. In the newly revealed “high-visibility environment” of global connectedness, the “long view of time” moved the focus from today’s structural problems to future solutions. Almost thirty years later, the temporality assumption continues to underlie the positive and speculative ethos of fashion sustainability.

EVALUATING ARTICULATED ASSUMPTIONS

Does fashion research have an innate goal of consensus-seeking and multiple perspectives when it comes to sustainability?

As already recognized by the Union of Concerned Researchers in Fashion (UCRF, n.d.) fashion research has become overly subservient to the industry framings and formulations of sustainability. The theoretical potential of challenging the consensus creating assumptions concerning sustainability (the perceived idea of sustainability as a shared project of progress best approached through multiple perspectives) in fashion research is twofold. First, problematizing assumptions concerning the research and development of sustainability in design disciplines can make us rethink the discipline in ways that open up other ways of knowing, by exposing the structures that exclude others in the first place. Second, centering – not rejecting – the position of the Bright Green Discourse in design disciplines and in the research and development of sustainability and sustainable fashion, enables it to be used as a threshold concept: a way of crossing the boundaries into new conceptual space.

Through this definition of problematization, I am advocating for a critique of origins that works as a tool for unlearning, as described by critical theorist Amy Allen: “(...) a genealogy that aims neither at the subversion or debunking nor the vindication or defence of our normative point of view, but rather more ambivalently at its critical problematization” (2016, p. 31).

An aspect that continues to support these corporate-led concepts and categories in fashion

sustainability is the fact that contemporary fashion research does not consider them central. It sees such ideas as historical representations of *weak sustainability*; a developmental phase in sustainability thinking that belongs to history. The secondary interpretations of the Bright Green authors have rendered the specific, Western marketplace-centered and neoliberal worldview less visible in favor of a more multifaceted approach.

Seeing these assumptions as threshold concepts emphasizes the importance of disciplinary contexts, and encountering what Hunt & Chalmers (2012, p. 42) call “troublesome knowledge”. This encounter provokes a liminal phase of transition, in which new understandings need to be integrated, and prior conceptions relinquished (ibid.). This liminal phase has the potential to open up new discussions and co-inquiries about the limits and possibilities of European fashion sustainability research.

DEVELOPING AN ALTERNATIVE ASSUMPTION BASIS

The alternative assumption basis presented here is built on newly understood histories of the ways that PR have shaped our understanding and responses to the environmental crisis (Aronczyk & Espinoza, 2021) and the Americanization of environmentalism (Aronczyk & Espinoza, 2021; Bernstein, 2002).

PR whether practiced by corporations or nonprofit and non-governmental sectors is the professionalization of public-making, predicated on appeals to self-interest, immediate situations, and directly implicated concern (Aronczyk & Espinoza, 2021, pp. 214-215). As defined by Aronczyk & Espinoza (2021, p. 215), a successful PR campaign functions as an epistemic community and a technology of legitimacy while controlling “(..) the way citizens come together to see themselves as members of a legitimate public and to recognize an issue as a legitimate problem”.

According to this alternative stance, the mainstream sustainability assumption regarding consensus conceived by multiple perspectives can be connected to the “stakeholder” model of public formation used in PR (Aronczyk & Espinoza, 2021). A stakeholder model is built around the notion of risk and distributes it among a range of “decision-makers”, whose participation stabilizes and renders the outcome of debate more indisputable by using global data and future-oriented temporality as support (Aronczyk & Espinoza,

2021, pp. 215-216).

Aronczyk & Espinoza (2021) conclude that this model has two major outcomes: First, a stakeholder model establishes a ground of consensus and compromise that operates beyond scientific or economic data, appearing more legitimate and representative of social values than the claims of scientists; and second, the stakeholder model of decision-making enables the model’s facilitator to decide what problems are presented to the public and how these problems are framed. In other words, the shared communication among different stakeholders shields the true owner of the problem from full accountability. Thus, Aronczyk & Espinoza (2021) suggest that PR should be viewed as a technology of legitimacy and an epistemic community, actively formulating and legitimizing the assumptions regarding discussions on environmental problems.

In *Cannibals with Forks*, Elkington drafts a paradigm change for companies moving into broader triple bottom line thinking from the singular, profit-driven vision. The book, written ten years after the Brundtland Report that famously defined “sustainable development” and five years after the Rio Summit in 1992, which institutionalized scientific and economic ideas as equal epistemic communities, was driven by rapidly growing globalization; new media landscape spurred by the internet, value shifts, and a growing focus on the transparency of corporations and their product supply chains (Elkington, 1997, p. 62). Elkington, writing mainly for the business audience, was influenced by the backlash that followed some companies trying to ignore the negative news about their production practices in newly globalized supply chains. He mentions the case of sportswear company Nike and sweatshops, which surfaced in 1991, as his reference to corporate catastrophe (Elkington, 1997, p. 132).

Beginning in the 1970s and intensifying in the early 1990s, in an operational strategy that was later called “Nikefication” (Davis, 2015), Nike outsourced production and distribution to other organizations, separating them from design. Revelations of sweatshop conditions and child labor in Nike’s production chains soon followed. In 1996, Life Magazine ran a reportage on child labor, presenting a Pakistani boy sewing a Nike football. Nike initially tried to ignore allegations and denied responsibility, but eventually, years later had to reverse, and change their communication strategy.

Nike's case, along with the industrial disaster in Bhopal, India in 1984, in which thousands of people died after being exposed to toxic gas, worked as an incentive for multinational corporations to privately promote corporate, voluntarist environmentalism (Elkington, 1997).

Accordingly, Elkington states that the key factor in determining long-term sustainability is the degree of trust between a corporation or industry and their external stakeholders (1997:85). To create trust, Elkington wanted to expand the range of stakeholders involved in industry's discussions and debates. Earlier, the focus had been on consumers and those directly affected by the company's products, as stated in *The Green Consumer* (Elkington et.al., 1990), but a widening range of stakeholders were needed after the unprecedented intensification of globalization integrated capital and product markets in the 1990s.

Elkington's thesis on stakeholder engagement and multiple perspectives draws inspiration from the value shifts from shareholder to stakeholder capitalism. He describes the latter as a "clarion call for the 21st century" (1997, p. 345). Integrating a growing range of partners (such as non-governmental organizations) and stakeholders into business environments became a key challenge to serve the basic idea underlying stakeholder capitalism: business and industry should be an integral part of society, not a separate set of institutions (Elkington, 1997, p. 231,298).

In other words, a broad range of stakeholders and the idea of multiple perspective sustainability is crucial for creating consensus and maintaining the hegemonic position of corporations in a globalized, connected world. Following the multiple perspective view, mainstream fashion sustainability research aims to operate by cataloging the various cultural practices associated with sustainability, and creating an encyclopedic gaze across different continents: an image of collaboration and learning from others. Consensus-seeking can also be seen in the ways that mainstream sustainability research often operates according to the triple helix model of innovation (Leydesdorff & Etzkowitz, 1998), combining the perspectives of academia, industry and government.

CONSIDERING ASSUMPTIONS IN RELATION TO THE AUDIENCE

The major audiences of this argument are located in the design disciplines, especially those dealing with sustainability and fashion issues. Will these audiences regard the alternative assumption basis as absurd, irrelevant or interesting?

As Kate Fletcher & Anna Fitzpatrick (2024) among others has noted, fashion sustainability requires many ways of knowing. This is a key assumption in the contemporary discourse on fashion sustainability. One approach to achieving this is to aim to decenter Eurocentric views on sustainability and to introduce forms of indigenous knowledge into the contemporary canon of fashion sustainability. For example, Jansen proposes a redefinition of research practice with the aim of "eradicating eurocentrism" and "delinking (fashion) from modernity", moving toward a "multitude of possibilities" and the "recognition of plurality of epistemologies" (Jansen, 2020, p. 3).

To further develop fashion sustainability research, this alternative assumption basis argues that more work needs to be done in the liminal phase created by the paradoxes of sustainable fashion. To decenter European perspectives of fashion sustainability, we first need to thoroughly center them and see how the Western ways of knowing epistemically structure fashion sustainability research, and work to marginalize other knowledge practices. Taking a historical and contextual perspective when studying how fashion research and mainstream sustainability have arrived at the *multiple perspectives* view could be one way to start and eventually contribute to opening up the discipline to other ways of knowing.

This alternative assumption basis does not suggest denying of the paradigmatic assumptions regarding fashion sustainability - including the need for several perspectives - but calls for further specification of the discipline's underlying categories and concepts. Thus, some of the audiences engaging with design disciplines from a sustainability viewpoint will potentially consider the alternative set of assumptions interesting.

EVALUATING THE ALTERNATIVE ASSUMPTION GROUND

This article examines John Elkington's seminal work *Cannibal with Forks* (1997), with a particular focus on the concepts and categories he introduced. Specifically, it analyzes how Elkington's

concepts have shaped consensus-seeking discourse on mainstream sustainability in this discipline of fashion sustainability.

As noted by Steven Bernstein (2002), the assumption that any cooperation on environmental problems means progress toward a more ecological order is overly simplistic, even faulty. This article argues that the categories of mainstream sustainability are facilitated by the argument that sustainability can have different orientations and that they derive from different value positions or definitions of the problem. However, these different orientations cannot be reconciled, and are based upon common standards. These common standards for understanding mainstream sustainability omit the broader historical context of marketplace and PR discussed earlier.

Drawing from the methodological considerations of reconstructing social theory (Allen, 2015, White et. al., 2017; Bhambra & Holmwood, 2021; Aroczyk & Espinoza, 2021); decolonial concern on fashion sustainability (e.g., Fletcher & Fitzpatrick, 2024; Jansen, 2020) and problematization (Allen, 2015; Alvesson & Sandberg, 2013; Bernstein, 2002), this argument engages in a critique of the canon by problematizing the underlying assumptions in the discipline of fashion research, not by denying or adding to the canon. In line with reconstructive ideas of social theory (e.g. Bhambra & Holmwood, 2021; Liboiron, 2021), its purpose is to show how the canon has been used to develop concepts and categories for understanding sustainability that erase its broader context with market-led definitions of environmentalism and PR.

By renewing this context and not rejecting it, I argue for a dialectical interrogation to revive European fashion research in a way that will stimulate critical dialogue and open it up to learning from others. If these assumptions underlying the discipline are not acknowledged, they stand in the way of developing fashion research on sustainability and moving toward other ways of knowing.

In the problematization process, the subject matter itself becomes the problem and instead of trying to formulate specific research questions by reviewing the literature, we need to ask different kinds of questions. Problematizing fashion sustainability without rejecting the troublesome knowledge on the market-led definitions and contextualization formed by PR could open up new perspectives and ways of thinking and practicing

research on sustainability in fashion disciplines.

Problematization-based research questions could then be formulated as follows, such as: How has fashion sustainability become an object of scientific investigation? Why did the content of fashion sustainability, or the appropriate way of understanding, addressing, or managing fashion sustainability problems evolve as it did? What historical and practical conditions have formed the *multiple perspectives* view on mainstream sustainability, and how has this happened? What determines our current understanding of fashion sustainability, from which we are able to formulate our research questions?

Thus, making fashion sustainability the topic and placing the assumptions that underlie it under dialectical interrogation, opens up specific construction processes to inquiry.

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CARE

FASHION AS FLOURISHING

A THEORETICAL APPROACH GOING BEYOND SUSTAINABILITY

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Abstract

As a theoretical framework, the concept of flourishing developed by John Ehrenfeld, can be used to consider the future of fashion. Redefining sustainability in terms of flourishing, can be a way for fashion companies as well as consumers, to be guided through the radical change that is needed within the fashion industry. Through applying a qualitative method of textual analysis, the paper reveals how flourishing can be integrated into a future fashion industry, with a focus on Being and caring as the main characteristics. The data is gathered from the fashion company babaà's website and analyzed in relation to earlier research on systemic change within the fashion industry. This, in order to provide practical steps for fostering flourishing within the fashion industry. In conclusion, one of the biggest impact a company like babaà can have, is through how they tell their story to their consumers as well as through showing how they as a company let caring steer their choices, with a specific focus on locality. This article builds on Ehrenfeld's concept of flourishing by illustrating its significance in fashion communication.

Keywords: *Flourishing, Being, Caring, Earth logic, Local*

INTRODUCTION

In contemporary society, the narrative around sustainability within fashion is that the industry is in a current phase of meaningful sustainable development (Fletcher & Tham, 2014, pp. 59-60). However, continuous rise in waste, pollution and overproduction tells another story. The reality is that fashion companies are not changing fast enough to counterbalance the fast growth of the industry. In the recent past, what sustainability has actually been doing, is to reduce unsustainability rather than creating real change (Ehrenfeld, 2008). Since the time for incremental change has passed, the fashion industry stands in front of the difficult task of a of undergoing a radical transformation (Fletcher & Tham 2019, p. 21). In order for this to

happen, the industry need to “*stay with the trouble*” of growing out of growth, as has been argued by Mathilda Tham and Kate Fletcher in *Earth Logic*, borrowing Donna Haraway's term (Fletcher & Tham 2019, p. 31). *Earth Logic* is a radical call for the fashion industry to place the wellbeing of Earth before economic profit (Fletcher & Tham, 2019, p. 31).

Through applying a qualitative method of textual analysis on the case-study company babaà, this article reveals how flourishing can be integrated into a future fashion industry, with a focus on Being and caring as the main characteristics. Flourishing entails ways of being where humans and nature thrive together, embedded in care and social connection. Being refers to being connected

in the here and now, whilst caring refers to caring for oneself as well as others and the natural world (Ehrenfeld & Hoffman, 2013, p. 84). This will be explained more in-depth under theory.

The research question driving the analysis is: How does the concept of flourishing manifest in the communication practices of the fashion company babaà, and what lessons can this offer for envisioning a sustainable future in fashion?

BACKGROUND

Western societies are currently overflowing with messages concerning sustainability within the fashion industry, however the industry have been able to use it to their advantage and as a marketing technique, by offering slightly better choices labelled “sustainable”. (Ehrenfeld, 2008, p. 7) There has also been attempts from the industry of producing and selling clothing that takes social and environmental sustainability seriously in the hopes of offering products and services that could lead to real prosperity within the industry in terms of wellbeing for people and planet. (Ehrenfeld & Hoffman, 2013, pp. 122-124) This article departs from the latter, with the aim of investigating how communication might play a role in fostering more care within the industry.

THEORETICAL FRAMEWORK

As a theoretical framework, flourishing is an As a theoretical framework, flourishing is an existential state with two parts: personal wholeness and social coherence (Ehrenfeld, 2020, pp. 130-131). Personal wholeness refers to a way of being which is in alignment with one’s authentic self (Ehrenfeld, 2020, p. 20). Social coherence comes out of how well one can exist within the surrounding institutions that constitutes modern society (Ehrenfeld, 2020, p. 25). Bringing forth flourishing, means a cultural transformation and a shift in deeply rooted beliefs about the world. There is a need to move from a society of *having* and *needing* to one of *Being* and *caring* (Ehrenfeld, 2020). This switch to *Being* and *caring*, can lead towards a future where humans and non-humans have the opportunity to live as well as possible in a state of flourishing (Fletcher & Tham, 2019). Following is a short description of *Being* and *caring* as well as their contraries, *having* and *needing*:

Being, written with a capital B, refers to human beings’ ways of being which embraces a sense of aliveness and connectedness to the surroundings (Ehrenfeld & Hoffman, 2013, p. 84).

On the contrary, *having*, is a lifestyle based on what possessions are owned and letting these possessions become one’s main sense of self (Ehrenfeld, 2008, pp. 109-110). The *having*-lifestyle, deeply entangled with the rise of capitalistic society, has led to a divide between humans and the natural world (Ehrenfeld, 2008, pp. 29-30).

Caring connects humans to themselves, to others as well as to the natural and spiritual world all around (Ehrenfeld, 2008, pp. 58-61). Furthermore, caring is something that is found in the everyday life. As humans, we are caring beings. *Needing*, on the other hand, is in close connection to *having* and clearly illustrates its characteristics through the state of overconsumption currently ruling societies in the global West (Ehrenfeld, 2008, p. 117). The notion of *need* is explained as an insecurity found in humans, fed by modern culture through pressures of consumption (Ehrenfeld & Hoffman, 2013, p. 84).

Using *Being* and *caring* as tenets for flourishing, they act as the blueprint for thinking about fashion’s future. Using the concept of flourishing as a theoretical lens through which to investigate fashion, opens up for new ways of re-thinking what fashion can be and what role fashion companies have in terms of sustainability communication.

LITERATURE REVIEW

Based on the work of American professor John Ehrenfeld, I interact with flourishing as my overall theoretical approach to what is “beyond sustainability”. Three books have been published by Ehrenfeld on the topic of flourishing: *Sustainability by Design* (2008), *Flourishing* (2013) cowritten with Andrew Hoffman and *The Right Way to Flourish* (2020). In these three books, the concept of flourishing is examined and the meaning of flourishing deepened with each one. In *Sustainability by Design*, Ehrenfeld criticises the prevailing view of sustainability and redefines it in terms of unsustainability. He argues that the addictive ways of modern life, mainly in terms of our obsession with instrumentality and consumption, has resulted in a general reduction of sustainability rather than a move towards true sustainability (Ehrenfeld, 2008, p. 46). *Flourishing* is a dialogue between Ehrenfeld and Hoffman and revolves around the need for a complete cultural shift needed to take place in society in order to bring forth flourishing (Ehrenfeld & Hoffman, 2013, p. 81). *The Right*

Way to Flourish builds on the two earlier books and offers a development of flourishing in a philosophical sense, as Ehrenfeld argues for flourishing not as an outcome in the sense that sustainability is often measured, but rather a way of being (Ehrenfeld, 2020, pp. 7-9). Furthermore, flourishing is deeply concerned with a reconnection with nature, community and values as flourishing is fundamentally about *connectedness* (Ehrenfeld, 2020, p. 114). Hence, the book describes flourishing as a state of being in which humans and ecosystems thrive together beyond sustainability. It unfolds as an existential experience of living a meaningful life that is connected to other humans, societies and the natural world (Ehrenfeld, 2020, p. 7).

Kate Fletcher and Mathilda Tham has approached the problematic of growth logic within the fashion industry through their manifesto-like report *Earth Logic: Fashion Action Research Plan* (Fletcher and Tham, 2019). This report interacts with the concept of flourishing arguing that there is a need for a mutual flourishing amongst human and non-humans (Fletcher and Tham, 2019, p. 36).

The book *Designs for the Pluriverse* written by Arturo Escobar defines the pluriverse as a world where within many worlds fit, embracing cultural and ecological diversity (Escobar, 2018). Escobar interacts with flourishing and builds on the concept through arguing that flourishing should be pluriversal and locally situated, hence, arguing for multiple experiences of flourishing shaped by indigenous knowledge and local cultures (Escobar, 2028, pp. 122-124).

For this article, the focus on flourishing as going beyond sustainability is rooted in diverse worldviews in which flourishing systems and beings can co-exist. This broadens the possibilities for what fashion can be, if the design phase takes the health of the planet and its living beings into consideration before the production phase begins.

METHODS

Textual analysis is a qualitative research method chosen in this article for its ability to understand written text in themes and meanings. In order to do this, I am examining the chosen texts in terms of language, symbols as well as structures in order to discover unvoiced messages, values and cultural references within the texts (Barthes, 1990). I use Roland Barthes and his insights in the book *The Fashion System* when going about my textual analysis. Barthes argues that fashion can be

conceptualized as a language, consisting of signs and symbols that are apparent in both denotative and connotative meanings (Barthes, 1990, pp. 27-28). Denotation corresponds to the object language whilst connotation corresponds to the metalanguage (Barthes, 1990, pp. 27-28). Hence, when using the method of textual analysis, I am mainly looking at the metalanguage, the language beyond the words that are used, in order to uncover the implicit meanings.

This method is utilized in order to study how the fashion company babaà communicate their company values as well as how these values might relate to the concept of flourishing. This allows for the analysis to examine language, themes and values communicated and works as a tool for understanding the written word and how it can perpetuate meanings related to flourishing. In this article specifically, the texts that are being examined are exclusively taken from babaà's website.

Using the method of textual analysis is relevant in this specific article as it contributes to understanding how a fashion company might be able to contribute to a paradigm shift towards flourishing through their choices, practices and communication.

CASE STUDY

The Spanish knit brand babaà is chosen as the case-study company to test the theoretical framework of flourishing. The choice to focus on babaà as a case-study was based on the criteria that they are a small family-oriented business, using local organic materials and local production. The company was founded by designer Marta Bahillo in 2012 (babaa.es/making-babaa/). Babaà offers knitwear made of cotton, wool, merino wool, cashmere and linen. They offer knitwear for women, men and children.

METHODS OF DATA COLLECTION

Textual material is the data in this article and it is selected solely from the babaà website (babaa.es) and specifically from the pages called "making babaà" and "faq". The process of selecting the data was guided by the aim of this article, that is, whether characteristics of flourishing can be found in babaà's sustainability communication. Hence, the texts were chosen based on how relevant they are in terms of sustainability and flourishing.

DATA ANALYSIS

Through a close reading of the entire babaà website with a semiotic approach, the focus is on the layered meanings within the texts. That is, the denotative “literal” message and the connotative “symbolic” message (Barthes, 1990, p. 40). The connotated analysis is where the language, choice of words and tone uncovers underlying narratives. This, in turn, is when keywords are identified and grouped into themes. In analyzing the frequency of keywords, only those that aligned with the theoretical focus of this article were considered. The keyword “relationship”, for instance, was included when it referred to a caring connection between the company and nature/animals/people. It was excluded when it was used in the context of EU trading relationships. This was done in order to ensure that the keyword frequency truthfully reflects the intended aim of the research.

Key words

The keywords that were identified as being of significance to the broader theme of flourishing, are: relationships, community, people, nourish, sheep, transparency, environment, wear and cherish.

Coded Themes

The keywords identified above, were separated into four different overarching themes: care, slowness, nature and local. These themes share characteristics with flourishing in different ways. The keywords and themes appear in different frequencies, see table below for details.

FINDINGS

RELATIONSHIPS

Under the tab “about”, there is an under title called “making babaà” which is where most of the sustainability-oriented information is to be found. Here, babaà present the story of how the brand was born as well as their overall values and approaches to sustainability, which are closely linked to one another:

“In the twelve years since our launch, babaà has evolved in myriad ways, but our essence remains the same. We built the brand around the core value of sustainability, using only local and natural materials. The reasons were many: It’s good for our planet, it nourishes our local textile industry and, most of all, it is good for our souls as

we develop close relationships that are the key to making babaà what it is.”

This quote, which is also the first text found under the “making babaà” title, reveals that the company was rooted in the believes of acting for a better world right from the start. It also states that this is both for the earth as well as for their community and themselves. Caring is central in the quote, even though it is not mentioned by word. Building relationships, acting with the intention of being good to the planet and wanting to nourish a local textile industry, are all acts of caring. Furthermore, since they state that this is the essence of babaà, it is apparent that this is a core value of the company rather than something for a specific collection.

Continuing on the path of relationships, and specifically speaking to the fact that they make their own yarn, babaà states further down in the text:

“Creating our own yarn takes a lot of work, but it also allows us to control the production process from the sheep to the final stitch. We know everyone involved on a personal level and are able to provide our customers with full transparency.”

Through this quote, babaà illustrate how relationships are a crucial priority for the company and that they take pride in the fact that they know everyone involved in the making of their clothes on a personal level. As fast fashion production lines are quite on the opposite side of this spectrum, usually with production taking place far away from the company’s head office, the personal aspect of babaà is rare (Davis Burns, 2019, pp. 116-117). The juxtaposition of fast fashion’s complicated production lines and babaà’s personal relationships through production, illustrate the rareness of these personal relationships. In order for fashion to move towards flourishing, relationships are vital as they are a fundamental part of the characteristic of caring (Fletcher & Tham, 2019, p. 14).

TRANSHUMANCE

The characteristic of caring goes beyond the usual human-centered caring to caring about animals and nature (as human’s are a part of) as babaà gets into more details about the flock:

“Sheep in Spain have a very good life. At least, ours do. We adhere to a process called

Themes	Keywords	Frequency (Numbers of occurrences)	Website section
Care	Relationships, Nourish, Cherish	3, 1, 1	Making babaà
Slowness	Wear	4	Making babaà, faq
Nature	Sheep, Transhumance, Environment	11, 4, 3	Making babaà, faq
Local	Community, People	2, 3	Making babaà, faq

Tab. 01

Transhumance, which is a type of pastoralism or nomadism comprising seasonal movement of livestock between fixed summer and winter pastures. In mountainous regions, it implies movement between higher pastures in summer and lower valleys in winter. This is not only great for the animals, as they spend the majority of their lives outdoors, but also great for the environment. It enhances fire prevention (the sheep eat many weeds that are potential fodder for wildfires) and the steppe ecosystem, enriches fallow land (thus making it farmable once again), and helps maintain alpine areas.”

Acknowledging the fact that the wool from which they make their products comes from a living animal who deserves to live a good life but who also, in its turn, contributes to climate change, babaà are transparent about how they address this. The process they refer to called Transhumance, places babaà in a respiratory relationship to nature where they respect that nature has its own agency and way of thriving without human’s involvement. This relates to flourishing’s characteristic of Being, as a way to achieve personal wholeness (Ehrenfeld, 2020, p. 81). Moreover, this demonstrates how

babaà designs together with nature (Fletcher et. al., 2019). As has been argued elsewhere, the concept of design as solely an agent of capitalism can be challenged by setting design in partnership with nature (Fletcher et. al., 2019, p. 9). Hence, babaà take nature into the equation in the design and production process by seeing to the needs of the sheep and the land which they graze on, rather than seeing nature as a resource from which to take. This scratches the surface of accepting that what is created by humans belong to the earth, rather than being separate from it (Fletcher et. al., 2019, p. 25). This recognition can, in its turn, assist the reconnection with nature that is needed moving forward in the fashion industry (Fletcher et. al., 2019, p. 131). This is not only crucial because of the fact that the earth has ecological limits, but reconnecting with nature and moving from a having and needing mindset to one of Being and caring in harmony with nature, will also lead to greater social wellbeing (Jackson, 2016, p. 137). To reach prosperity should include the capacity for humans and non-humans to live well together on the planet within ecological limits. Living well does not correlate with the number of things we can buy, but rather oppositional, it is about shifting

away from overconsumption and towards valuing community and well-being (Jackson, 2016).

LOCALISM

Babaà brings up their local community:

We truly treasure the opportunity to work locally and build relationships with our community year after year. These partnerships are an integral part of babaà, and we hope you will cherish your cardigan or crewneck sweater even more knowing a bit of the background about the people (and animals!) that brought it to life.

The concept of local plays a crucial role. It is not only a valid reason for why it is believable that they have good relationships with everyone involved, since they are in fact close enough to meet the people in person. Local is also one of the most fundamental alternatives for sustainability within the fashion sector going forward. In *Earth Logic*, Fletcher and Tham presents local as one of six holistic landscapes that can move the fashion industry towards ecological prosperity and caring. Localism is described as contributing to a sense of rooted community and identity, it favors place-specific knowledge and nearby resources and can create community self-reliance (Fletcher & Tham, 2019, p. 49). The tenets of local braid nicely together with flourishing and this is illustrated through the example of babaà. It is through localism that babaà are able to build the relationships they regard as the essence of the company and this is simultaneously where the caring takes its biggest form for babaà. However, babaà also show equal care for the local sheep and the environment they live and graze on, as discussed earlier. Fostering a local fashion community as babaà exemplifies, holds the possibility of creating a diverse sustainable world (Escobar, 2018, pp. 15-16).

EARTH LOGIC

Encouraging consumers to cherish their babaà cardigan more because of how it has been made, suggest a shift in mindset from having and needing to Being and caring. This because caring and presence becomes apparent when one considers everything that contributed to the making of a sweater. This is, furthermore, a pathway towards less consumption and less, is also one of the six holistic landscapes presented in *Earth Logic*.

Flourishing cannot be present within the fashion industry without the recognition that fashion as an industry has issues that go beyond clothing production, issues that are rooted in western culture's self-enclosed outlook (Fletcher et al., 2019, p. 196). The positive effects of a company willing to put an emphasis on how they value both worker's and ecosystems as parts of how their products come into being, can help switch our current culture's obsession with instrumentality into a more present awareness of Being and caring. Moreover, letting go of materialistic needs, make room for empathies and care to flourish (Jackson, 2016, p. 69).

SLOWNESS

Continuing in the lines of design and nature's partnership in the creation of babaà wool knitwear, they celebrate the imperfection that comes with minimal treatment of the wool. For example, when asked on their website under "faqs" about why there are straws in the wool, babaà replies:

"...our local wool is minimally treated, so you may find bits of our sheep's natural habitat mixed in from time to time."

"Our wool comes straight from our sheep to you. In some cases it has never been treated or dyed. Because of this, some people may find the wool mildly abrasive at first. However the wool will soften naturally with each wearing as it adapts, softens and conforms to its new owner."

At this point, babaà celebrates the fact that designing and creating in respectful ways with nature will sometimes leave marks. In a society harshly driven by perfection, where so much as a wrinkle as a sign of aging is seen as something ugly, it is vital that a fashion company openly celebrates natural imperfections if we are to every truly reconnect with nature.

Furthermore, babaà also honors the fact that their items should be worn many times. This is a sharp contrast to the typical trend driven fashion industry and moves towards a flourishing existence of care and slowness. This tendency of care and slowness embodied by babaà is supported by their simple silhouettes, loose fits and reoccurring styles. This results in less of a stress for people to "buy the new style" or fit into one's sweater after body changes. As a result, this can encourage consumers to connect more to their items though caring and

long-lasting relationships. Care, as an act within a flourishing existence, can contribute to budding stronger relations between humans, materials and natural world (Fletcher et. al., 2019, p. 36). It is significant that babaà is not a huge company and do not use any retailers. As Ehrenfeld argues, connectedness, which is crucial for flourishing, wanes when the scale becomes larger (Ehrenfeld, 2020, p. 130). Hence, babaà holds a greater opportunity for flourishing to exist by keeping their company fairly small. Furthermore, babaà does not work with any retailers. For a company active within a fashion industry that is very much profit-driven and operates within capitalistic structures, not having any retailers means they have more freedom with their expressions and values.

CONCLUSIONS

This article has introduced the concept of flourishing as a theoretical tool for thinking beyond sustainability, in order to open up for a more caring and connected future of fashion. Through using the qualitative method of textual analysis on the case-study company babaà, the analysis has tested the theoretical concept of flourishing. Through closely analyzing what babaà communicates as their company values and translated these values into flourishing's main characteristics of Being and caring as well as relating them to other relevant research on systems change within the fashion industry. The analysis illustrates how it is possible for a fashion company to move beyond sustainability and incorporate the characteristics of Being and caring, as tenets to move towards prosperity for both people and planet.

A fashion company, like babaà, illustrates promising steps towards a paradigm shift aligned with the concept of flourishing. Although, despite these promising initiatives, it remains evident that babaà operates within capitalistic frameworks where factors such as sales, money and margins continue to determine a company's survival.

In conclusion, flourishing can offer a deeper and more meaningful understanding of fashion, especially through communication. For a small company like babaà, this is perhaps one of the biggest impacts they can have, contributing to transforming how people view fashion and its connection to the world around. Through their communication, they illustrate that they as a company care and strive for a fairer future for their community and natural surroundings. This plays a

significant role in shifting from the current system towards true prosperity in fashion, where flourishing experiences can be had for both companies and consumers.

LIMITATIONS

Whilst this article provides an in-depth insight into babaà's sustainability communication, it only investigates one company. It would be beneficial to look at several companies for comparison. It would also be beneficial to have a consumer perspective on how the sustainability message comes across.

CAPTIONS

[Tab. 01] Tables of Data Analysis. Credits: Author.

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CARING FOR FASHION BY DOING THE LAUNDRY

GENERATING ALTERNATIVE ACTS OF CONSUMPTION FROM THE LAUNDRY BASKET

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Abstract

Wearing has long been the primary act of fashion, yet fashion consumers additionally engage in a complex, interactive relationship with garments when they are not worn. This paper explores the nuanced relationship between care and fashion consumption by examining the acts of care involved in doing the laundry. In identifying laundry as a series of seemingly small quasi-events that intertwine identity, social norms, and cultural consumption, caring for fashion can be reframed by abstracting typical laundry acts, such as progressing folding into a caring act of holding. Common consumption patterns and behaviours can be altered by disrupting standard laundry practices and engaging consumers in care activities based on joy, fulfilment, or even frustration. Examining how we consume fashion objects in our homes through the laundry basket can provide further insight into body-object relationships from the perspectives of care, maintenance, and dependence. This can thereby redefine expressions of bonding and our engagement with material culture by suggesting the consumption of acts as opposed to things as a means to care for fashion.

Keywords: *Laundry, Care, Consuming acts, Expressions of bonding, Body-object relationships*

INTRODUCTION

Wearing is commonly viewed as the heart of the relationship between body and object within fashion (Thornquist (b), 2018). Despite the significance of wearing as a fashion act, humans also have an extensive and complex relationship with garments when not worn. A wardrobe can be viewed as a complex set of practices involving consumption, care, and imagination, both off and on the body (Thornquist (a), 2018). As fashion consumers, we dedicate a significant portion of our lives tending to the clothes we or our immediate family members own, and often, this care is labelled as a chore rather than a thoughtful activity.

Care can be viewed as the commonplace “layers of labour that get us through the day, a

material space in which many are trapped” (Puig de la Bellacasa, 2017, p. 87). In a fashion object context, doing the laundry can be a demanding layer of labour and a vital element of fashion maintenance. By exploring and defamiliarising the chore of care, we can begin to identify mundane aspects of our lives as aesthetics (Saito, 2022) and as expressions of bonding between body and object. In doing so, further care acts can be designed to prompt bonding and engagement.

Most people consider doing the laundry a notoriously mundane event. However, the procedure of this event encompasses multiple acts, practices, encounters, and happenings that contribute to a humanistic code of conduct and consumption patterns.

Society's socially approved codes of conduct shape how we interact with our things (Chapman, 2012), and these normative interactions can be viewed as cultural products of their own in the form of customs and values (Chapman, 2021). Codes of conduct can also impact how we cultivate our everyday material experiences in seemingly small encounters with our things. One way to enrich everyday encounters is to focus on the small moments of pleasurable experience that generally go unnoticed because they are fully absorbed into the background of our lives (Saito, 2017). In this light, doing the laundry can be viewed as a quasi-event.

Quasi-events are a primary condition of human social life. They are seemingly unimportant events that recognise the mundane and engage with the minor—moments that do not become spectacles but are infused with meaning nonetheless. The consequence of a quasi-event can be only a slight shift, a delicate alternation (DiSalvo, 2022), such as hanging up a sock to dry or folding a pair of pressed trousers. Because quasi-events occur daily, they can draw attention to delicate routines and patterns in life. This is where everyday care acts thrive, yet still often go unnoticed by the carer.

FASHION CONSUMPTION & CONSUMING ACTS

The general understanding of the concept of consumption can vary significantly based on individual perspectives. For example, a fashion enthusiast might associate consumption with purchasing clothing, whereas a baker may consider it savouring freshly baked bread. Therefore, consumption is a constant process, an integral part of human nature (Chapman, 2012), and refers to more than purchasing; it can occur through use, enjoyment, and even disposal (Dant, 1996).

Fashion consumption exists in various aspects of our lives and is critical in shaping cultural consumption. Fashion can symbolise the meaning of an object, as people commonly use fashion objects to express identity, taste, lifestyle, social status, and community, as well as an extension of the self (Boradkar, 2014; Pink, Mackley & Morosanu, 2015; Kuusk, 2016; Thornquist (a), 2018). Today, many (fashion) products serve as signs of the user's character rather than as entities in their own right or as reflections of the object's character (Verbeek, 2005). This can obscure the distinction between body and object, which places the object in the background of the

act of wearing. In order to alter fashion consumption patterns, fashion acts beyond wearing must be investigated, allowing users to appreciate the object as a unique entity.

Habits of consumption can become an end in themselves because they tap into the human desire to possess. However, by infusing consumption habits with meaning beyond mere possession, a shift in consumption behaviour and understanding can occur (Csikszentmihalyi & Halton, 1981). By examining the meaning of what and how we consume, a shift can be explored from consuming *things to actions*.

Social change depends on human attitudes and values, and altering consumption habits is imperative in addressing consumption-related issues (Cooper, 2005; Shove, 2010; Kuusk, 2016). Conversely, desire and consumption are fundamental human behaviours and emotions (Chapman, 2012; Norman, 2004 (b)), which renders it unreasonable to expect people to simply want less. Therefore, asking consumers to want less can lead to feelings of guilt and failure for individual consumers. However, establishing alternative consumption patterns by nurturing acts of care in body-object relationships as methods of consuming can sustain the current level of wants while limiting the environmental impact of the consumed act.

There is a need to reorient consumption patterns (Marchand & Walker, 2008; Thornquist (b), 2018), and studies have shown that consumers prefer products that allow them to be engaged in doing or products that enable an activity (Marchand et al., 2008). Doing is commonly associated with more meaning than doing for the sake of doing; it is frequently laced with emotions such as care, love, and fellowship (Saito, 2017). Care is a doing and life-sustaining everyday practice and an affirmation of the significance of a series of activities (Puig de la Bellacasa, 2017 & Saito, 2022). By giving further meaning to a series of activities, they can be granted supplementary purpose and provide the doer with enjoyment and satisfaction.

Enjoyment is an imperative component in exploring new ways of living and consuming. Joy can serve as escapism or a means to cope with frustration through play. "Thus it is essential to cultivate enjoyment because it is one of the most powerful means to experiment with alternatives to the trap of routine" (Csikszentmihalyi et al., 1981, p. 245).

Deriving enjoyment from utilising a skill enhances the engagement in a task and can shape the overall experience, contributing to and concentrating the general flow of the act (Verbeek, 2005). The flow of performing an act can give it intrinsic value, even when the act has no material value (Csikszentmihalyi et al., 1981). Consequently, exploring enjoyable and fulfilling routine acts holds significant potential for broadening and disrupting current consumption habits.

CARING ACTS OF THE LAUNDRY

Care is often exhausting labour (DiSalvo, 2022; Puig de la Bellacasa, 2017), and housework, mainly related to cleaning, is commonly considered tedious. This is primarily because it demands neither creativity nor sophistication, portraying it as a straightforward maintenance act. However, cleaning activities such as doing laundry can provide a subtle sense of satisfaction (Saito, 2017).

Caring for clothes by laundering ensures they can be worn again, maintaining the clothes' appearance and, by extension, the wearer's. Laundry is an essential daily care practice, and when this ritual is neglected, it can become apparent to those nearby, as humans are concerned with the impressions they give others regarding the cleanliness of their clothes (Mendelson, 2009; Saito, 2017). Because of this, we can consider caring for fashion as a form of self-care and care for others.

Doing the laundry demands a multisensory array of skills in everyday domestic practices. It involves embodied knowledge and sensory perception to perform an act that is rarely verbalised but performed without questioning (Pink, 2012). In the purity of this act, an appreciation for the subtle joy of everyday achievement can be rewarded. In that regard, doing the laundry can be viewed as an act that rewards or even affords an achievement. As such, it is a fascinating action-achievement system to explore in the scheme of body-object relationships of care and a means for humans to care for fashion by doing.

LAUNDRY AS DOMESTIC MATERIALITY & SOCIAL PATTERN

Doing laundry involves an array of acts that must be performed in a specific order, ranging from *sorting*, *washing*, and *loading* the machine to *drying*, *folding*, and *putting away*. This series of activities is further entangled with broader associations such as material or garment demands and cultural norms

(Yates & Evans, 2016). Therefore, doing laundry is not exclusively about making things clean but also about putting disorder into order from a broad societal perspective (Shove, 2004).

Over the last century, habits and techniques of doing laundry have changed significantly, with long-term consequences for domestic electricity and water use (Shove, 2004). Therefore, laundry habits can be valuable examples of how household practices can impact consumer behaviour (Yates et al., 2016). Laundry is a resource-intensive domestic activity that has been the subject of systematic change in the name of sustainability (Mylan & Southerton, 2018). Such changes have included washing at a lower temperature (Shove, 2004) or using less detergent per wash (Laitala, Klepp & Boks, 2012). Modifying certain laundry practices and addressing their demands has positively influenced the usage of laundry resources. Because of this, there is a flair for sustainability and change in the meaning and value of acts and human behaviour already linked to the state of the laundry basket and doing the laundry.

The laundering process demands action and movement from the body and has notoriously become repetitive and labelled a daunting chore. However, anticipating feeling good or looking good in freshly cleaned clothes is essential to doing the laundry. This indicates two core pleasures in doing the laundry: the labour of care for the clothes and the result of that labour (Saito, 2017), such as the anticipation for a freshly cleaned and ironed appearance of both garments and wearer. Therefore, there is a cause and effect to doing the laundry, which rewards the carer in multiple ways and, in turn, builds a connection or even a relationship between the garment and its carer over time through repeated encounters.

Washing clothes daily keeps a specific formulation of laundering acts in circulation. Daily laundering becomes routine as a domestic materiality; however, it will only persist if enough carriers propagate it similarly. Patterns of consumption associated with meaning or normalcy require constant reproduction to be sustained (Shove, 2004 & 2010). In this context, a care act must be continuous or repeatable to be persistent and sustained through use.

Viewing laundry through standardised and continuous practices can enable sociological exploration and encourage new perspectives on the environmental effects of routine acts and

the potential for actions to contribute to positive change (Yates et al., 2016). In this manner, laundry can be used as an empirical probe for exploring relationships between performances and practices as socially arranged entities and acts (Mylan et al., 2018).

AUTOMATION AS THE DEMISE OF BONDING

It is reasonable to assume that the more frequently clothes are washed, the more time the carer has to interact with them. However, the increasingly automated laundry approach may have the opposite effect. The washing machine lies at the heart of the laundry process, as we currently perform laundry in the Global North. Washing machines have become common and sought-after appliances for most homes, and as consumers, we expect everything that comes out of the machine to be clean. Thus, the washing machine is the main event of laundry acts and greatly influences how other elements of the laundry are combined (Shove, 2004) and acted out.

Automation is often the task of design to simplify lives by relieving certain chores or efforts. In this way, design can arrange partitions, leading to new ways of building bridges with both things and other individuals (Ávila, 2022). Therefore, by automating one act, another has the possibility of emerging. However, the dominance of the washing machine as the primary event might have taken away the fact that laundry is a delicate human act of care.

Everyday tasks continue to become increasingly automated as machines improve in efficiency and intelligence (Norman, 2013). Yet, technological devices can diminish human involvement and connection with objects (e.g., garments) (Verbeek, 2005). “A machine is not a way of doing something; it stands in the way of doing something” (Carse, 1986, p. 123).

When a machine washes a garment, the care has been outsourced to another, compared to when a garment demands embodied, focused attention through handwashing. Consequently, automation can deprive the hands-on experience central to getting to know something, forming relationships, and bonding. Considering this perspective, the care act of washing in a washing machine is beyond the scope of embodied care because of its almost complete automation in the Global North. Therefore, we must focus on what happens before and after the washing machine.



Fig. 01

NON-MACHINE ACTS

Aside from washing, laundering also means collecting, organising, sorting, washing, drying, folding and putting away. These acts involve various sensory skills such as touching, smelling, looking at, dealing with machines, and folding while navigating norms, moralities, and expectations (Pink et al., 2015). Considering a selection of laundry processes that commonly do not occur in a machine can demonstrate how care processes are often better operated by hand:

Sorting: Before placing the laundry in the washing machine, it must be sorted according to colour and care instructions on the garment care label. Failure to sort the laundry according to instructions can damage delicate clothing in the machine (Mendelson, 2009).

Drying (Fig. 01): When the washing machine has completed its chore, the clothes or textiles must be dried (Mendelson, 2009). Various approaches can be taken to dry laundered items. Delicate items, such as dress shirts, should be hung up to dry on a hanger straight from the machine to ensure they dry without wrinkling, while other items, such as cotton sheets, can be



Fig. 02

dried in a tumble dryer or on a line (Saito, 2017). When hanging clothes to dry, paying attention to how they are arranged is essential to prevent marks from the drying line or clothespins (Saito, 2017). Hanging garments up to dry can, therefore, be a careful act of arrangement or an arrangement of care.

Folding (Fig. 02): After the garments have dried thoroughly, they are folded according to specific systems and traditions depending on the type of garment and material. This is done for optimal storage and to keep the garment in ready-to-use condition (Mendelson, 2009) while awaiting human attention in the closet. In addition to being a practical act of storage, folding can function as a vital point of quality checking. In that sense, it is an intimate, hands-on process of handling garments, allowing the handler to become more familiar with the garments through touch and feel.

Considering these non-machine laundering acts, drying has been largely automated through tumble dryers, whereas sorting and folding still rely entirely on human involvement. Sorting and folding can be time-consuming acts and must be performed manually by the caregiver,

demanding specific attention to the object and act. Consequently, objects requiring hands-on interaction can be a foundation for exploring alternative body-object relationships and expressions of bonding. This suggests that the fundamental aspect of caring for clothes as objects of character lies not in the machinery itself but in the hands-on moments before and after the machine. Therefore, it is essential to consider the abstraction of physical acts of care as a means to explore broader implications within body-object engagement. To further investigate this concept beyond a sole focus on garments, a non-fashion object can serve as an ideal starting point by emphasising the expansion and focus of the care act.

ALTERNATIVE ACTS OF CONSUMPTION: FOLDING BECOMES HOLDING

Inanimate objects are vital tools for developing self-awareness through nonverbal embodied intentions. An excellent example of a basic inanimate non-fashion object that embodies intention is the *ball*. A ball has a limited vocabulary confined to four expressions: it can roll, rest, fly,

or bounce. However, elaborate communication between body and object can be composed of these seemingly simple expressions because they also afford acts such as throwing, squeezing, kicking, catching, and so on (Csikszentmihalyi et al., 1981; Norman, 2013).

In the following design examples, I have focused on the ball's ability to roll as its perceived affordance (Gibson, 1977; Norman, 2004 (a) & 2013) while simultaneously considering it as an object of assembly through social gatherings such as ball games. In those instances, the object holds the game and the gathering together. Thus, from the object's perspective, everything and everyone arranges itself around its presence, "the subject moves around the sun" (Schiermer, 2011, p. 83), or the body moves around the object, such as when performing acts of laundry.

Looking back at the dependency garments place on their human carer in their need to be folded, I have extended folding to holding as a form of embodied and demanding care act. Every day, we hold various things in our hands, often without recognising the significance of this act. Whether carrying groceries or a coat, cradling loved ones, or simply holding someone's hand, these gestures of function, affection and care are essential to everyday life in a similar manner to doing the laundry. Furthermore, choosing a familiar non-fashion object, such as the ball, assists in separating the act of holding from wearing. Therefore, I have attempted to merge a perceived affordance of rolling with the care affordance of holding so the object may lend itself to nurturing behaviour and demand to be held.

These examples of balls on wheels (Fig. 03, Fig. 04) play with the notion and function of rolling and what materialises when two rolling agents, such as the ball and the wheel, are combined. The dual agents create a dependency by cancelling out each other's ability to roll. Consequently, the object demands constant human support as a form of exhausting labour to get the ball rolling. In this manner, the care act becomes the protagonist in the body-object relationship, bestowing it with greater agency and significance, allowing it to potentially evolve into a product of its own.

These challenging objects offer a speculative approach to how complicating and thus decelerating body-object engagement can positively influence the relationship. This is akin to how folding clothes demands a more intimate and



Fig. 03

time-consuming care than merely pressing a button on the washing machine.

IMPLICATIONS OF DESIGNED-IN DEPENDENCY

Focused interaction between humans can occur when people agree to sustain a single focus of cognitive and visual attention for a specific time, such as in a (ball) game, a joint task, a conversation, or constantly having to hold a ball so it may roll. A focused gathering can, therefore, be viewed as an encounter or a "situated activity system" (Goffman, 2013, p. 8). In this case, the focus of the gathering between the ball and body has been made compulsory and constant. The body-object relationship becomes codependent and complex in movement and use. This grants the object the agency to frustrate, surprise, fail, disrupt routines and engage interest for an extended time.

All artefacts behave in accordance with their design, which forces the body or user to move with the design (Ross & Wensveen, 2010; Janlert & Stolterman, 2017). In this case, the aim was to study the implications of constant holding as a form of care for an object and whether holding can



Fig. 04

be a demand for the function of rolling. Constant holding turned out to be highly important in moving the body and thereby engaging the body in persistent care.

Objects are embedded in complex practices and use, and an object not in use does not have the same agency as an object in use. Therefore, the dynamic use of objects can be shaped by their past practices, which are linked to a given situation's contextual and social implications (Wakkary, 2021). Awarding an object the ability to be in contact with the body continually can grant the object a more robust agency as a player in encounters with bodies. Thus, objects can act as proxies or stand-ins for the innate human desire to connect in a literal, physical manner.

Some artefacts are meant to be only partially understood, and this challenge can breed new expressions and behaviours as we get to know them. Human perception of objects is immensely flexible, and objects can alter or even change human practices and behaviours (Wakkary, 2021). This indicates that humans are predisposed to understand and accept change in material objects and expect or display a willingness to serve the objects' new demands, such as bending over

constantly to get the ball rolling.

In addition to being susceptible to serving demanding objects, humans have a general desire to be challenged and pushed in material engagements. Or, as Harper further elaborates:

Can a sustainable expression be so complex and challenging that it demands a sustained interest in exploring it (for an extended period of time)? Is the most aesthetically sustainable object a thing of such elevated complexity that the user is immediately (and time again) challenged and forced to consider its provenance in relation to the surrounding world? Perhaps the pleasure of sustainable objects lies in their ability to disrupt the users' comfort zone (Harper, 2018, p. 3).

To keep humans interested in caring for material objects, further ways to develop caring acts through surprise, wonder, and some degree of ridicule must be explored. The balls on wheels succeed in this rather well because the body needs to give it constant attention for the ball to roll. This connects the body and object in a permanent and sustained relationship because of a

physical dependency and the fact that the object is consumed through a demanding embodied act.

CONCLUSION

Given the significant time we devote to our clothing, we ought to be practically obsessed with their care. Yet, this fixation has largely been outsourced due to the automated nature of laundry. By designing alternative and borderline ridiculous objects of care and human interaction, we can begin to reevaluate care practices and routines through an alternative lens on consumption.

Laundry is an ongoing, practical human activity, and as such, it comes naturally to most garment users (Pink et al., 2015). New supporting care acts can emerge by examining these current and standard embodied care practices of laundry, such as sorting, drying, and folding. Focusing on the act rather than the object can grant a more comprehensive perspective on the object as an independent character to engage with instead of viewing it as a direct extension of the wearer's identity. This allows for considering alternative acts of consumption in fashion rather than wearing.

While social norms are often considered the drivers of human behaviour, the role of needs and aspirations is frequently overlooked as a significant player in societal transformation (Shove, 2010) such as consumption patterns. By understanding the everyday implications of the acts of the laundry, we can begin to recognise the impact of such (care) practices and intersubjective relationships (Pink et al., 2015).

Changes in behaviour often require breaking old habits to establish new ones (Shove, 2010). By breaking the habit of the ball's ability to roll and implementing a constant demand for human assistance to consume the product through an act, a new relationship of dependency is created and repeatedly encouraged.

This paper introduces a basic yet compelling example of a body-object relationship built on dependence as an alternative expression of bonding between body and object. By disrupting a convenient and comfortable consumption pattern, consumers are more likely to rethink and reorient their consumption from things to acts. Consequently, objects must encompass a sense of ridicule to spark wonder, surprise, and even scepticism, which increases the object's potential to evolve alongside its handler over time.

Extending the intimate, hands-on laundry

act of folding to holding has allowed a new product category to emerge. By exploring the care act of holding through a non-fashion object, or a ball, this object has been granted independence from the core act of fashion, wearing. Therefore, by bending over and holding the ball to roll it, an alternative expression of bonding is found, suggesting a new and complex expression of sustainable consumption. Still, this area requires further exploration by studying other care acts and how to integrate the emerging alternative acts of care into the design and consumption of fashion objects.

CAPTIONS

[Fig. 01] Arrangements of care.

[Fig. 02] Folding, an intimate, hands-on act of care.

[Fig. 03] A ball on wheels affords rolling only when held.

[Fig. 04] When in play, the ball demands the body's complete attention to function, creating a dependency between body and object while granting the care act further agency.

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PROSPERITY IN ITALIAN FASHION: NETWORKS OF CARE

HOW MICRO AND SMALL ENTERPRISES REDEFINE THE RELATION BETWEEN THE ECONOMIC AND THE SOCIAL

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Abstract

The fashion system is notorious for perpetuating inequalities and exploitation, driven by entrenched power dynamics that dictate which ideas and interests prevail. While sustainability often dominates discussions on alternative paradigms (Henninger et al., 2016), care has emerged as a critical perspective, emphasizing processes over outcomes (Franzo, 2023). This approach highlights practices that responsibly manage time, resources, and expertise, fostering positive relationships between people, the environment, and territories. This paper draws on data from *CreAbility*, an ongoing action-research project involving Italian micro and small fashion enterprises, as well as associations and designers known for their social and cultural impact. The project aims to foster networks of practices that promote collaboration and enrich the theoretical debate on fashion's potential to generate social and economic value (Moore et al., 2023). Through periodic focus groups with diverse stakeholders, the study examines the concept of prosperity beyond mere economic gain, exploring how these actors challenge existing hierarchies and contribute to ecological, social, cultural, and economic well-being. The initial findings highlight key aspects for the fashion system to address in order to act as a positive agent of change in the Italian context.

Keywords: *Italian fashion, Ethics of care, Networking, Territorial proximity, Prosperity*

INTRODUCTION: ADDRESSING TERMINOLOGY

TERMINOLOGICAL EXCURSUS

We have long moved beyond the superficial notion that fashion is merely a carefree aspect of consumption, driven solely by the pursuit of pleasure, satisfaction, and aesthetic appeal. Beneath its surface, fashion is deeply entwined in complex social dynamics and power relations on the side of consumption. Moreover, it exposes realities within its production processes that are neither easy to confront nor pleasant to acknowledge. Since industrialisation, fashion has evolved into a mature, labour-intensive industry, characterised by intricate global supply chains with significant consequenc-

es for individuals, communities, and ecosystems (Brooks et al., 2017).

Awareness of these issues has grown rapidly over the last decades, fuelled by campaigns such as Greenpeace's *Detox My Fashion*¹ and *Fashion Revolution's Who Made My Clothes*² to name just two of the earliest catalysts. The growing attention to the ethical and environmental dimensions of fashion has sparked important debates beyond the industry. However, this increased focus has also led

¹ The Detox my Fashion campaign was launched in 2011, the link to homepage is available here: <https://www.greenpeace.org/international/act/detox/>, 21/02/2025.

² The Who made my clothes? campaign was launched following the Rana Plaza disaster in 2013, the link to the homepage is available here: <https://www.fashionrevolution.org/tag/who-made-my-clothes/>, 21/02/2025.

to a proliferation of poorly defined terms, creating both opportunities and challenges. It is therefore crucial to use this moment to critically examine the field, refine its terminology, and clarify the key issues shaping both academic discourse and practical interventions.

The academic debate on value-based consumer behaviour is tightly related to Michele Micheletti's definition of *political consumerism*, described as actions taken by individuals who choose producers and products to influence institutions or market practices considered objectionable (Micheletti, 2003). Over time, this concept has expanded to include a broader range of market-oriented actions motivated by various concerns related to both production and consumption (Boström et al., 2019). Consumers may be driven by political, spiritual, environmental, social, or other factors, and they are highly diverse, with the common factor being their awareness – to varying extents – of the impact of their purchases on the world. Definitions of critical (e.g. Yates, 2011) and ethical (Harrison et al., 2005) consumption often present an idealised view that only partially reflects the complex and heterogeneous motivations behind specific consumption choices, which blend both self-interested and altruistic factors (Stolle & Micheletti, 2013).

The concept of *responsible consumption*, defined as a purchasing behaviour that reflects concerns of an ethical, social, or environmental nature (Lim, 2017), is widely used in sociological studies on consumption, but the term originates within the tradition of corporate social responsibility. One of the first authors who employed it was Fisk (1973), who conceptualised it as a mechanism to influence corporate behaviour towards greater accountability, emphasising the rational and efficient use of resources while respecting the individuals involved in the process. As a result, the term has historically been interpreted predominantly in social terms (e.g. Webb et al., 2008; Prendergast & Tsang, 2019).

Lastly, *sustainable consumption* entered international discourse through Agenda 21, the sustainable development framework adopted at the 1992 Earth Summit in Rio de Janeiro (UNCED, 1992; Seyfang, 2009). Initially, the concept of sustainability was primarily concerned with the preservation of environmental resources over time. However, subsequent definitions have expanded this interpretation, incorporating not only the

environmental dimension but also social and economic aspects, in alignment with the *triple bottom line* framework proposed by Elkington (2004).

The most recent and arguably controversial aspect of the sustainability paradigm is the cultural dimension, which is sometimes assimilated - or at least incorporated - into social sustainability but is also increasingly considered as an independent *fourth pillar*. Soini and Dessein (2016) highlight the critical role of culture in sustainability, noting that achieving sustainability goals hinges on human actions, behaviours, and perspectives, all rooted in cultural contexts. A significant challenge lies in the normative dimension that this introduces, as values and ways of life must be carefully balanced within the sustainability framework.

This brief excursus cannot ignore that the evolution of concepts and the choice of terminology reflect the times in which they emerge. Thus, we observe the ongoing evolution of the debate, with the introduction of two new terms, care and prosperity, which have increasingly come to the forefront in discussions on production and consumption practices, also in the field of fashion. These two terms evoke a holistic perspective, one that integrates multiple dimensions (ethical, social, environmental, and economic), highlighting their interdependence and promoting a systemic approach that values relationships, processes, and collective well-being over isolated attributes.

CARE AND PROSPERITY

In the wake of the Covid-19 pandemic crisis, an interdisciplinary group of economics and social sciences scholars known as the Care Collective authored *The Care Manifesto: The Politics of Interdependence* stating that: "Care is also a social capacity and activity [...], our individual and collective ability to provide the political, social, material, and emotional conditions that allow the vast majority of people and living creatures on this planet to thrive" (Chatzidakis et al., 2020, p. 6).

Practices of care – as will be further discussed in this paper – are traceable not only within the intimate sphere, but also at the community level; they can be found in the quality of relationships, or in the connection between the work of creative professionals and their sphere of proximity, whether understood as a process of co-creation, inclusion, representation or empowerment.

Ezio Manzini (2022) reflects on whether fashion could play a role in fostering positive change by communicating ideas, encouraging new behaviours, and promoting relationships that steer the industry away from its current destructive trajectory. Ultimately, the aim should not be for fashion to reduce the harm it causes but to become an agent of change towards a *sustainable civilisation* (Manzini, 2022, p. 465).

Moreover, he states that fashion, through its communicative role, can enable practices of care, and through its relational role, it can promote networks of actors actively pursuing change (Manzini 2022). This view aligns with the position put forward by Anneke Smelik that this perspective on fashion is “based on an interwoven community, which promotes collective forms of joy and wellbeing, rather than on the satisfaction of hyper-individualistic desires” (Vaccari, 2022, p. 84).

If we see care not as an abstract concept but as a set of practical manifestations, we are recognising mechanisms that, though often submerged, involve understanding who and what is cared for, by whom, and *why* and *when* they are cared for. Ethics of care emphasises interdependency and relationality in the organisation of labour and market connections. A shift in focus towards a collective dimension, where networks among brands, businesses, stakeholders, and communities are identified, cultivated, and implemented, is not new within the Creative and Cultural Industries (CCIs). It aligns with the concept of *creative clusters* (Cooke and Lazzeretti, 2008), geographic concentrations of creative companies and associated institutions that strengthen each other through competition and collaboration (Gureshidze, 2016, p. 13).

In fashion, while competition has often been a driving force, forms of cooperation have long existed. Today, we see a growing emphasis on collaborative approaches that contribute to mechanisms of power redistribution. The main challenge lies in the inherent protectiveness surrounding the creative aspects, both material and immaterial. However, as demonstrated by the experience of collectives, adopting a different business model or embracing diversity in terms of ideals and practices does not preclude the creation of a network in which members can inspire and support one another. Such practices enhance opportunities within the collective and lead to positive spillover effects such as shifting competi-

tion away from an individualistic form of rivalry.

This study aims to explore how networks of actors within the fashion system can develop models aligned with paradigms that reimagine prosperity beyond traditional economic metrics. These networks have the potential to position fashion as a transformative force, capable of questioning its own trajectory and promoting a more inclusive and sustainable vision of progress.

To investigate this phenomenon, we focus on *CreAbility: Creativity for Capacity Building*, an initiative aimed at tackling systemic challenges within the Italian Creative and Cultural Industries (CCIs). By addressing issues of influence, control, and authority, the networks involved illustrate the potential of fashion to generate both social and economic value (Moore et al., 2023).

These initiatives challenge traditional notions of prosperity by emphasizing the civic and humane dimension of sustainability (Manzini, 2022), fostering mindful communities, supporting diversity, and collective growth. *CreAbility* serves as a critical case study for assessing whether and how such frameworks contribute to a network of care capable of reshaping the future of fashion and its role within the broader CCI ecosystem.

METHODOLOGY

BACKGROUND:

THE *CREABILITY* PROJECT

CreAbility: Creativity for Capacity Building is a project³ aimed at empowering Italian cultural and creative professionals by equipping them with skills and tools to thrive in a rapidly evolving landscape shaped by digital innovation and sustainability imperatives.

The challenges faced by creative firms, cultural organisations, artisans, and artists across Italy - particularly in adapting to the digital and green transitions while contending with shifting financial support for the cultural sector - have been well-documented. Since the early 2000s, scholars have highlighted the precarious nature of cultural and creative industries, emphasizing the need for innovative approaches to ensure their sustainability (Throsby, 2001). Similarly, Flew and Cunningham (2010) argue that capacity-building initiatives must address both the economic potential and the

³ The project is financed by the Italian “Piano Nazionale di Ripresa e Resilienza” (National Plan for Recovery and Resilience - PNRR). Project website in Italian available here: <https://www.creability.it/>, 21/02/2025. For a description of the project in English see here: <https://centridiricerca.unicatt.it/modacult-la-ricerca-creability>, 21/02/2025.

societal value of cultural and creative industries.

CreAbility addresses these challenges by promoting entrepreneurial strategies that advance inclusivity and sustainability within the cultural and creative sector, with a specific focus on fashion, craft, and urban design. The initiative employs a comprehensive approach based on training, mentoring, and networking; this approach aligns with the findings of scholars like Potts et al. (2008), who highlight networking within creative industries as a crucial mechanism for enhancing collaboration, innovation, and adaptability. The project's research design reflects insights into the transformative potential of culture and creativity in addressing societal and economic challenges (Pratt, 2012). By linking cultural practice to sustainable development, *CreAbility* provides a foundation for scholars to reconceptualize prosperity within the creative sector, advocating for a shift from transactional economic models to a more holistic, relational understanding of growth (Moore et al., 2013).

The *CreAbility* networking model strategically involves hubs – key nodes within already existing networks – and affiliated organisations to map and interconnect ecosystems that share common sets of values across the fashion, craft, and art/design sectors nationwide. These stakeholders include small entrepreneurial ventures, self-production initiatives, hobbyists, and both formal and informal institutions and associations whose activities transcend financial returns. By aligning their practices with the principles of circularity, transparency, and community empowerment, these realities introduce the caring approach into the public sphere (Tronto, 2013).

Over two years, *CreAbility* will bring together a range of stakeholders - cultural centres, universities, municipal authorities, professional networks, and cultural agencies - to strengthen Italy's cultural and creative industries (CCIs). The initiative will offer tailored educational courses focused on digital transformation and sustainability, equipping participants with essential technical and strategic skills. At the heart of this effort is *CreaNet*, a platform for networking, training, and mentoring, designed to foster collaboration and knowledge-sharing within the cultural community.

The project will systematically implement research and evaluation activities using a qualitative and participatory approach, focusing on the perspectives and experiences of cultural

and creative practitioners. This methodology is academically significant as it enables an in-depth exploration of the context-specific challenges and opportunities within the sector, while ensuring the co-production of knowledge. Actively involving practitioners aligns with participatory research principles, fostering inclusivity and contextual relevance. This approach also enhances the applicability and sustainability of the project's outcomes by fostering stakeholder ownership and engagement, critical for the longevity of capacity-building initiatives (Reason & Bradbury, 2001). Grounding the research in real-world dynamics generates insights that are both theoretically robust and practically actionable, reflecting key findings from studies on effective practices in cultural and creative industries (Belfiore & Bennett, 2007; Pratt, 2012).

THE PARTICIPATORY RESEARCH METHOD

Participatory research has gained prominence in qualitative social inquiry due to its emphasis on collaboration and inclusivity (Bergold, 2007; Bergold & Thomas, 2010). Unlike traditional methods, it involves individuals whose lived experiences are central to the study. These research collaborators work alongside academics in the planning, execution, and interpretation of the research (Bergold & Thomas, 2012), leading to the negotiation of research objectives that blend academic inquiry with practical application. Recognized as a complex and multifaceted approach (Arnstein, 1969), participatory research is rooted in the belief that research should not be a one-sided endeavour. Instead, it seeks to empower participants and generate practical insights that foster positive social change, benefiting both researchers and participants alike through a mutually advantageous knowledge-production process.

Central to many participatory research projects is the use of focus groups, which offer a structured yet flexible space for participants to engage in dialogue and collectively explore various aspects of the research (Bergold & Thomas, 2010). *Culturally responsive focus groups* are particularly valuable as they ensure diverse perspectives are respected, creating an inclusive and empowering research environment. These focus groups not only facilitate in-depth discussions but also provide a safe space for participants to express their views,

fostering a collaborative and equitable research process (Rodriguez et al., 2011).

The *CreAbility* project exemplifies the participatory research approach by actively engaging project stakeholders⁴ throughout the research process. Collaboration in this framework goes beyond data collection, encompassing ongoing reflection, analysis, and continuous evaluation of the knowledge generated. Central to the project is the integration of inquiry with action, where project hubs not only share and discuss challenges but also explore potential solutions and strategies to address them. This dual focus on reflection and action guarantees that the research yields both intellectual insights and practical outcomes. By working together to identify problems and develop solutions, participants take ownership of the research process and its real-world implications.

Between July and November 2024, *CreAbility* conducted three Culturally Responsive Focus Groups (CRFGs). Initially facilitated by the research team, meaning the authors, the hubs gradually assumed a more active role over time. They began recruiting participants and independently facilitating the discussions, demonstrating the growing autonomy of the hubs. This shift underscores the participatory nature of the project, reflecting the increasing ownership and engagement of the hubs in the research process. The structured discussions aimed to identify common themes and enable comparisons across sectors, allowing participants to reflect on both shared experiences and diverse perspectives.

Though the participants represented the fashion, crafts, and urban design sectors, for the purposes of this article, we will focus on the CRFGs relevant to the first. The criticism that the fashion industry has faced for its detrimental environmental impact and lack of diversity underscores the importance of exploring more sustainable and equitable practices. By delving deeper into the perspectives gathered from the focus group discussions, the authors aim to uncover strategies and recommendations to guide the development of more responsible and inclusive fashion-related initiatives.

⁴ The project involves three different categories of stakeholders: the official partners are the research organisations that have contributed to the project and benefit from the funding, the hubs are entities that are - formally or informally - at the centre of networks and communities, and finally there are the beneficiaries of the capacity-building actions, i.e. companies, associations, individual designers.

ANALYSIS

During the first focus group conducted with stakeholders involved in the project, the research team facilitated a session to enable participants to discuss the meanings of care and prosperity. A writing activity was proposed in which each participant was asked to share one or more words (up to three) that described each term in the practical context of their daily operations or organisations.

The brainstorming session on care proved to be more immediate, with a clearer convergence around the association between care and attention. When it came to prosperity, participants required more time to reflect on the words they wanted to contribute. There was less consensus and more requests for clarification. This suggests that the topic may have been less explored within the organisations involved and/or that the term is less commonly used in the language of the participants.

Still, participants expressed appreciation for the opportunity to discuss these terms among themselves, and they all agreed that the term sustainability is often controversial, ambiguous, and overused in various discussions and contexts.

In the words of one of the participants:

“In academia, when courses related to sustainability are mentioned, it often becomes a bit of a reiteration of the same concept, which by now should be the sine qua non condition for doing things – that is, you simply cannot not be sustainable! So, let’s move beyond that. Let’s consider other values that underpin sustainability.”

CARE AND ATTENTION

The association between care and attention underscores the profound connection between these two concepts as already noted by Manzini (2022): “Care, therefore, implies an intrinsically artisanal approach: doing things taking the required time, giving them the required attention [...]” (p. 464).

From the discussion among the participants in the CRFG, it is apparent that care is far from being merely a mechanical action; it demands deep engagement, heightened awareness, and continuous monitoring. Attention functions as an indispensable tool for providing care, enabling the perception and effective response to the needs, emotions, or challenges of the recipient. Without attention, care risks becoming superficial, perfunctory, or even inadequate.

Furthermore, care can be understood as a form of mindful attention that transcends physical tasks to encompass emotional and cognitive involvement. This perspective is particularly relevant in the context of initiatives such as *CreAbility*. Here, attention extends beyond practical responsibilities to include emotional attentiveness, such as active listening and the recognition of non-verbal cues. It is noteworthy that listening emerged as the second most frequently proposed term during participant discussions, highlighting its perceived centrality in the practice of care.

In addition, attention also involves a commitment to fostering dignity in the ways work is approached and practiced. This extends care into the realm of ethical action, ensuring that all forms of engagement—whether practical, emotional, or intellectual—respect the intrinsic value and humanity of those involved.

The convergence of care as a practice of attentively supporting the individual, promoting dignity through empathy, and fostering connections within the community and society, was clearly expressed in the words of one of the participants:

“Over the years, we have seen the lives of the people who work with us change drastically; people who have joined the communities where they live, who have been able to have a rental contract, who have been able to get a diploma, a driving license, in some cases to buy a car, in a very virtuous case to buy a house, or to reunite with their families. Women over 55 who had worked for a lifetime in a company, who lost their job, who have disabilities, who through this job got back in the game and reactivated a whole series of autonomies and today they lead a more self-sufficient life than they could have imagined before.”

Attention, therefore, becomes a tangible expression of respect and recognition of value. By dedicating time, focus, and presence to those they work and collaborate with, fashion realities demonstrate a genuine commitment to others, underscoring the importance they place on interpersonal and professional relationships. This emphasis on attentiveness serves as a powerful indicator of an organisation's ethos and its dedication to fostering meaningful connections with very tangible consequences (Tab. 01).

PROSPERITY AND WELLBEING

As outlined in the introductory framework, prosperity involves creating conditions where all individuals have equal access to opportunities, resources, and the means to contribute to and benefit from both economic and social progress. This broader view connects prosperity directly to well-being, emphasizing that it requires the flourishing of individuals across economic and social dimensions, leading to improved quality of life, social equity, and sustainable development. The results from the focus group echo these principles and align with the interpretation provided by Smelik (Vaccari, 2022).

The semantic analysis of the focus group transcriptions reveals that the participants also used other terms like *collective well-being*, *growth for all*, and *community networks* to describe their commitment to prosperity. These references highlight the interconnected nature of prosperity, where social cohesion, inclusion, and the sustainability of communities and resources are central. The table's findings further support this, underscoring the importance of shared growth, social equity, and a quality of life that is both sustainable and accessible to all.

These insights strengthen the idea that true prosperity goes beyond economic gains, emphasizing the need for equitable distribution to ensure that everyone can thrive within a connected, supportive environment (Tab. 02).

It was emphasised that the logic of collective well-being does not necessarily align with a short-term profit-driven perspective:

“It is essential to be able to communicate what we do, as essential as offering products that are well-made [...] In this world we live in, it is crucial to be able to communicate our values, to convey what we do, our vision, our mission. Even if people do not directly become consumers of our products, they become consumers of ideas, consumers of values, of visions. This is equally important to me, because these fosters hope for the future.”

Word or expression proposed for “Care”	Occurrences
Attention	12
to oneself, others, the animal world, and the environment	1
to the context	1
to others, to what surrounds us	1
to the community	1
to complexity	1
Listening	5
to the need of the beneficiaries	1
and dialoguing	1
Empathy	2
Commitment	2
Accountability	1
Putting people first	1
Harmony	1
Equity	1
Interactions	1
Networking	1
Community	1
Proximity	1
Enhancement of territorial diversities	1
Avoid superficiality	1
Specificity	1
Avoid superficiality	1
Specificity	1
Dedicate time	1
Long-term planning	1

Tab. 01

Word or expression proposed for “Prosperity”	Occurrences
Wellbeing	4
Collective	1
For all	1
broad and socially inclusive	1
Growth	3
For all	1
Of the society as a whole	1
Common	1
Sharing	2
Project-based	1
Plurality	1
Diversity	1
Enhancement of specificities	1
Networks among communities	1
Development of communities in a territory	1
Territorial network between public and private sectors	1
Quality of life	1
Ensure the possibility of choice	1
Ensure future prospects	1
Facilitate interactions	1
Good relationships between parties	1
Self-sustaining actions	1
Replicability	1
Regeneration of places	1

Tab. 02

COMMON GROUNDS AND CULTURALLY RELEVANT NARRATIVES

As oThe initial CRFG established a shared language, essential for effective communication and collaboration. It was conducted with representatives from the hubs, while the subsequent two were open to participants identified both by the research team and – primarily – by the hubs themselves. This approach ensured a balanced mix of veteran members, who actively contributed to all three sessions, and new voices and perspectives that

enriched the community and ongoing discussion.

After agreeing on key terms, the second focus group focused on care and attention in project communication and website imagery, emphasizing inclusive representation, particularly of BIPOC individuals, aligning with Lyson’s findings on fostering collective identity in community activism (Lyson, 2014). These discussions underscored the importance of adequately portraying all partners to promote diversity and inclusivity. The third focus group

explored collective growth, prioritizing vulnerable community members such as the elderly, individuals with disabilities, and those facing mental-health challenges.

The sequential analysis of the three focus groups revealed that as *CreAbility* evolved into a familiar and trusted space, discussions became more dynamic, with participants actively sharing diverse perspectives rooted in their experiences. This indicates that the methodology fostered open exchanges, enriching dialogue and promoting the articulation of divergent views. The freedom to express authentic opinions not only underscored the dialogic nature of the process but also surfaced culturally relevant narratives. By encouraging inclusivity and equity, the discussions cultivated a sense of belonging and agency among participants.

Furthermore, these findings, particularly given the project's emphasis on smaller actors, point to potential empowerment within a sector dominated by large players. *CreAbility* functions as a bridge, enabling smaller stakeholders to participate in the broader narrative and ensuring diverse perspectives are heard. While such initiatives may not entirely address systemic inequalities, they offer valuable tools for empowerment, contributing to a more balanced and equitable fashion ecosystem. In this respect, *CreAbility* reflects what Aiken (2017) describes as community-based initiatives that challenge entrenched power structures and advocate for social justice.

CONCLUSIONS: CULTURAL VALUES AND CIVIC PRIDE

The *CreAbility* project was founded on three key concepts: inclusion, prosperity, and sustainability, each tailored to fit its unique context. Inclusion is not limited to ensuring participation but also involves creating accessible tools and spaces that celebrate diversity and promote equal opportunities. Central to this is actively engaging with community voices, incorporating their feedback, and adapting solutions to meet their needs.

Prosperity is redefined beyond material wealth, focusing instead on a holistic sense of well-being encompassing economic, social, and cultural dimensions, with community at its core. Within *CreAbility*, prosperity involves fostering creative, technological, and social skills that empower participants and prepare them for future challenges. It also entails supporting initiatives that create jobs, enhance quality of life, and boost the

local economy.

Sustainability, often overused as a buzzword, holds a deeper meaning in *CreAbility*. It signifies a commitment to long-term thinking, where resources are used responsibly with future generations in mind. This concept extends beyond environmental practices to include products and services that foster a culture of responsibility and social awareness, embedding sustainable values within everyday practices.

The preliminary results appear promising, aligning with both the direction identified in the literature and the expectations of the research team. When asked to define their work in three words, participants highlighted principles that transcended the mere creation and transmission of cultural values. Their responses underscored broader concepts such as social cohesion, community bonds, and collective solidarity, reflecting a deeper commitment to civic responsibility and societal well-being. Notably, the hubs emphasized values rooted in social and communal benefits, such as belonging, shared ideals, and civic pride, over personal gains. These efforts illustrate the bridge-building role discussed earlier, where smaller, unconventional actors gain platforms to amplify their narratives and strategies of resistance.

In conclusion, by encouraging collaborative cultural creation, *CreAbility* promotes inclusivity and facilitates the exchange of collective wisdom, ultimately challenging traditional hierarchies. This reframing seems to expand the potential for fashion to drive meaningful societal change. While it may not fully resolve the inherent challenges outlined earlier, introducing alternative narratives into the fashion system fosters a shift toward greater inclusivity, making it a more dynamic and constructive space than before.

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CAPTIONS

[Tab. 01] Occurrences of each word or expression suggested in answer to the prompt “What is Care in the context of the activities promoted within your organisations”. Entries in the table are grouped based on similar meanings. Italicized words or expressions specify aspects of the corresponding term in plain text.

[Tab. 02] Occurrences of each word or expression suggested in answer to the prompt “What is Prosperity in the context of the activities promoted within your organisations”. Entries in the table are grouped based on similar meanings. Italicized words or expressions specify aspects of the corresponding term in plain text.

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CONTRASTING HIERARCHICAL AND DECENTRALISED SYSTEM ANALOGIES TO REVALUE PROSPERITY

DECENTRALISED SYSTEM ANALOGIES ENABLING FASHION SUSTAINABILITY

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Abstract

The hierarchical capitalist system exploits all living systems, including labour. Revaluing prosperity ideologies involves freeing the production of new systems from an opportunistic economy and fostering subject formation that values “complexity, diversity and multiple ways of belonging” (Braidotti & Regan, 2017, p. 182). Agents in the fashion system struggle to adopt the counterhegemonic ontologies required for true sustainability. A responsive, integrated, and decentralised system and an ethic of care are needed to empower more role players to address dynamic societal challenges. This paper contributes to redefining the concept of prosperity by contrasting analogies of the hierarchical capitalist fashion system with alternative decentralised structures, thereby identifying intervention points to enable agency for fashion system participants. Drawing from Nel’s (2025), PhD research, critical discourse analysis and a constructivist qualitative methodology grounded in theory through desktop analysis are applied. The characteristics of decentralised systems offer intervention points in the fashion system, promoting a framework that moves away from exploitation and integrates agency—enhancing economic resilience by diversifying economies and reducing vulnerability to global market fluctuations. Revaluing prosperity paradigms, from prosperity for the privileged few through capitalist profit motives to more inclusive, decentralised notions of prosperity could promote well-being for all.

Keywords: *Decentralised fashion system, Ethic of care, Systems theory, Fashion sustainability, Agency*

INTRODUCTION

The hierarchical capitalist system exploits all living systems, including labour. To revalue prosperity ideologies, we must free the production of new systems from an opportunistic economy and foster subject formation that values “complexity, diversity and multiple ways of belonging” (Braidotti & Regan, 2017, p. 182).

Agents in the fashion system struggle to adopt the counterhegemonic ontologies required for true sustainability. A responsive, integrated, and decentralised system and an ethic of care are needed to empower more role players to address dynamic societal challenges. This paper contributes to redefining the concept of prosperity by contrasting analogies of the hierarchical capitalist fashion

system with alternative decentralised structures, thereby identifying intervention points to enable agency for fashion system participants.

The root of inequality stems from the ideology of societal structures (Piketty, 2020). The neoliberal economic theory treats labour and natural resources as commodities, prioritising a favourable business climate over collective rights and environmental regeneration (Harvey, 2005). Capitalism’s continual accumulation causes cyclic crises and inequalities, resolved by exploiting new territories and resources (Harvey, 2001). This perpetuates global disparities and environmental issues in fashion supply chains (Piketty, 2014). Escobar (2018) advocates for a “pluriverse” of multiple ontologies beyond Eurocentric views.

Development does not just consist of increased GDP growth and natural resource use or increased inputs for increased outputs; it involves change through “differentiation, diversification and transformation” in production processes (Ellerman, 2004, p. 510). Considering a multiplicity of collective rights rather than hierarchical class divisions and strategies of environmental regeneration (that value all life forms rather than consider them mere commodities to be exploited) opens the argument for less hierarchical structures.

METHODS AND DESIGN

The researchers applied an interdisciplinary constructivist qualitative methodology, drawing on the doctoral research of Nel (2025). Critical discourse analysis and desktop analysis grounded in theory were used to review relevant academic and industry texts to uncover dominant themes. Thematic coding provided insights into dominant social paradigms inherent in capitalist systems and enabled a critique that sought to expose power relations and challenge prevailing socio-economic structures (Saunders, Lewis & Thornhill, 2016).

The paper argues that examining and contrasting hierarchical capitalist systems with decentralised system analogies could reveal potential intervention points for fostering more relational and sustainable prosperity within the fashion industry. The aim is to reveal how existing capitalist ideologies perpetuate unsustainable practices and reimagine how the fashion system can enable complexity, diversity, and collective agency and support a more responsive, integrated, and decentralised concept of prosperity.

HIERARCHICAL VERSUS DECENTRALISED SYSTEM ANALOGIES

The capitalist economic model is characterised by rapid growth, supposedly aimed at improving living standards and enhancing prosperity (Schumpeter, 2003). However, various theorists have critiqued the system’s negative societal and environmental impacts. Central to these critiques is the hierarchical nature of capitalist epistemology, which stratifies power, wealth, and opportunities, creating an inequitable, top-down distribution of resources. This structure privileges a small elite who controls production and capital flow while marginalising workers, consumers, and communities with limited agency and social class mobility.

Drawing from the works of influen-

tial theorists such as Marx (2005; 2009; 2015; 2020) on class division and surplus value, Piketty (2014; 2020) on ideology and inequality, Harvey (2001; 2005) on capital accumulation, Wright (1980) through the research approach to power, and Niessen (2020, p. 866) on “fashion sacrifice zones”—the analysis highlights the perpetuation of inequality and social stratification inherent in hierarchical capitalism. The fashion industry exemplifies this dynamic through global supply chains and trade policies that consolidate power at the top, diminishing the agency of those at the lower end of the hierarchy.

The paper applies structuralist approaches, network communication theory, and management theory to define and examine ‘hierarchical epistemology’—a concept that describes an organisational system where power, value, and agency are centralised and stratified. This structure results in linear flows of control, reinforcing inequalities by creating stark divisions between those in positions of power and those subordinate to them (Peterson, 2016). The complex systems of social and economic realities under this framework are nested hierarchically, usually centralised and arranged in tiers that limit the autonomy of lower levels (Beunen, Duineveld, & Van Assche, 2021; Deleuze & Guattari, 1987).

Network communication theory provides an analytical framework for comparing hierarchical systems with decentralised alternatives. Adapted from Baran’s (1964) *Typology of communication networks*, Figure 01 “Structural system typologies,” illustrates the relative resilience of different network structures—centralised, decentralised, and distributed.

The resilience of a network and its ability to withstand disruptions depend on the nature of its nodes and interconnections (Bodó, Brekke & Hoepman, 2021). As illustrated in Figure 1, centralised systems exhibit vulnerability due to the concentration of power. In contrast, decentralised and distributed systems are characterised by shared control, offering greater adaptability and potential for sustainable prosperity.

Centralised networks, characterised by a single central node, are inherently vulnerable; if this central point fails, communication across the network collapses (Baran, 1964). While more resilient, decentralised networks still possess nested hierarchies that rely on higher-level nodes to maintain connectivity, making them susceptible

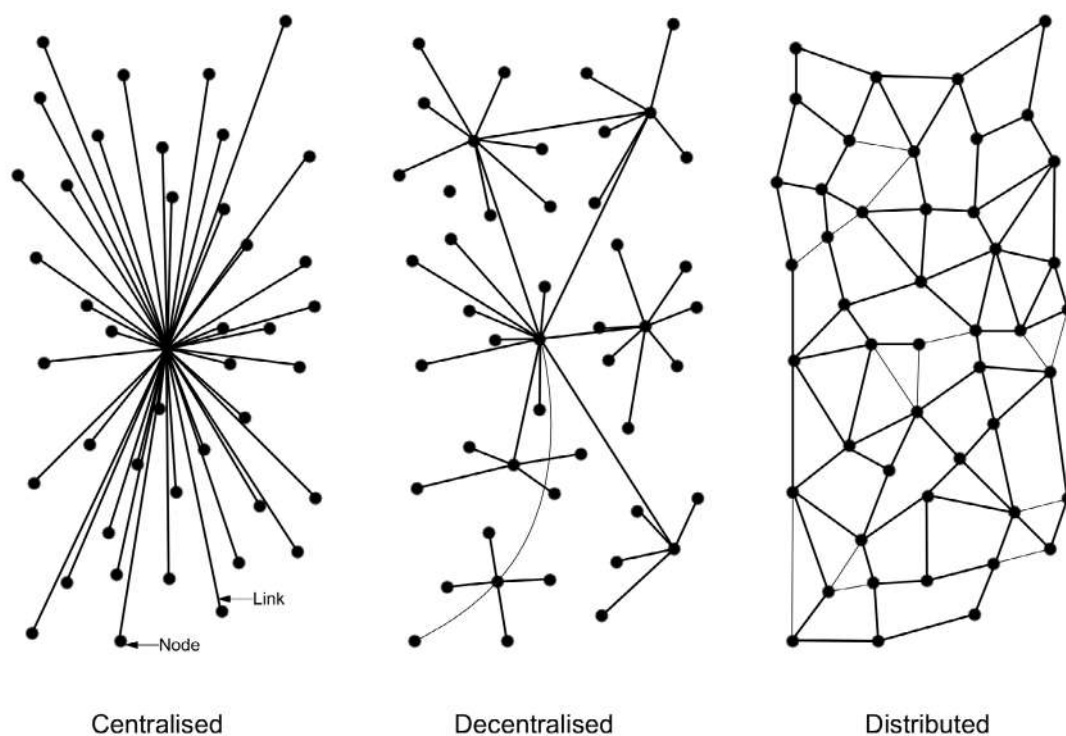


Fig. 01

to partial failures (Baran, 1964; Bodó et al., 2021). Distributed networks, on the other hand, represent a paradigm where each node maintains multiple connections, enabling continued operation despite the failure of individual nodes. More decentralised models underscore resilience, autonomy, and adaptability through nodes' collective action and cooperation (Bodó et al., 2021).

Bodó et al. (2021) highlight that decentralised and distributed structures, by distributing power and decision-making, can offer alternatives to hierarchical systems that reinforce inequality and power concentration. These structures promote resilience by fostering localised, autonomous actions and emergent behaviours driven by shared values and insights that maintain systemic coherence. Such network properties stand in contrast to the centralised capitalist fashion system, which, with its dependence on complex global supply chains, proved highly vulnerable during crises like the COVID-19 pandemic (Reidel, 2023). This reliance on centralised structures exposed significant limitations in flexibility and sustainability.

By contrasting hierarchical capitalist structures with decentralised system analogies,

this paper aims to identify intervention points that enable greater agency for fashion system participants. This shift would support the development of a more responsive, integrated system that moves beyond centralised control, fostering a more inclusive, equitable, and sustainable concept of prosperity.

APPLICATION AND ANALYSIS: DECENTRALISED SYSTEM STRUCTURE ANALOGIES

The shift towards decentralised and distributed models could address issues of political oppression, economic disparity, and social power imbalances, offering new modes of participation, solidarity, and reduced monopolistic control (Bodó et al., 2021). However, challenges remain, such as the need for collective governance, coordination mechanisms, and regulatory frameworks to maintain coherence and accountability within distributed systems. Moreover, these systems depend on agents who are both willing and capable of participating, raising questions about autonomy and equitable engagement (Bodó et al., 2021). Bodó et al. (2021) conclude that no single system operates in

isolation; instead, effective social and economic systems are composed of interconnected structures that collectively enhance resilience and adaptability.

Applying these principles to the fashion system, decentralised and distributed models align with alternative ways of thinking about prosperity, presenting an opportunity to shift from centralised control to more diverse, inclusive, and interconnected networks. By moving from hierarchical, centralised models to more responsive and decentralised systems, fashion participants can potentially be empowered with greater agency and the ability to foster more sustainable, resilient practices that value diversity and collective well-being for people and ecosystems.

SCALAR MANAGEMENT

Henri Fayol's scalar management principle illustrates the structured, linear authority within hierarchical capitalist organisations, where power flows from upper management to lower levels (Fayol, 2016; Peaucelle & Cameron, 2013). This principle facilitates clear communication and decision-making but limits interaction and decision-making power at lower levels, reinforcing a rigid system where authority remains centralised (Masterclass, 2022). The isolation of lower management and potential miscommunication highlight the limitations of centralised structures, which prioritise the interests of major shareholders and profit motives over collective benefits for employees and communities.

In contrast, decentralised and distributed systems offer more flexibility and inclusivity. Capitalist hierarchies, by centralising decision-making power, are inherently vulnerable to disruptions, as the failure of a central management node can destabilise the entire structure. The fashion industry exemplifies this with its global supply chains; therefore, the organisational structure creates an intervention point that enables agency.

EXPLOITATION OF GLOBAL DISPARITIES

Capitalist systems reinforce global inequalities, enabling economically dominant nations to exploit less developed regions for resources and labour, perpetuating historical patterns of colonial exploitation. The fashion industry's reliance on outsourcing to low-wage countries exemplifies this, subjecting workers to poor conditions and minimal pay. This system worsens economic and social

disparities while consolidating wealth at the top.

Piketty's (2014) extensive income and wealth data analysis highlights how capitalism fosters increasing socioeconomic inequality. He shows that wealth accumulation remains concentrated among a small elite, undermining democratic values and leading to political instability. Piketty (2014) argues that despite educational advancements aimed at creating equal opportunities, middle-class incomes stagnate while the wealthiest benefit from technological advances and capital returns. The notion of meritocracy erodes as inherited wealth solidifies power among the elite, threatening social and economic mobility. Piketty's (2014) findings align with Marx's (2009; 2015) insights on the 'law of capitalist accumulation', showing that unregulated capitalism intensifies inequality and concentrates wealth. Piketty (2014) suggests that investing in education and technological convergence is crucial but insufficient to bridge the widening economic gap. The structural inequalities ingrained in capitalist systems necessitate systemic change, including progressive taxation and wealth redistribution, to offset these disparities and democratise economic benefits.

Piketty (2014) underscores that inequality is not an inevitable social condition but a result of political choices. This perspective challenges the global status quo, advocating for political interventions to reshape capitalism towards more democratic and equitable systems. As Mandela (2005) poignantly stated, poverty and inequality are man-made and can be addressed through deliberate human action. Despite post-colonial economic shifts, global systems remain fundamentally hierarchical, and meaningful changes are needed to move towards social and economic equity.

IDEOLOGY AND INEQUALITY

Piketty's (2014, 2020) analyses offer significant insights into how capitalist systems, underpinned by hierarchical structures, exacerbate inequality. In *Capital in the Twenty-First Century*, Piketty (2014) argues that inequality widens when the return on capital outpaces economic growth (Steinmetz-Jenkins, 2020). Extending this argument in *Capital and Ideology*, he examines global disparities, highlighting systemic issues such as a lack of transparency in wealth distribution, gender inequalities, and the paradoxical impoverishment of developing nations due to trade liberalisation and prioritisation of property rights (Piketty, 2020).

Piketty asserts that inequality is rooted not in economics or technology but in ideology—upheld by educational, legal, and financial systems that legitimise the concentration of power and wealth (Yun, 2022). This ideological foundation restricts opportunities for redistributive policies and perpetuates hierarchical systems that favour the elite. Transformative change, he suggests, requires grassroots political action, policy reform, and mechanisms like progressive wealth taxation to challenge entrenched inequalities and redistribute resources more equitably (Piketty, 2020).

The persistence of inequality in capitalist systems is also evident in the language and concepts used to describe social and economic structures. Piketty (2020) critiques terms such as ‘factors of production’ and ‘human capital’, which reduce individuals to mere components of economic systems, stripping them of their full human potential. This dehumanising language serves to sustain inequality by normalising the commodification of human and social relations. Niessen (2020, p. 866) echoes this critique in the fashion industry context, illustrating how colonial-era definitions of fashion perpetuated European superiority and devalued traditional, non-Western clothing as “non-fashion.” This ideological legacy persists in education and industry practices, prioritising rapid style changes associated with Western fashion over Indigenous and craft-based traditions.

The capitalist fashion system embodies and exacerbates these inequalities. Wealth and decision-making power are concentrated in the hands of a few conglomerates and luxury brands, marginalising smaller designers, independent labels, and garment workers. This concentration limits opportunities for diverse voices and innovation, reinforcing a hierarchical structure that privileges the powerful. Additionally, the global fashion supply chain often exploits less developed regions by outsourcing production to areas with lower labour standards. This practice entrenches economic hierarchies, as garment workers face poor wages and unsafe conditions while being framed as beneficiaries of industrial ‘progress’ (Niessen, 2020).

Niessen (2020) further highlights how terms such as “garment workers” can obscure harsh realities, normalising inequality by positioning exploitative jobs as economic “blessings” simply for providing income. The devaluation of Indigenous clothing and craft as non-fashion underscores how

capitalist structures render traditional practices economically unviable, perpetuating cultural and economic disenfranchisement (Niessen, 2020).

In contrast, decentralised structures offer potential pathways to redefine prosperity by distributing power, enhancing agency, and valuing diverse contributions. These systems promote collaborative decision-making, shared values, and equitable participation, countering the rigid hierarchies of capitalist frameworks. By embracing decentralised models, the fashion system could empower a broader range of participants, prioritise community welfare, and foster sustainable practices that support long-term, collective prosperity.

CLASS DIVISIONS AND HIERARCHICAL STRUCTURES

Capitalism inherently reinforces class divisions and entrenches power dynamics, restricting upward mobility and maintaining social hierarchies. Marxist theory conceptualises ‘class’ as a historical exploitation process where capitalists extract surplus value from workers’ labour while monopolising control over resources and production (Wright, 1980). This hierarchical structure privileges the elite, consolidating power and wealth at the top while limiting workers’ agency at lower levels.

Erik Olin Wright’s (1980) Power Resource Approach (PRA) extends traditional Marxist class theory by identifying diverse forms of power that labourers can leverage to challenge systemic exploitation. These include associational power (e.g., trade unions), institutional power (e.g., legal rights), structural power (e.g., workplace bargaining), and societal power (e.g., coalitional efforts and discursive influence) (Schmalz, Ludwig & Webster, 2018). PRA underscores the potential for transformative class agency but also highlights how capitalist structures limit workers’ ability to mobilise these resources effectively.

For example, garment workers in low-wage countries face significant barriers due to the hierarchical global labour structure, which privileges top-tier management and shareholders and undermines the bargaining power of lower-tier workers (Schmalz et al., 2018). Structural and societal power can be mobilised to address these disparities through collective action, local alliances, and transnational networks, showcasing intervention points for fostering agency.

Applying Wright's (1980) theory of occupational grouping to the fashion industry illustrates the entrenched class divisions within its global supply chain. The 'Circuit of Style-Fashion-Dress' (Kaiser, 2012) maps interconnected production, distribution, and consumption processes, highlighting how class relations manifest across the system. This circuit reveals various exploitation nodes, from designers and media gatekeepers to farmers, manufacturers, and policy regulators (Bye, Tomfohrde, Nel & Davis, 2023). In the hierarchical capitalist model, fashion conglomerates and luxury brands dominate resources and decision-making, marginalising smaller designers and workers. For example, despite being a leading Global apparel exporter, garment workers in developing countries, such as Bangladesh, earn some of the lowest wages in the industry (Anner, 2019), exemplifying the severe class disparities perpetuated by capitalism. Wright's (1980) emphasis on class agency suggests that with strategic use of power resources, grassroots movements and local participation can create intervention points to disrupt hierarchical systems.

Distributing decision-making and fostering local autonomy can empower stakeholders, promote resilience, and support more inclusive and sustainable practices. These models could better support collective action, shared values, and innovation, challenging the rigid class divisions embedded in capitalist frameworks, thereby creating a conducive environment for agents in the fashion system to value diversity and collective well-being. By embracing decentralised approaches, the fashion industry could transition towards a model that prioritises equity, enhances worker agency, and promotes sustainable practices, thereby reimagining prosperity to be more inclusive and responsive to all stakeholders.

David Harvey (2005) highlights the contradictions in neoliberal capitalism, where labour and the environment are commodified, with state policies prioritising a "good business climate" over collective rights and environmental sustainability. This underscores the limitations of hierarchical structures in fostering equitable growth and suggests the need for alternatives that prioritise collective rights and ecological regeneration.

RETHINKING DEVELOPMENT: FROM HIERARCHICAL GROWTH TO DECENTRALISED FLOURISHING

Ellerman (2004) explores Jane Jacobs' ecological perspective on economic development, contrasting quantitative growth with qualitative transformation. He critiques traditional economic theories that treat growth as a uniform increase in output, arguing that this approach fails to address the complexities of true development (Ellerman, 2004). Instead, Ellerman (2004, p.510) highlights the importance of *differentiation*, *diversification*, and *transformation*—a process where development evolves through diverse and interconnected changes, akin to a river delta branching into multiple rivulets rather than a single deepening stream. This metaphor underscores the value of a decentralised, adaptive approach that encourages varied and localised economic activities.

Ellerman (2004) emphasises that genuine development involves more than just expanding GDP through inputs like migrant labour and resource extraction. It requires contextually adapted production processes, products and services that lead to qualitative improvements. This differentiation aligns with Jacobs' idea that cities are not merely scaled-up versions of small towns but are transformed through complex and diverse processes that foster innovation and resilience (Ellerman 2004).

Qualitative development also speaks to the need for upstream interventions—proactive, integrated policies that create environments conducive to health and wellbeing—rather than solely measuring downstream outcomes (Ellerman, 2004; Giles-Corti, Lowe & Arundel, 2020). In sustainable development discourse, many efforts remain embedded within a capitalist framework that prioritises output over systemic change. For instance, although sustainable development goals often assess outcomes like air quality, they may neglect the upstream policies necessary for long-term impact (Giles-Corti et al., 2020). This highlights the need for a paradigm shift that transcends traditional capitalist models and moves toward more holistic, transformative approaches.

In the context of fashion, these insights point to the necessity of moving beyond "growth" measured by profit and production scale. Instead, fostering a decentralised system rooted in relational prosperity—where interconnected, adaptive, and diverse processes are prioritised—can create

pathways for a more sustainable and equitable industry. This shift could help redefine prosperity by enabling diverse participants within the fashion system to act as agents of change, enhancing resilience and promoting collective well-being. By embracing decentralised models that support differentiation and localised adaptation, role players in the fashion system can identify intervention points for sustainable transformation. These models encourage participation, agency, and collaboration, countering capitalism's hierarchical, exploitative structures and aligning with a future-oriented vision of prosperity that benefits all.

REGENERATIVE DESIGN AND ETHICS OF CARE AS ALTERNATIVES TO CAPITALIST STRUCTURES

Regenerative design, conceptualised by John T. Lyle, forms a foundational element for circular economy frameworks by emulating natural cycles and metabolic flows to create sustainable, cost-efficient systems (Dias, 2015; Ellen Macarthur Foundation, Sa). Unlike traditional sustainable design, which focuses on minimising harm, regenerative design incorporates feedback cycles that foster adaptability, resilience, and thriving ecosystems (Brown et al., 2018). Cole and Oliver (2016, p. 41) describe regenerative design as a “co-evolutionary, partnered relationship between human and natural systems,” highlighting its context-specific approach and a commitment to interconnected development.

Dias (2015) underscores that regenerative design extends beyond quantifying environmental, social, and economic impacts by mapping relationships and promoting co-evolutionary change. This approach supports an ecological worldview that integrates human and ecosystem health, urging the shift from mechanistic views to living, adaptive systems (Mang & Reed, 2013). This perspective positions human awareness and mindfulness as central to the design process, shifting the focus to individuals rather than objects (Mang & Reed, 2013).

Akama and Yee (2016) advocate for “intimacy-based orientations” in design, emphasising interdependence, respect, and reciprocity. They argue that design interventions emerge within interconnected systems and cannot be seen as detached or isolated acts. This contrasts with capitalist “integrity orientations,” where external values guide actions independently of their contexts

(Kasulis, 2002). Instead, an intimacy orientation integrates systems and actors into a personal, intuitive, and relational network, fostering interconnectedness and holistic social innovation (Akama & Yee, 2016).

The *ethics of care* framework complements regenerative design by addressing the ethical deficits present in capitalist systems, such as the neglect of community, relational values, and ecological regeneration (Nel 2018). This approach shifts focus from commodification—which severs human connections to nature and each other—to fostering relationships built on empathy and collective responsibility. Eisenstein (2011) supports this by advocating for a reconceptualisation of the ‘self’ as part of an interconnected community within ecological systems, countering the capitalist drive for individualistic consumption.

Raworth (2022, p. 95) critiques the traditional economic portrayal of humans as “solitary, calculating, competing and insatiable” beings, arguing that such a narrow vision is inadequate for ensuring that human needs are met within the ecological boundaries of the biosphere. This view supports the capitalist framework, prioritising competition and growth over collective well-being. Instead, Raworth (2022) advocates for a more nuanced understanding that frames humans as heuristic, reciprocating, altruistic, and inherently social, capturing the diversity of values and motivations that drive human behaviour.

Incorporating ethics of care into the fashion industry offers an alternative moral compass that evaluates whether practices are rooted in consumption or aligned with ethical, context-bound values (Nel 2018). This relational approach prioritises community, connection, and moral responsibility over profit-driven objectives (Jaggar, 1992). Applying ethics of care requires integrating moral “elements of care: attentiveness, responsibility, competence and responsiveness” (Tronto, 1993, p. 136). By integrating regenerative design and an ethics of care, the fashion system could shift from a hierarchical, exploitative model to one that promotes collective agency, sustainability, and well-being.

CAPITALISM'S HIERARCHICAL EPISTEMOLOGY AND ITS IMPLICATIONS FOR THE FASHION SYSTEM

This paper examined how capitalism's hierarchical epistemology shapes and sustains social, economic, and political inequalities, concentrating power, wealth, and opportunities among a privileged few while marginalising the majority. In the fashion industry, these hierarchies manifest through the dominance of elite fashion conglomerates, the exploitation of garment workers in developing countries, and the global disparities stemming from unequal access to resources and economic opportunities. Stakeholders in the Capitalist system rationalise this exploitation by framing it as a consequence of free trade and market competition, thereby obscuring the underlying systemic inequalities. The fashion industry exemplifies these disparities, showcasing how elite brands control resources and decision-making, leaving garment workers and smaller stakeholders with minimal agency and limited opportunities for upward mobility. Such centralised, top-down models restrict participation, exacerbate exploitation, and reinforce class divisions, obstructing social equity and economic justice.

A departure from “business as usual” involves embracing concepts like degrowth, regenerative design, and circular economic practices, which align economic success with ecological health. The World Commission on Environment and Development (WCED, 1987, p. 14) aptly stated, “Ecology and economy are becoming ever more interwoven locally, regionally, and globally into a seamless net of causes and effects.” The interconnectedness of economy and ecology underscores the need for approaches that consider economic actions' broader impacts.

A fundamental shift is needed toward decentralised and participatory structures that redistribute power, promote equity, and prioritise environmental sustainability and collective well-being to address these systemic challenges. The characteristics of decentralised systems offer intervention points in the fashion system, promoting a framework that moves away from exploitation and integrates agency. This revaluing of prosperity paradigms can enhance economic resilience by diversifying economies and reducing vulnerability to global market fluctuations. Encouraging local investment and develop-

ment that supports small businesses would enable local production, community-based initiatives, and cultural preservation, empower sustainable practices (such as local material use and minimising transportation), and provide more equitable labour. Thus, fostering a sense of community and belonging and enhancing relational prosperity through stronger interpersonal connections.

The capitalist model, focusing on individualistic gain and top-down power dynamics, perpetuates inequality and environmental degradation. In contrast, decentralised systems foster collaboration, shared responsibility, and adaptability, creating spaces where diverse agents can participate meaningfully. There is a need for a paradigm shift that challenges the capitalist fashion system's rigid, hierarchical structures—firstly, identifying intervention points that empower fashion system participants and better align the industry with sustainable and ethical goals. Secondly, moving towards a decentralised model—where design practices are rooted in ecological thinking and relational ethics—creates opportunities for greater agency and participatory innovation. This involves rethinking current practices to support models prioritising relational, community-focused approaches, enabling sustainable and inclusive qualitative development.

Contrasting the hierarchical capitalist fashion system with decentralised system analogies highlights potential pathways for redefining prosperity and empowering fashion system participants. Revaluing prosperity requires transitioning from exploitative centralised profit-centric models to more responsive, integrated structures that enable fashion system role players to prioritise equity, collaboration, and shared values, such as environmental care, towards resilience and decentralised flourishing for all.

CAPTIONS

[Fig. 01] “Structural system typologies” illustrates three system typologies: centralised, decentralised, and distributed, analogies for different fashion system structures. It was adapted from “Typologies of communication networks” (Baran 1964).

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HANDLE WITH CARE

SUSTAINING CHIC-NESS WITH THRIFTED CLOTHES

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Abstract

The “Handle with Care” project aims to promote self-expression, building confidence, looking and feeling good while doing good. This project is about “coolness” so that what we define as *environmental movers* may embrace sustainability in fashion in everyday life. This paper defines and investigates models of environmental movers (EM), based on a long-term collaboration and community-based project about fashion, sustainability, identity, with a focus on environmental solutions to ecological, class, and social justice. The authors describe and evaluate the first two years of “Handle with Care,” a long-term collaboration between a university, including an independent study and two classes, and a community partner. The collaboration led to the planning and opening of Envirochic/Chic Shack, an environmental boutique developed and implemented with a local high school in the United States. The theory of *environmental movers* and the praxis of the Chic Shack promote an inclusive and mindful community that invites everyone to express themselves as they are. The larger “Handle with Care” project centers experiential learning, engaged and embodied experiences for both high school and college students to learn and practice fashion and sustainability together.

Keywords: *Sustainability, Circular consumption, Fashion, Nature, Community*

INTRODUCTION

In the United States and most countries in Europe, consumers of all ages have too many clothes, shoes, accessories, often living in houses full of unnecessary objects, driving multiple cars: according to the United States census, the average household income in 2023 was over \$80,000, In 1922, 91.7% of households had at least one car, more than a third had two (Valentine, 2024). This abundance often leads to wanting more, instead of an introspective look at the reasons for this over-consumption. In the same countries (United States and most of Europe), as well as the rest of the world, the other side of too much stuff for some is not enough for others. Class, race, gender inequalities lead to deep divisions between those who have too much and

those who may need something, be it food, clothes, housing, health care, education, and employment.

Environmental injustice, defined as historic, social, cultural, political, economic inequalities that emerge because of where people live and what they have (or do not) is central for the arguments and lessons from this paper. The depth of the differences creates ecosystems that can simultaneously benefit some while harming others, even within the same city or region. One example is where trash and toxic waste may end up, away from an area and into another. Scholarship in environmental justice (see the definition from the United States Environmental Protection Agency; Johnson, et al., 2020; Penniman, 2018; Humes, 2024) prove that the people who deal with the literal and

metaphorical environmental *residue* are often from lower socioeconomic classes or from minoritized communities.

Specifically, the authors focus on fashion and sustainability, as part of the project “Handle with Care.” As a team of faculty, students at a university, teachers, staff, and administrators at a local high school and school district, the authors have developed a model to take clothes that are discarded, donated, thrifted, no longer loved by finding them a new home. This model highlights a circular fashion (Dana et al., 2023; Fletcher and Tham, 2015; Charter et al., 2023; Henninger et al., 2017; Muthu, 2015, 2016, 2017) and cradle-to-cradle philosophy (McDonough and Braungart, 2002; Henninger et al., 2017).

Thus far, the “Handle with Care” team has opened an environmentally friendly boutique at a local high school in the United States, in collaboration with a class project at Wake Forest University. This project is about fashion, sustainability, but also about identity, style, self-expression. Most importantly, this project is a *movement*, as students in high school and in college reflect on their current consumption and environmental practices. The class, in conjunction with the larger project, aims to create and observe *environmental movers*.

OBJECTIVES

The “Handle with Care” project aims to promote self-expression, building confidence, looking and feeling good while *doing* good. In the formational high school and college years, students develop their own style and identity. The focus is on thrifting, recycling, upcycling, as well as the ability to knit, sew, crochet, make their own clothes by hand and take care of them long-term so that students learn and maintain life-long sustainable habits. The project is also about “coolness” so that students may embrace sustainability in fashion and fashion as sustainable in everyday life, influencing their peers and demonstrating that being chic and green is the way forward (see Fani et al., 2023; Denisova, 2021, Brooks et al., 2017).

This paper defines and investigates models of *environmental movers* (EM), based on a long-term collaboration and community-based project about fashion, sustainability, identity, with a focus on environmental solutions to ecological, class, and social justice.

Based on the “Handle with Care” community project and class, as well as other projects not

discussed in this paper, *environmental movers* are sustainable visionaries, young thrifters, recyclers, nature walkers, water savers, and often all of the above. *Environmental movers* act and argue from a perspective of abundance, respect for other people, animals, inanimate objects, nature, while advancing practices of care for all. *Environmental movers* engage arguments that move, as they maintain and sustain what they already have for the benefit of all.

The goal of this project is to create and engage life-long *environmental movers* who 1) resist current habits based on consumption and exclusive practices rooted in racial capitalism, and 2) return to relationships with people and nature from perspectives that trace back to indigenous communities (Kulnieks et al., 2013). *Environmental movers’* arguments are careful, inclusive, innovative, simple yet deep, old but new, daring while simmering.

METHOD: ENVIRONMENTALLY CHIC, NOW AND LATER?

The “Handle with Care” model follows the method of participatory critical rhetoric (Middleton et al., 2014, 2015a and 2015b; McKinnon et al., 2016, Alsakhita, 2024) as the team works collaboratively as co-creators in all aspects of the project, from curriculum design with undergraduate and graduate students, to the finalization of all details of the Chic Shack with teachers and students at the high school. This approach, as summarized by Alsakhita (2024), “centers individuals not merely as objects of the study but as co-creators of meaning of the narratives.” The examples in this paper are community-based case studies with students, teachers in the United States, as well as Italy. They demonstrate cross-cultural lessons for scholars and practitioners in fashion and sustainability (Shi, 2022). Students and teachers collaborate on pedagogical models that invite, persuade, and care for nature, and each other, horizontally and centrifugally.

The method includes a description and evaluation of the first two years of “Handle with Care”: the long-term collaboration and two classes, which includes Envirochic/Chic Shack, an environmental boutique planned, developed, and implemented with a local high school in the United States. This space provided a platform to explore and advocate for sustainability through fashion and style. All students participate in environmentally conscious “shopping” by either selecting donated

items they need or “paying” through donations of clothes, eco-currency, or by contributing their time and efforts to support the boutique.

“Handle with Care” includes two additional projects not discussed here: Amic(h)i(c) and COM Prom/Prom Shop. Amic(h)i(c), a combination of the word for “friends” in Italian (*amici*) and “chic,” is a cultural and sartorial exchange between high schoolers in the United States and Italy. Amic(h)i(c) mirrors the goals of “pen pals” to connect peers across different cultures (see Shi, 2022). Students exchange clothes, walking in each other’s used shoes/shirts/pants, learn about sustainability and develop strategies to avoid overconsumption. They also connect via email or social media to get to know each other and discuss their fashion and sustainability habits. COM Prom and Prom Shop is an end-of-the-school-year celebration developed, first, for an academic unit at Wake Forest University, and now a pilot for high schools in conjunction with the local school district. The goal is to collect donated prom dresses, suits, formal attire for all genders, then open a pop-up shop for all local high schoolers, so they can thrift and look/feel good for their end-of-the-year events.

In this paper, the focus is on Envirochic/Chic Shack, because of its successful opening as an environmentally friendly boutique for high school students, with the support and assistance of university students.

All three projects are still works-in-progress. After only two years, the goal is to impact students’ environmental practices for the future. The initial-albeit incomplete- reactions from students of the second class at the university, in the form of comments from their reflective assignments and from discussion groups, in addition to personal examples of successes, challenges, offer lessons for educators and administrators. The case-study cannot prove that students are and will be *environmental movers* forever. However, the model, including (in the appendix) the syllabus and the MOU with community partners, is for others to do, act, move toward their own environmentally chic habits based on abundance and respect for nature.

The “Handle with Care” model combines environmental justice theory with identity studies that center youth and the ways they build confidence and self-esteem based not on what they have but on who they are—encompassing race, gender, sexuality, religion, culture, nationality, origin, and mental and physical characteris-

tics. University and high-school students across the United States and Italy are invited to reuse, thrift, and express themselves through an environmentally friendly boutique that emulates the trendiest vintage shops in fashion capitals such as Milan and Paris.

This community-based collaboration is experiential and embodied (Burns et al., 2021), centering on *environmental movers* as already engaged in arguments that agitate (instead of regurgitating) because we/they listen and learn from each other, horizontally and centrifugally. *Environmental movers* use and learn from arguments that move through words and actions, toward sustainable practices in everyday fashion consumption. As a form of persuasion, environmental movers make arguments in *motu* (Keohane and Von Burg, 2023), moving through challenges and disagreements in discourses around sustainability, fashion, mobility, while advancing new possibilities for collaboration.

Responding specifically to this conference call to imagine fashion as prosperity, for a sustainably “chic” future, the “Handle with Care” team members are environmental movers. As an experiential and embodied model, the premise is one of abundance, asking students to pause and reflect on their own consumption and the effects their purchasing habits have on the environment. Students also reflect on their “why,” what personal reasons motivate them to connect and respect nature, not only for themselves but for others. The two basic principles of *environmental movers* (*abundance and nature*) serve as guiding goals for the class and the community projects. As opposed to fast fashion, online shopping, lack of awareness about labor practices, textile production, and even modes of packaging, students develop their own definition and find their own place within the environmental movement. As a long-term goal, the questions ask how and why this change may last: will students keep thinking and acting as *environmental movers*?

FINDINGS: ENVIROCHIC/CHIC SHACK

In the United States, local high schools often have a closet with donated clothes for students who show up with dirty, ruined, or poorly fitting clothes. The students who wear/use those clothes are mostly from low socioeconomic backgrounds, often from black/brown/indigenous/immigrant communi-

ties who may not have the means to dress “like” the other pupils. At times the clothes go to girls or others who are “under”-dressed, deemed too provocative for class. The pile of clothes is seldom exciting, rather a last resort for students who wear them begrudgingly. A team of college and high school faculty and students in the United States planned, prepared (even painted) and opened Chic Shack in April 2024. Originally called “Envirochic”, the space became the “Chic Shack” because of a student’s suggestion at the high school selected for this pilot: an environmental boutique planned, developed, and implemented by teachers and administrators, along with the high school students, to learn and practice arguments about fashion and sustainability.

At the Chic Shack, all students shop in environmentally conscious ways, taking items that they need. The initial idea for the boutique was to ask students to “pay” with donated clothes, or to develop an eco-currency, or to give back time/efforts toward managing or supporting the boutique. As of now, all clothes are free, to anyone who needs them, given that the local high school is a Title I school, meaning the school has a high percentage of students who qualify for assistance.

Envirochic/Chic Shack encourages a focus on the life span of clothes (how to take care of them, from washing to fixing them). The model is one of *caring for* fashion and *daring* to be oneself through thrifting, with a focus on circular modes of style. Envirochic/Chic Shack also invites students to share their passions, unique sense of self through unique pieces from their cultures, connecting sustainability to any curriculum (Seijas and Parra, 2022).

In addition to the Chic Shack being aesthetically pleasing (see pictures, figures 1, 2, 3), the most important aspect is the location, at the high school. The proximity to students and the accessibility of the space are central to the success of the space, so that students can get the clothes they need when they need them, without needing transportation on their own or from their peers/parents. As of 2023, only about a quarter of teen drivers (16-18) have a driver’s license, with lower numbers of young drivers having access to a car to go to school when coming from lower socio-economic backgrounds (Mathis, 2023). There is a list of local thrift stores available as additional shopping options. Some collaborate with the Chic Shack to offer vouchers or receive donations, but the Chic

Shack is unique in that it is conveniently located where students already spend their time in school (Fig. 01, Fig. 02).

The long-term plan is that the Chic Shack could serve as a pedagogical center to develop *environmental movers*. High school students learn and develop skills in sustainability, fashion, style, environmental consciousness, entrepreneurship, business management/economics, PR and marketing, as they plan, develop, furnish, and run Chic Shack. The model envisions high school students as peer-mentors who train new students to keep the model going, with the support of Wake students as mentors-the full syllabus and the list of learning outcomes and goals are in Appendix A.

Though the idea is unique, it is like other initiatives involving college students or teachers in collaborative fashion efforts. *Fashion Highlight Journal* presents the success of Rosato and colleagues (2024), who created an experimental study that removed college students from the barriers of exclusivity to the classroom and allowed student innovation of uniforms for a local railway company. The Chic Shack project, however, focuses on sustainability efforts of providing clothing options for youth in local schools. Both projects maintain an experiential learning aspect for college participants that allows students to interact collaboratively in a way that benefits themselves and others.

While working on the development and opening of the Chic Shack, the team presented the model to other educators and experts in environmental justice. They all praised the model for the two key principles of *environmental movers*: the focus on *abundance*, with copious donations of clothes and even funds to thrift for age-appropriate clothes. And the focus on *nature*, as the environmentally friendly boutique discourages over-consumption or unethical shopping, reminding that even those who need “new” clothes can bring home gently used ones.

DISCUSSION: RHETORIC AND SUSTAINABILITY IN THE CLASS AND BEYOND

When the team first agreed on the collaboration between Wake Forest University and the high school, the vision was for the completion of the environmentally friendly boutique (first named Envirotique, then Envirochic, and eventually Chic Shack) in 2 -3 months. The ambitious, not to say



Fig. 01

absurd, plan did not actualize in that timeframe because of the need for time and people. Before the university class was offered with the idea of college students mentoring younger students as they organized, opened, restocked, and managed the space, the local high-school teachers and staff participated in the preparation of the space. They invited a few high-schoolers who served as opinion leaders, spokespeople for their peers-without whom there would be no thrifting. The most important feedback from the high schoolers was about whether their peers would come to the Chic Shack. The students asked if they would support each other as thrifters, while selecting used clothes that had to be not only wearable but also desirable. “Coolness” must be the first thing on the high schoolers’ mind as they enter the Chic Shack, not need. As a Title I school, the Chic Shack is indeed a need for many, but it must remain a space for teens to navigate identity-building in a judgment-free zone. The supportive atmosphere, where students look out for one another without criticism, created the positive momentum that led to a successful opening day.

In the Fall of 2023 and Spring of 2024, college students, along with faculty, helped to

prepare the space by cleaning the area, painting, sorting and washing all donated clothes, then using donated and new furniture (racks, chairs, rugs, curtain for a dressing room) to make the space into a boutique. College graduate students and faculty had the opportunity to research high-end thrift stores in Milan, Italy, as well as Paris, France, and Barcelona, Spain, in addition to local second-hand stores. They implemented inspirations from those thrift stores to create a welcoming place, using lighting, colors, texture, coxy furniture, and of course the thrifted clothes.

On Earth Day, April 22, 2024, *environmental movers* came, thrifted, helped one another selecting clothes, and set aside a few items for their peers in Milan, for the clothes exchange. The university students prepared QR codes for mini-lectures about fashion and sustainability; supported the high school with PR material; and attended the grand opening as personal shoppers. The day was joyous, as about 300 high-schoolers, a third of the school, came through and left with thrifted clothes. As the Spring 2024 semester ended and the school year went into summer, the team reflected on the successes and opportunities for improvement, both for the class and, most



Fig. 02

importantly, for the Chic Shack. In May 2024, the first part of the cultural and sartorial exchange with the Lyceum in Italy took place.

In Fall 2024 and Spring 2025, the team is still working on a long-term sustainable model for the Chic Shack to operate by and for high school students. After a very successful and energizing grand opening in April 2024, during the summer, the heat/temperature change in the Chic Shack caused serious damage to the inventory. The team had to go back to work.

A generous donation and ongoing support for the model allowed a re-opening in October 2024, again with the support of the college students. They thrifted for new clothes and volunteered to receive community-donated supplies. The revamped space also included food for immediate consumption and to take home (Fig. 03).

In Fall 2024 and Spring 2025, pedagogically, two faculty and the teaching assistant, who was a student in the first class, redesigned some assignments with a more specific focus on environmental justice, and focused the first part of class on the project. The college students, from day one, understood the background and plan for the

Chic Shack and picked specific roles to help, from thrifting to PR/Marketing. With only one month to prepare for the re-opening, the students and the local school district staff worked with alacrity and purpose, and the reopening was also a success.

As a model for and by environmental movers, as a template for similar places for thrifting and learning, the Chic Shack offers several lessons, even as the team continues to collaborate with the high school and plans to create more environmentally friendly boutiques across town. The reflections serve as a self-evaluation and as an invitation for others to implement this model anywhere.

RECOMMENDATIONS FOR FUTURE PROJECTS

The main take-aways and recommendations for others to implement this model elsewhere center on the development of environmental movers, focusing on abundance and nature.

Abundance (of clothes, enthusiasm, time/it takes):

- There will be donations, but they must be high-quality and age appropriate;
- There must be a plan for intake (donations), for cleaning, and for display/on the shelves;
- Collaboration means all team members have an important role, listening and learning from all participants, especially the students who will be thrifting in the space;
- Beauty, intentionality, care for the space to be inviting, clean, colorful takes time, so teachers must encourage patience, while allowing those in need to shop through the preparation stage;
- The movement builds resistance to consumerism/capitalism.

Nature (focus on environmental justice, balance between need and sustainability, joy/chic-ness in thrifting):

- Focus on the “why,” importance of respect for nature and the environment, especially from an environmental justice perspective, highlighting differences in impact;
- Highlight the “coolness” of being environmentally friendly;
- Include discourses of care, for each other, for the clothes, finding a new home for them (lessons in laundry, sewing, upcycling);
- For college students, especially from a private university, invite learning about socio-economic differences and the reality of environmental justice close to their campus, understanding the



Fig. 03

context of their temporary home and reflecting on the inequalities in other areas, including their own home regions.

To evaluate the initial impact of the Chic Shack model and the pedagogical benefits for the college students, the second communication and environmental studies class, in Fall 2024, participated in voluntary discussion groups, led by a communication graduate student who had been participating and observing class meetings. The goal of the discussion group was twofold: first, to evaluate the class itself, beyond end-of-the semester evaluations from the first two classes; and secondly, to understand how and why the students may have changed their purchasing and consumption habits in relation to fashion and sustainability. While class assignments, including journals and reflective essays, do ask the students directly how and why the class material and the Chic Shack project may have impacted their everyday habits and long-term goals, the discussion groups allow more in-depth interactions among students, without the pressure of the grade. As of now, the team has not asked for feedback or conduct focus groups with the high school students, mostly due to the limited period of

operation of the Chic Shack, and because the high school students are not engaged in a class/curriculum that centers fashion and sustainability through an environmental justice perspective.

The class evaluations, comments, and reflections from college students as *environmental movers* were both positive and neutral, echoing what the “Handle with Care” team has highlighted above as ongoing plan to collaborate as university and high school students, teachers, administrators, and environmentally mind-full consumers.

CONCLUSION: MOVING TOWARD SUSTAINABILITY IN FASHION

At the center of the “Handle with Care” project and the Chic Shack, specifically, are *environmental movers*. After two years of working to prepare and to maintain the space, are students learning about abundance and nature? This paper presents the initial vision, model, implementation, and lessons from the community-class collaboration that led to the opening of an environmentally friendly boutique at a local high school.

The “Handle with Care” model focuses on sustainability and style, to promote and encourage meaningful and long-lasting eco-friendly habits. As *environmental movers*, the team promotes an inclusive and mindful community that invites everyone to express themselves as they are, during a critical time in the development of their self-esteem and creation of their own style.

The theory of environmental movers and the praxis of the Chic Shack are models of experiential learning, engaged and embodied experiences for both high school and college students to learn and, hopefully, remember and keep doing, moving. What will the students, as *environmental movers*, do as they observe and embrace abundance and nature? Will those who may have not experienced abundance agree to be “cool” with thrifted clothes? How does the overall trend toward thrifting and used clothes impact the sartorial choices of students? How may college and high school students from different socio-economic, racial, cultural backgrounds learn from each other and encounter their differences through clothes? Will they ever walk in each other’s used shoes? As a project rooted in environmental justice, the need to ask these questions and to explore solutions remains central, because a shared, sustainable future is never too much to handle, with care.

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Dr. French and Dr. Von Burg do not remember when they decided to embark on this project on fashion and sustainability, after almost 20 years of friendship and supportive spouses. We do remember the moment we sat with Ms Terry Matthews and Mr Matt Batten and learned about a possible space for a clothes' closet in a local high school. Ms Long-Williams, and eventually Ms Williams and other teachers, counselors, and administrators, invited us into their local high school, starting what would become a long-term collaboration. As educators, we immediately immersed students from an independent study to imagine, plan, work, paint, sort, observe, present, and teach. Farah and Gina, Communication graduate students, were part of every minute and every move, sorting clothes, painting, presenting locally and internationally. Alyse and Una led the way as fashion connoisseurs, implementing a pilot boutique before the Chic Shack. Sam, Vianney, Pratiti, and Maurice brought energy and expertise in the early stages of the project. Roksanna and Toni added their caring and critical contribution and attention to environmental justice. The university classes could literally not have taken place without students who were moved by the real impact of their contributions, taking ownership of all parts of the projects with their eyes and hearts on the high school students. For them, university and high school students, we keep moving, carefully.

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CAPTIONS

[Fig. 01] Detail from the Chic Shack, picture taken by the authors.

[Fig. 02] Detail from the Chic Shack, picture taken by the authors

[Fig. 03] Detail from the Chic Shack, picture taken by the authors.

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APPENDIX A-CLASS SYLLABUS (INTRODUCTION)

This seminar emerges from two semesters of independent study and a pilot class with graduate and undergraduate students designing the curriculum together. In addition to exploring various themes and examples of fashion and sustainability across Wake Forest, the local community, and other parts of the world, the independent study has led to a community collaboration with North Forsyth High School (NFHS) in Winston-Salem, NC. The NFHS students are working with Wake students to open and maintain Envirochic, a thrifting store. Two students from the Independent Study also developed a similar project at Casa Artom, Venice, Italy, so that the students, faculty, and staff can donate, use, and take clothes. Students may work on/with Envirochic and/or two additional projects (Amichic and Comechic, see details below).

The goals of this course include:

- Studying the rhetoric of fashion and thrifting, connecting discourses of style, culture, community with themes of sustainability and environmental justice.
- Tracing and interrogating supply to source patterns, their economic impact, and environmental impact.
- Connecting to campus and community partners (in addition to Envirochic and Casa Closet, the team works on a cross-cultural clothes exchange with a high school in Milan, Italy; the plan is also to develop initiatives in conjunction with CEES, the Office of Sustainability, Campus Garden, and maybe Athletics-one example may be working on sustainable/green Wake gear and athletic uniforms).
- Meeting and discussing key themes about fashion and sustainability with local experts/speakers who may share how and why they develop products/businesses/initiatives that combine environmental theory with identity studies (both in person and via zoom). Speakers will include local designers, artists, and scholars in fashion and sustainability.
- Reading material, both academic books/articles and resources from various industries/fields, to understand the history, the current practices, and the possibilities for the future of fashion and sustainability.
- Planning and organizing new events such as a fashion show, while connecting to existing and possibly new initiatives across campus and in the community.

As students, you will think, learn, and practice skills along modules on:

- Fashion, specific to thrifting, recycling, with a focus on minimalist and long-term clothing/slow fashion vs fast fashion.
- Sustainability and environmental justice, connected to above-focusing on all details/lifespan of clothes, from production chain, fabric, labor practices, location/transportation, and local impact/footprint on the communities where clothes are made.
- Sustainability and environmental practices in the selection, care, maintenance, and upkeep of all items of clothing, focusing on daily habits of use/reuse/rewear-ability, laundry skills. This could include, possibly, classes/workshops in sewing/knitting/stitching to design/make and maintain and repair items.
- Economic and social access to fashion, as well as the business of fashion, from high fashion practices to everyday use.
- Identity/self-esteem/style development, as an intentional and careful skill for students to feel and look good, comfortable, and express themselves as individuals and as representatives of their culture/s from various regions and parts of the world.
- Identity and self-expression development also as connected to family and cultural traditions and items that may carry sentimental value as heirlooms/mementos OR as crafting/creating new traditions for those who may have come to the US or NC with little or no possessions, or may have lost what they have due to various circumstances (natural disasters, family trauma...).
- Purchasing, shopping for items, and working with local thrift stores, as well as soliciting donations, to stock and maintain inventory in Envirochic and other community closets.
- Business/financial/accounting, possibly in conjunction with high school Economics class/es for students to develop a horizontal/circular model to raise and spend funds for new stock-this could develop into a special Envirochic currency or other egalitarian method of acquiring clothes and maintaining inventory.
- Interior design/furnishing to make Envirochic a welcoming, comfortable, and inviting space for all (an Engineering student already volunteered and designed the floor plan).
- PR/marketing/advertising/event planning/online presence/social media, designing and promoting Envirochic within the school and the community.
- Fund-raising and grant-writing, to sustain and maintain Envirochic and/or similar projects.
- Networking/professional development through meetings with local experts and site visits/field trips to local industries and thrift shops.
- Scaling up, as the high school Envirochic becomes a model for other schools locally and beyond (already a small boutique at Casa Artom, Venice, designed by the founder of the campus club Wayward Fashion).

APPENDIX B-MEMORANDUM OF UNDERSTANDING (MOU) WITH HIGH SCHOOLS

DRAFT MOU FOR THE “HANDLE WITH CARE” MODEL, STARTING WITH ENVIROCHIC

For interested teachers/clubs/high schools:

The larger “Handle with Care” model is a long-term partnership between Wake Forest University and local high schools, as well as high schools in Italy.

Envirochic (or different name selected by students) is an environmentally friendly and sustainable boutique for students. The first Envirochic (now “Chic Shack”) was first implemented at North Forsyth High School in Winston-Salem, NC, between 2022 and 2024.

As a team of Wake Forest University students and faculty, we had been studying fashion and sustainability, in preparation for and in the first class in the Spring 2024.

Meanwhile, at NFHS staff and teachers started with the plan to develop a clothes closet. The WSFCS director for community organizing and Wake Communication faculty met to discuss a possible collaboration, and the idea of a sustainable and environmentally conscious boutique emerged.

The goals of Envirochic (a name that also came from a NFHS student, building on the initial suggestion: Envirotique/ENVTQ, as part of the “Handle with Care” project) are:

1. Access to clean, fashionable, gently used clothes where students go to school, at the high school-without having to travel to get to a thrift store;
2. Basic yet bold engagement with sustainable and environmental practices that teach how to maintain, alter, and care for clothes long-term;
3. Confidence-building tools that empower students to express themselves and embrace their identity, culture, style.

What you need to start Envirochic/What we as Wake will/may do:

- Preparation/consultation
- Collaboration
- Workshops (only)

What the high school needs:

1. A faculty or staff member to lead, coordinate Envirochic and collaborate with Wake;
2. The space to host and maintain Envirochic;
3. Clothes, donated and gently used-at first to start the project, then ongoing to maintain it. The clothes should be cleaned/freshly laundered, OR marked as in need of cleaning-this may require lots of time to launder all donations. Only clean items are offered in the space;
4. Shelves, clothes racks, hangers, and other furniture (couch/chairs, lamps, mirrors), either as donations or in funds to purchase them;
5. Additional small items as necessary to beautify the space (art, lights, curtains);
6. A name (either Envirochic@school name or a unique name, with logo, in collaboration with students);
7. Volunteers/students/faculty/staff to prepare the space and all aspects of the project;
8. A long-term (2-3 years) plan and vision for the maintenance and sustainability of the space, the restock-

ing of clothes, and the management of Envirochic-we suggest connecting Envirochic to a specific faculty/class, or student club (for example, and Environmental Club or Student Government);

9. Plan an opening day and advertise/promote it to create excitement and buy-in from the students;
10. Optional: a sartorial and cultural exchange with a high school on Milan (one class at the time).

Our Budget between 2022 and 2024:

Donated Furniture \$0
Donated Clothes \$0
Paint \$200
Shelves \$300
Clothes Racks \$150
Hangers \$50
Miscellaneous \$50

TOTAL \$750

REWEAR, REDEFINE, CO-DESIGN

TOWARDS AN ONTOLOGY OF PRE-LOVED AND PERSONALIZED FASHION

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Competing Interests: The Author(s) declare(s) no conflict of interest

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Abstract

The concept of uniqueness is becoming increasingly central in consumer purchasing decisions, the desire for exclusivity and authenticity is manifested through the growing adoption of garments that enable individuals to express their identity, enhancing the personal value of the clothes they wear. This study explores the affective dimensions of fashion, focusing on the rise of hyper-personalized and pre-loved garments as key drivers of a paradigm of slower, sustainable consumption. Far from being simple trends, these practices enact significant transformation in how individuals and objects relate. Drawing on philosophical frameworks, the paper positions garments as transitional objects that embody personal and collective narratives, fostering emotional durability and a deeper connection with materiality. While hyper-personalization, empowered by digital interactivity, invites consumers to collaborate in the creative process, transforming garments into existential companions, the re-ontologisation of pre-loved garments challenges fast fashion's disposability, framing second-hand clothing as a means of ethical resistance and ontological continuity. These dynamics, intertwined with principles of slow fashion and circular economy, point to a broader socio-cultural shift toward inclusive prosperity, balancing individual well-being, environmental integrity, and social justice, reframing fashion as a critical practice renewing its role as a medium for reimagining a more sustainable and existentially resonant sartorial culture.

Keywords: *Pre-loved garments, Slow Fashion, Hyper-customization, Garments life-cycle, Fashion Studies*

INTRODUCTION

Fashion has always been a medium through which narratives are woven, identities defined, and relationships established. In a production landscape dominated by standardization and mass manufacturing, the value of uniqueness and relationality emerges as a form of cultural resistance. The growing significance of these principles is empowered by the rise of practices such as *hyper-personalization* and the adoption of *pre-loved* garments, which, going beyond the fulfilling of a mere esthetic desire, radically redefines the relationship between clothing and consumers. Expanding upon this relational ontology, the co-creation of a garment arises as a site of embodied intentionality in which the act of

design, thus reconceived, unfolds as a phenomenological encounter that transcends utility and enters the realm of meaning, memory, and ontological significance.

Hyper-personalization is made possible and encouraged by the accessibility of digital platforms that facilitate a high degree of interactivity; the possibility of being part of the creation process introduces a deep relational dimension to the purchasing experience through a direct involvement in the co-design process. This approach, which could be described as dialogical or *intra-active* (Barad, 2007), allows the individual to assume a participatory role, giving rise to a transformative experience that amplifies the garment's affective value, thereby reducing the likelihood of its rapid

disposal, embracing the path toward slow fashion. In this perspective, the garment becomes the product of a shared experience and, therefore, takes on a deeper role in the individual's existence as an integral part of their experiential horizon. Imbued with personal meanings, fashion transcends its material state, reconceptualizing its products as transitional objects, entities that are simultaneously *me* and *not me* (Winnicott, 1953). Through this practice, a dynamic interplay develops between subject and object, wherein fashion transcends its aesthetic or functional role to become a process of self-expression able to materialize the relation between body, material, and design (Merleau-Ponty, 1962). Beyond reinforcing the emotional bond with the garment, the co-design process simultaneously encourages critical reflection on the concept of consumption and promotes a model based on emotional durability while cultivating a deeper relationship between the individual and the product (Chapman, 2005). By fostering a stronger emotional connection and encouraging mindful engagement in the design process, hyper-personalization emerges as a practice increasingly aligned with the *ethos* of slow fashion, advocating for longevity, sustainability, and a more responsible approach to consumption (Fletcher, 2010).

In a comparable manner, the growing interest in pre-loved garments, valued for their past and thus for the emotional connections intrinsic to their histories, reflects a significant cultural transformation in consumer preferences. As observed by Chapman (2005), previously cherished garments acquire a dual value, both historical and subjective, transcending the traditional stigma associated with second-hand clothing. These trends are interconnected by a broader thread linking fashion, individual affectivity, and collective well-being, paving the way for a renewed emphasis on the concepts of durability and *inclusive prosperity* (Latouche, 2012) and positioning fashion as a vehicle able to promote balance between consumer satisfaction, environmental integrity, and social justice (Black, 2012). In this context, prosperity is thus redefined as an inclusive concept that considers the well-being of the global financial, environmental, and social ecosystems (Latouche, 2012), wherein the principles of the sufficiency economy and regenerative design provide effective guidelines for a sustainable future (Antonelli, 2019). By extending the life cycle of garments and fostering a culture of reuse and repair, these

evolving consumer practices contribute to the broader framework of the circular economy, which seeks to minimize waste and maximize the regenerative potential of materials within the fashion industry (Ellen MacArthur Foundation, 2017). This emerging paradigm perfectly aligns with the principles of slow fashion, which advocates for a more reflective and sustainable approach to clothing consumption (Fletcher, 2010). By fostering an affective bond with garments, whether through hyper-personalization or reverence for pre-loved clothing, individuals are encouraged to extend the lifespan of their wardrobes, thereby challenging the prevailing culture of disposability (Clark, 2008). This reconceptualization of fashion as an experiential and relational entity has the potential to offer an antidote to the alienation of consumption, reinstating garments as subjects of a reciprocal relationship rather than objects of passive acquisition (Gentina et al., 2016).

To fully understand the move toward a more reciprocal and meaningful relationship with clothing, this paper aims to examine the underlying ontology of pre-loved and personalized fashion, exploring how these practices challenge conventional notions of consumption, moving beyond mere commodities to become vessels of personal and collective narratives, imbued with affective meaning and ethical significance.

FASHION AS AN AFFECTIVE AND PHENOMENOLOGICAL PHENOMENON

The affective and phenomenological approach to fashion has been, and continues to be, the subject of numerous investigations rooted in material culture and fashion studies. Phenomenology, as developed by thinkers like Merleau-Ponty, seeks to understand the world as it appears to us through our senses and consciousness, focusing on the embodied and subjective nature of human experience (Merleau-Ponty, 1962). The anthropologist Daniel Miller gave a fundamental perspective on the themes of relationship-building and the fluidity between people and objects, exploring how material culture influences social relationships and how objects mediate human interactions (Miller, 2008). On the other hand, beyond the realm of the humanities, this essay, in delving into such a specific domain as the relational, finds it essential to engage with psychoanalytic thought. The studies of the British psychoanalyst and pediatrician Donald



Fig. 01

Winnicott proves instrumental in the role of garments as transitional objects, capable of bearing traces of our being-in-the-world, documenting corporeal interactions with reality and intertwining the lived corporeal experience with the affective and relational dynamics of human existence (Schilder, 1935; Winnicott, 1953).

This relational dimension also extends to the social fabric, where garments act as mediators between the individual and the collectivity. Through practices such as reusing garments or preserving items previously owned by others, pre-loved clothing becomes an instrument of affective continuity, capable of transcending temporality and establishing a connection between past, present, and future (Fig. 01). Langh (2022) introduces the concept of *bleeding garments*, referring to clothing that seems to exude emotions, maintaining an almost *magical* bond with the people, places, and moments with which they have been associated. This connection cannot be replaced or replicated, not even through images or memories, as it is the garment itself that embodies memory and emotional energy. Langh (2022) affirms that recognizing and valuing this affective domain means honoring their poetic potential,

making the complexity of the human relationship with materiality finally visible. Thus, garments do not merely function as interfaces between the self and the external world but act as material archives of experiences, relationships, and personal narratives. Weiner and Schneider (1989) emphasize that fabric, with its fragility and malleability serves as a *symbol of resilience*, carrying fragments of the past and reflecting the individual's ability to transform emotions into memory and connection.

Analogously, the experience of co-creating generates a profound relationship with the artifact, transforming the design process into a phenomenological act. When the individual actively participates in designing their garment, a dialogue is established between body, mind, and material. This process is not merely technical but ontological: the act of choosing a fabric, a color, or a cut becomes an intentional gesture in which the self is projected onto the material, infusing the garment with a part of their identity. Creating a garment thus assumes the significance of giving visible form to a personal discourse, intertwining aesthetic and subjective dimensions, and transforming these artefacts into tangible fragments of one's embodied being. Schneider (2006) emphasizes that,

in these moments of co-creation, the fabric ceases to be neutral material and becomes a relational medium capable of connecting the individual to the surrounding world and their inner self. As highlighted by Langh (2022), this emotional attachment with the co-created and, therefore, personalized artifact renders the garment a unique *material archive*, imbued not only with memories but also with the creative process that generated it.

In her book *Loved Clothes Last*, the writer Orsola de Castro (2021) underscores a crucial factor for the narrative of this contribution: the close correlation between emotional attachment and garment durability. In an ecosystem marked by resource scarcity and ecological fragility, the sentimental relation to garments becomes a strategic theme for rethinking design and consumption, emphasizing an ethic that accounts not only for human needs but also for the responsibilities inherent in fostering global and shared prosperity (Barad, 2007; Filippello & Bucci, 2019). This emphasis on emotional attachment and its impact on durability takes tangible form through the daily, embodied experience of wearing and interacting with our clothes. Having explored the affective and phenomenological dimensions of fashion, it is essential to analyze how these are concretely manifested through the embodied narratives in garments.

EMBODIED NARRATIVES: THE AFFECTIVE MATERIALITY OF GARMENTS

As previously explored, fashion operates as an affective and phenomenological experience, shaped by insights from anthropology, psychoanalysis, and philosophy. The focus now shifts from theoretical perspectives to their material manifestations, examining how these dynamics unfold in the realm of embodied narratives and the affective materiality of garments. As Findlay (2016) observes, dressing practices encompass a complex sensory process rooted in the corporeal relationship with the material itself, embodying a profoundly affective and phenomenological manifestation of human experience. Phenomenology, as developed by thinkers like Merleau-Ponty, seeks to understand the world as it appears to us through our senses and consciousness, focusing on the embodied and subjective nature of human experience. In the context of fashion, this means examining how garments shape our perceptions, emotions,

and sense of self, becoming an integral part of embodied subjectivity (Merleau-Ponty, 1962). According to Merleau-Ponty (1962), the interaction between the body and the material world is mediated by an intentional relationship in which the garment is not simply worn but experienced as an *extension of the body schema*.

Schilder (1935) defines this pattern as a dynamic configuration that does not terminate at the physical limits of the skin but expands through interaction with external objects, such as clothing. This corporeal extension imbues garments with a significance that transcends their practical function, transforming them into *material companions* of human existence, capable of recording emotions and experiences. A leather jacket, softened and molded to the wearer's body over years of use, or a comfortable sweater, knitted by a loved one and worn through countless evenings at home, transforms into a sensory artifact, offering a sense of warmth, security, and connection. The materiality of fabrics itself contributes to shaping the evocative nature of garments: its softness, flexibility, and inherent fragility reflect human vulnerability, establishing a parallel between the skin and the material that envelops it (Weiner & Schneider, 1989). As De Castro asserts, "Clothes are our chosen skin. We can use them to speak about our principles, demand a positive change and make sure that what makes us feel good about ourselves is also an instrument to bring good to others" (De Castro, 2021, p.11).

The fabric, with its ability to mold itself to the body and capture its movement, represents a sensory medium that bonds the individual to the materiality of the world. Schneider (2006) underscores its connective potential, both in a relational perspective as in a spiritual one. This connection becomes particularly intense in moments of crisis or loss, where garments reinforce their role as transitional objects (Winnicott, 1953). In this context, garments are not merely carriers of memory but materialize genuine emotional relics, capable of evoking a sense of presence through their physical contact with the body. A grandmother's wedding dress, a concert t-shirt, faded and worn from years of wear or a dress worn on a first date can become charged with emotional significance, serving as tangible reminders of pivotal moments in one's life.

From this perspective Remo Bodei's thought is particularly significant, highlighting the

profound difference: ‘The meaning of “thing” is broader than that of “object,” as it also encompasses people or ideals and, more generally, everything that matters and is close to one’s heart’ (Bodei, 2009, p.32). Western tradition has often devalued emotional bond to material objects, considering it a regressive or superficial phenomenon. In this perspective Miller (2006) highlights how materialism has historically been interpreted as a threat to the purity of human experience, while Lipovetsky (1994), as cited in Attfield (2000), criticizes fashion for transforming garments into homogenized consumer objects stripped of authenticity and meaning. Nonetheless, this vision overlooks garments’ intrinsic affective and evocative potential, which extends beyond their aesthetic or utilitarian function.

PRE-LOVED GARMENTS: TOWARD A PHENOMENOLOGY OF AUTHENTICITY

The previous chapter examined the emotional and sensory dimensions of garments, attention now shifts to a particular category of clothing that exemplifies these qualities with distinct significance: pre-loved garments. Investigating the phenomenology of authenticity within the realm of second-hand fashion offers deeper insight into the shifting values and evolving consumption patterns that are redefining the industry’s future. Within the fast fashion landscape, characterized by homogeneity and mass production, the value of uniqueness assumes a renewed centrality. Limited capsule collections, craftsmanship, and personalization emerge as responses to the alienation provoked by the standardization of consumption, restoring meaning and depth to products (Franke & Schreier, 2008). The adoption of pre-loved garments represents a practice that destabilizes the dominant representation of fashion as a phenomenon of rapid and replaceable consumption, transcending the material state of garments, thus fostering an emotional connection with stories and meanings otherwise lost. Acquiring a pre-loved garment, therefore, signifies participating in a collective narrative, appropriating an object that carries with it the traces of a lived experience, engendering a conscious philosophical act that challenges planned obsolescence and the culture of replacement (Cervellon et al., 2012). The intersection between uniqueness and pre-loved garments is manifested in the latter’s ability to

embody an authentic and unrepeatable value. Roux and Guiot (2008) underline that the motivations behind purchasing second-hand goods include both practical considerations and affective needs, reconfiguring the used object as an emotional witness. Visible wear, imperfections, and signs of use transform into *marks of authenticity*, standing in deep contrast to the anonymity of industrial production (Roux & Guiot, 2008). Uniqueness, in this context, far from being merely an aesthetic attribute, stands as an ethical and existential principle that redefines the role of fashion in the construction of subjectivity. Pre-loved garments constitute a particularly significant category within the context of affective value, as they embody a layered temporality, an interweaving of individual and collective memories. This phenomenon, which could be interpreted through the lens of the *phenomenology of memory* (Ricoeur, 2004), transforms consumption into an act of narrative appropriation, wherein the new owner intertwines his own story with that already embedded within the fabric. In this perspective, Naomi Klein’s words seem more relevant than ever: “A fresh generation is marching for revolution, and they want to wear clothes that tell a new story. Let’s give it to them.” (Klein, 2019).

Traditionally, the second-hand clothing market has been primarily associated with the informal economy, often perceived as a marginal sector or one catering to specific consumer niches. However, this segment has experienced significant growth in recent years, establishing itself as a substantial component of the global economy. Numerous companies have decided to incorporate this strategy into their product management; among them, Patagonia has been a pioneer in this field: its *Worn Wear Program* encourages customers to return used garments, which are then repaired and resold (Talkbacks, n.d.), contributing to the philosophy of circular consumption (Fig.02). Analogously, Gucci has launched the *Vault Project*, a platform combining vintage fashion with reinterpreted archival pieces. According to a GlobalData report for ThredUp, the global second-hand clothing market is projected to reach \$350 billion by 2028, with a compound annual growth rate (CAGR) of 12% (FashionUnited). Following these principles, even the online market contributes to fostering a circular idea of fashion: a considerable number of websites have emerged explicitly with the purpose of facilitating the exchange or sale of



Fig. 02

second-hand clothing. Vestiaire Collective, founded in Paris on October 14, 2009, reported a turnover of €12.4 million after only 5 years, by 2014. On the same trajectory, a proliferation of similar platforms has been observed: Vinted, The RealReal, Depop, and ThredUp are just a few of the many rapidly growing companies in this sector.

As observed by Crane (2012), it thus becomes evident, that contemporary fashion is moving away from standardization toward a model that celebrates diversity and authenticity as central values. From this perspective, both the hyper-customization of unique products and pre-loved items represent a resistance to the superficiality of consumption, turning fashion into an opportunity to rethink the whole relationship between consumer and product. Through the lens of circular fashion, these garments provide a sense of continuity and belonging; their materiality becomes a medium through which the consumer's identity is reflected and reconfigured in a continuous dialogue between memory and desire (Fletcher & Grose, 2012).

HYPER-PERSONALIZATION: UNIQUENESS AS AN ONTOLOGICAL PERSPECTIVE

The aspiration to uniqueness thus constitutes a foundational trait of human self-expression and it finds in fashion to be one of its most tangible manifestations. The desire to distinguish oneself through what one wears, embodies a form of ontological self-affirmation: the act of dressing contributes to the the construction of the self (Franke & Schreier, 2008). In this perspective, fashion takes shape as a symbolic language through which the individual communicates his style and his phenomenological existence. As theorized by Franke and Schreier (2008), this trajectory of appropriation imbues the object with heightened emotional resonance, fostering a deep sense of attachment that naturally encourages longer retention and, in turn, improves its durability.

A practical example is provided by the brand *Nike By You* (formerly *NikeiD*), which allows customers to personalize sneakers by personally selecting colors, materials, and details. According to a study conducted by Deloitte (2015), 36% of consumers express interest in purchasing personalized products, with this percentage rising to 42% among individuals aged 16 to 24 (Virid, n.d.). These figures illustrate how personalization is particularly appealing to younger generations, who view the creative act as a means to express their individuality. From this perspective, personalization assumes the role of a relational practice, wherein the consumer actively participates in creating the product. This process transforms the consumer into a co-creator, establishing a profound emotional bond between the object and its maker, thereby reducing the likelihood of its rapid disposal or, worse, neglect it. Norton, Mochon, and Ariely (2012) demonstrate this bond through the IKEA Effect, observing that the perceived value of an object increases by 20-25% when the consumer actively contributes to its creation.

Personalization also entails an ethical responsibility; when the consumer becomes a co-creator, he is consequently more inclined to value and preserve the product, thereby mitigating rapid consumption cycles. Mugge, Schoormans, and Schifferstein (2009) demonstrate that personalized products are 50% more likely to be repaired or retained compared to standard products. A notable example of this approach is Levi's Tailor Shop, where customers can personalize their

WORN  WEAR

BETTER
THAN NEW

patagonia

Fig. 03

jeans by adding embroidery, patches, or structural modifications. In addition to fostering an emotional connection with the garment, this conscious act encourages sustainable practices such as repair and reuse. Levi's reported a 10% increase in sales for personalization services between 2019 and 2021, indicating that consumers are willing to invest in products they perceive as their own (Fig.03). Franke and Schreier (2008) also demonstrate that 81% of consumers are willing to pay a premium for personalized products, as they perceive them as reflections of their individuality. This trend is extensively explored in the luxury sector: fashion companies like Louis Vuitton and Burberry offer personalization services, enabling customers to add initials or exclusive details to their products. This approach led Louis Vuitton to record a 12% increase in sales of personalized products between 2018 and 2022, illustrating that uniqueness can also constitute a powerful economic and cultural driver.

Schmitt (1999) states that consumers who engage in the creative process develop a stronger attachment to products, reducing the desire for replacement, demonstrating, once again, that the emotional value of personalized products serves

as a compelling incentive for fostering more mindful consumption. Another example of a company embracing this strategy is Adidas, with the initiative *Made for You*, a line of customizable sportswear entirely produced on demand. This system reduces waste by 30%, as garments are produced according to the customer configuration. According to a McKinsey report (2021), adopting personalization models on an industrial scale could reduce fashion waste by 10-20% by 2030, highlighting its potential as a significant driver for environmental sustainability. Thus, garments consumers' co-creation represents far more than a commercial trend: it is a critical statement, intertwining aesthetics, ethics, and sustainability. Hyper-personalization in the fashion sector, indeed, other than offering the opportunity to stand out, can support the deceleration of the consumption cycle, promoting a culture of value and durability. In this sense, it can be regarded as a valuable instrument for reconstructing a more human and responsible relationship with the objects surrounding us.

CONCLUSION

The concept of *Slow Fashion*, firstly introduced in 2007 by designer Kate Fletcher, encapsulates the principles articulated in this discussion by advocating for a slower, more deliberate, and conscious approach to fashion consumption. In her work *Fashion-ology: An Introduction to Fashion Studies*, Kawamura thoroughly examines this concept, positioning it as a direct critique of the dominant consumerist paradigms (Kawamura, 2005). Her analysis reassigns garments the ontological status of objects capable of mirroring and enriching the subject's lived experience.

From this vantage point, hyper-personalization and pre-loved garments transcend trends, constituting instead tangible philosophical constructs that interrogate and disrupt the prevailing logic of consumption. These categories restore the primacy of relationality between individual and object within the sartorial realm. Through these practices, fashion reclaims its poietic dimension, no longer confined to an instrument of aesthetic display but, instead, a medium through which authenticity and sustainability are actively explored within an increasingly homogenized global landscape.

Empirical evidence provided by Mugge, Schoormans, and Schifferstein (2009) underscores that affective bond to garments significantly prolongs their lifecycle. This engagement with sartorial objects functions as a countermeasure to disposability, cultivating a temporally and ethically deliberate consumption mode. The affective turn in fashion studies foregrounds human-clothing interaction's embodied, sensorial, and material dimensions, thereby reorienting discourse away from symbolic or utilitarian frameworks (Ravnløkke et al., 2023). In this sense, the words of philosopher Bodei perfectly describe this relationship:

We invest objects intellectually and emotionally, endowing them with meaning and sentimental qualities, wrapping them in treasures of desire or repulsive coverings, framing them within systems of relationships, and embedding them in stories that we can reconstruct, stories that concern ourselves or others (Bodei, 2009, p.23).

Through this lens, fashion emerges as a profoundly relational practice, mediating between the human body and the material world. Such an approach opens new avenues for sustainable design,

emphasizing practices that valorize the intricate bond between corporeality and matter. In this framework, sustainability transcends its reduction to technical solutions, positioning itself as an ethical imperative: an invitation to reconceptualize our emotional and existential relationship with materiality (Fletcher & Grose, 2012). This affective approach provides a novel paradigm for rethinking sartorial practices, integrating body, emotion, and physicality into an ongoing philosophical dialogue. In this expanded vision, garments become sites of epistemological inquiry, agents of connection, and facilitators of an ethics grounded in sustainability. Orsola de Castro eloquently encapsulates this perspective in her work *Loved Clothes Last* (Fig. 04):

We shouldn't be measuring a garment's value by its price tag, but by the purpose it has in our life. We should own it because we love it, and because we love it, we should want to keep it forever, consume it, wear it to death (De Castro, 2021, p. 2).

Under this reinterpretation, fashion transcends its industrial constraints and assumes the character of an ethical practice, inviting us to rethink our modes of being-in-the-world through the entwinement of body and materiality. The affective dimension of garments emerges as a form of strategic resistance to the accelerated rhythms of contemporary consumption, advocating instead for a slower, more reflective engagement with objects, one that paves the way toward shared prosperity.

CAPTIONS

[Fig. 01] The storefront of "SecondAbbey – The Shop of Pre-Loved Clothes" visually embodies the cultural and affective reevaluation of second-hand garments. Source: "SecondAbbey – The Shop of Pre-Loved Clothes", photograph by Gary Butterfield, licensed under CC BY 2.0.

[Fig. 02] A campaign image from "Loved Clothes Last" by Orsola de Castro, celebrating the emotional durability of garments through personal narratives. Source: "A Love Letter to My Dungarees", Orsola de Castro, Fashion Revolution, licensed under CC BY-NC-ND.

[Fig. 03] Promotional visual from Patagonia's Worn Wear initiative, which encourages the repair, reuse, and resale of used garments. The slogan "Better Than New" challenges traditional notions of value, advocating for emotional durability and environmental responsibility. Source: Patagonia, Worn Wear campaign (n.d.). Reproduced under fair use for academic purposes.

[Fig. 04] Interior view of Levi's Tailor Shop in Mexico City (CDMX), a space dedicated to customization, repair, and co-creation. Source: Levi's Tailor Shop, Madero CDMX.



Fig. 04

Image © Levi Strauss & Co., used for illustrative purposes under fair use.

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