FROM SHEEP TO SHELF

A CASE STUDY ON CIRCULARITY AND VALUE-SHARING IN AUSTRALIAN WOOL'S GLOBAL VALUE CHAIN

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Abstract

Wool, as a natural and renewable fibre, embodies the core principles of a circular economy through its durability, biodegradability, recyclability into value-added products, extending its utility. Unlike many textiles that were produced locally, wool has been part of a global supply chain since the Middle Ages, spanning large-scale farming and cloth production across different regions. Despite its historical significance, wool now represents just 1% of total fibre production, with demand steadily decreasing due to compounded factors, including criticism over animal welfare and negative environmental assessments. This paper uses Timothy Morton's (2013) concept of hyperobjects, alongside animal ethics and environmental sustainability, to explore wool as a material and cultural fibre embodying vast, interconnected processes across time and space, bridging agriculture, manufacturing and design. It presents the case of M.J. Bale, an Australian menswear brand, and global partners including a Tasmanian grower, Italian spinners and weavers, and Japanese tailors. In Australia, wool's rich cultural heritage is tied to the nation's history and economy, yet the country retains little manufacturing. The paper advocates for value-shoring, a partial deglobalisation approach where supply chain partnerships are based on shared environmental, ethical, and social values.

Keywords: *Wool; Hyperobjects; Animal ethics; Australia; Value-shoring*

INTRODUCTION AND RESEARCH ISSUE

Wool production has existed for millennia: first as local, household production, and with the growth of cities and population in the Middle Ages, as the product of large-scale farming and manufacturing practice across Europe, from the Mediterranean to England (Power 1941). The production of wool involves numerous actors and processes for breeding, grazing, shearing, washing, spinning and weaving, with the fibre stretching across many geographical and cultural contexts. Sheep are key agents in this process, as producers of wool and part of a larger ecosystem as their grazing patterns and interaction with the environment impact the land and ecosystems they inhabit. As such, wool is a natural and renewable fibre that straddles between two industries, the agricultural and the cultural through fashion and textiles, embedding material and immaterial values. As an agricultural industry, it embeds material values related to husbandry maintenance and the environment, and immaterial values related to animal ethics (Ferrero-Regis 2020). As part of the fashion industry, wool embeds both material values through processing, manufacturing, and immaterial values through designing according to styles and trends (Ferrero-Regis 2020). As a fibre, wool inherently supports the principles of a circular economy through its durability, biodegradability and recyclability. However, it is crucial to note that being a circular fibre does not equate to sustainability, as each state of production

must be critically examined. As Segre-Reinach (2022) points out, the living animal often disappears from view during the fashion production process but resurfaces in both the physical material and the symbolic meaning of the final product.

In this article, 'wool' specifically refers to Merino wool, which is predominately produced and exported by Australia. Wool holds a significant cultural and economic place in Australia's history, once serving as the country's primary fibre until the 1950s when it was gradually overtaken by synthetic fibres like nylon and polyester, as well as natural fibres like cotton (Ferrero-Regis, 2020). Globally, demand for woollen garments has gradually diminished due also to volatile trading patterns. Wool currently accounts for only 1% of the world's global fibre market (Textile Exchange 2023). Despite this, Australia remains the largest exporter of Merino wool, accounting for 80% of global supply, while experiencing a significant decline in its domestic manufacturing capabilities, with much of the processing shifting to China (Australian Wool Innovation Limited, n.d.). A Deloitte (2024) feasibility report suggests that relocating portions of the wool supply chain back to Australia is only viable with substantial government and private investment. Australian Merino wool is highly regarded for its quality, with finer fibres below 18.5 microns that are soft and suitable for high-end fashion, while coarser wool is typically used for more robust products like carpets or blankets. The premium nature of Merino wool contrasts with fibres like cotton, which, despite having a larger market share, generally occupies a lower price bracket in the global market.

This paper investigates wool as both a material and immaterial fibre, whose manufacturing process has been connected to cultural practices across the planet for a long time. Through the case study of the Australian wool brand, M.J. Bale, this paper examines the brand's leadership in wool and its commitment to responsibility, provenance and circularity, achieved through a collaborative network involving Tasmanian growers, Italian spinners and weavers and Japanese tailors. The paper argues for 'value-shoring', a process of partial deglobalisation and supply chain shortening that favours collaboration between companies with shared environmental, ethical and social values. Timothy Morton's (2013) idea of hyperobjects supports this paper's analysis of wool's position as an object dispersed in space and time, from farm through to in its final form as a designed and manufactured object as a fashion product on the shelf.

METHOD

This paper adopts a value chain methodological approach to investigate the complex processes involved in wool production, presenting a case study of the Australian menswear brand M.J. Bale, and its collaboration with Simon Cameron and Vitale Barberis Canonico (VBC). The study builds on fieldwork conducted in Tasmania in 2018 with Cameron, owner of Kingston Wool Farm and the prior research and publications of lead author. It expands on this foundation with further research, including an interview conducted by both authors with M.J. Bale's Sustainability Manager, Athena Savvas, in 2024. The interview focused on how value-shoring supports the brand's transition towards a circular economy. Field work, interviews and publicly available reports from the fashion industry government and non-government organisations, enabled cross-checking of sustainability and animal ethics information and claims on the businesses' websites.

THEORETICAL FRAMEWORK

Wool's production is a process that spans years, from the breeding of sheep to the final product, and its supply chain is extensive, from wool farming in different regions of the planet, stretching from India, to South Africa, South America, China, Australia and New Zealand, to the long process leading to a clean wool fibre and spinning and weaving (fig. 01). This wool is a material that embodies vast, interconnected processes across time and space. Morton's (2013) concept of hyperobjects, alongside animal ethics and environmental sustainability supports the theoretical framework and the findings of this paper. According to Morton (2013), hyperobjects are entities so massively distributed across time and space that they transcend local contexts and are difficult for humans to fully comprehend. Morton's (2013) framework is particularly relevant to understanding wool's position in the textile global value chain. Although Morton (2013) does not expand on animals as part of hyperobjects' systems, he does consider planetary flows and human interventions. By conceptualising wool through Morton's (2013) hyperobjects framework, this study

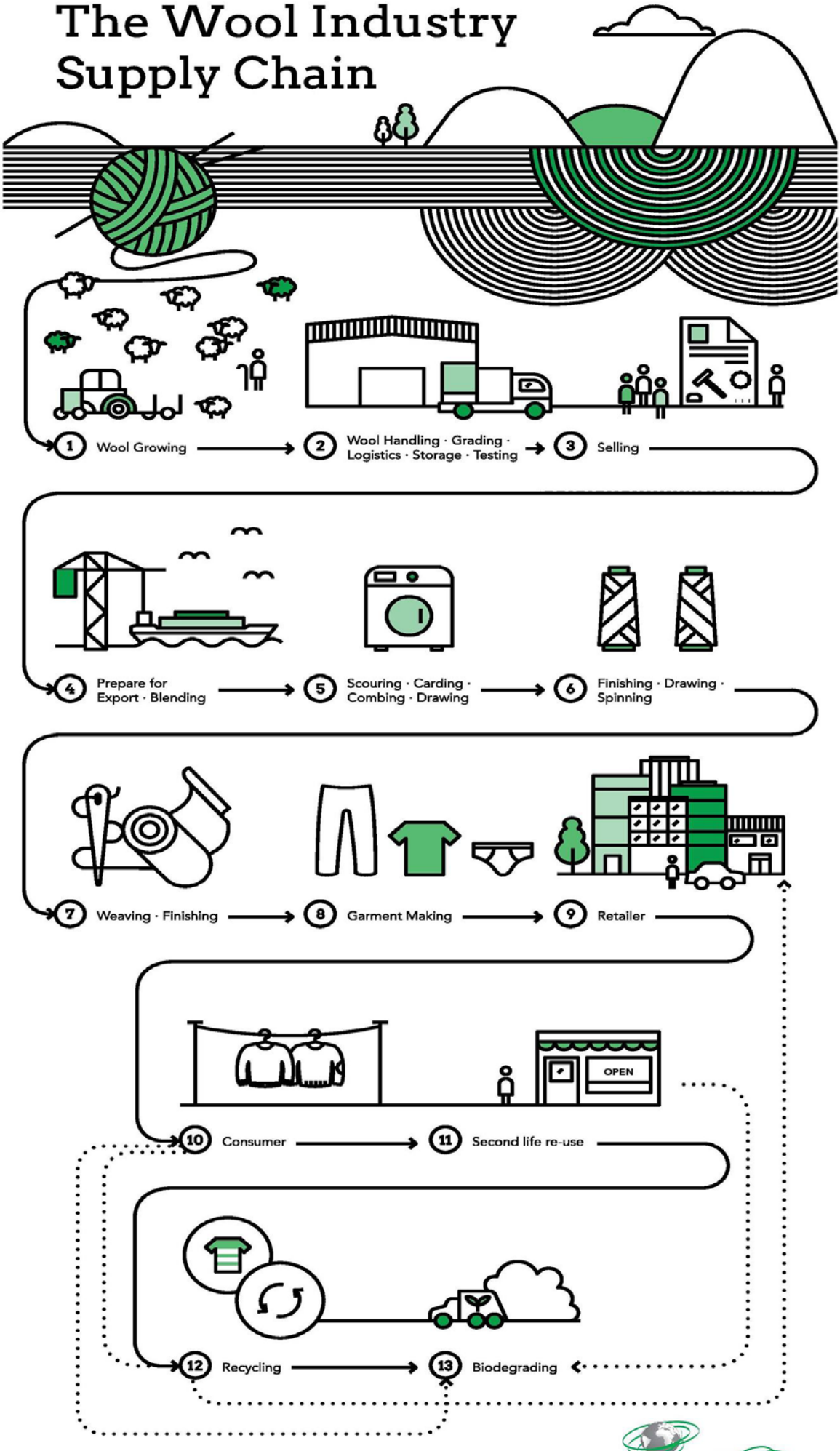
The Wool Industry
Supply Chain
1 Wool Growing
2 Wool Handling · Grading · Logistics · Storage · Testing
3 Selling
4 Prepare for Export · Blending
5 Scouring · Carding · Combing · Drawing
6 Finishing · Drawing · Spinning
7 Weaving · Finishing
8 Garment Making
9 Retailer
OPEN
10 Consumer
11 Second life re-use
12 Recycling
13 Biodegrading
INTERNATIONAL WOOL TEXTILE ORGANISATION
IWTO

Fig. 01

capture the object's inherent complexity.
The collaboration between M.J. Bale, Italian spinners and weavers, and Japanese and Chinese tailors in the creation of the Kingston Line, redefines wool's global value chain by focussing on environmental and ethical values, challenging the traditionally economy-driven distribution of materials and practices across geographies that form hyperobjects. This value-shoring, also akin to friend-shoring (Attinasi et al 2023), can include sourcing materials from farmers known for their low-impact grazing, humane treatment of sheep or practicing regenerative agriculture; working with manufacturers who specialise in processing fine wool; and preserving traditional localised practices in tailoring. However, while companies may share similar values, this alignment does not inherently increase sustainability or ethical practices in the value chain as other companies in the supply chain may tend to continue to prioritise traditional approaches and cost-efficiency and mass production. Instead, a value-shoring approach focuses on creating value through ethical and sustainable practices, which is built on each actor's engagement with the environment, ethics, circularity and re-establishment of locality and heritage. This case study also examines the limitations of this approach, particularly in the context of global pressures and the complexities of the wool supply chain. In this context, the term 'supply chain' is used to describes the general linear movement of goods from raw material to final product, while 'value chain' refers to discrete chains and their value-add processes and stakeholder interactions.

ETHICAL DIMENSION OF WOOL PRODUCTION

Sheep, described as a "key animal in the history of farming" (Morehead, 2014, p. 1), hold a significant and long-standing role in human culture. The wool industry involves a diverse range of actors—producers, manufacturers, and consumers—all contributing to the complex processes that shape wool as a commodity (Pawson & Perkins, 2013). Human labour, especially in rural communities, plays an essential role throughout the wool lifecycle, from selective breeding and sheep care to the labour-intensive practice of shearing. These traditions, deeply rooted in cultural history, reflect the evolving human-sheep relationship in wool production and highlight emerging conversations on posthumanism and post-anthropocentrism (Braidotti, 2013). This shift raises critical ethical questions about the treatment of sheep and human responsibilities toward these sentient beings, urging a rethinking of human-animal relationships within the wool industry, particularly in the context of sustainability and circularity.
Since the release of Peter Singer's (2015) *Animal Liberation* nearly 50 years ago, the distinctions between human and non-human, particularly animals, have become blurred, prompting a revaluation of the forms of agency, and compelling the fashion industry to acknowledge the importance of animal welfare. Over the past decade, a shift in fashion studies towards ethics, inequalities and decoloniality has culminated in the emergence of a strong ethical and political orientation of critical fashion studies in the early 2020s (Segre-Reinach 2022). This shift towards integrating animals into complex system thinking has introduced new challenges, questions, possibilities and resolutions within the wool industry. The intersection of posthumanism and critical fashion studies has prompted organisations like PETA to advocate for animal liberation, particularly raising awareness about animal abuse in the fashion industry. Wool is often cited as a problematic animal-derived product as it is not 'natural' due to selective breeding. This refers to the Australian Merino sheep as the result of crossbreeding, initiated from Iberian Merinos, and continuing from the end of 1700s when the Merino sheep was imported to the country (Woolmark Company, n.d.). The effect of crossbreeding has led to high-quality wool production for economic gain, however this genetic mark-up is now engendered in the animal, which must be shorn regularly to prevent death. Because of its high genetic diversity, there may be the possibility to breed the Merino sheep back to a century ago (Kijas et al 2012). However, it would be impossible to re-wild a sheep that has moved places since the Neolithic.

ENVIRONMENTAL DIMENSION OF WOOL PRODUCTION

Wool's complex global value chain from farming to retail and disposal means the fibre's environmental footprint, such as greenhouse gas emissions from sheep and land degradation, extends far beyond the immediate act of producing and consuming wool. Wiedemann et al. (2020) found that the highest emissions come from wool fibre production,

followed by processing greasy wool which requires significant energy, and garment care. Consequently, the environmental impacts of wool occur globally and often in unpredictable ways.

Lifecycle Assessments (LCAs) are commonly used in sustainability reporting to compare the environmental impacts of different fibres. For example, Circumfauna (n.d.), an initiative by Collective Fashion Justice, compared the carbon emissions of Australian wool and cotton, finding that an Australian wool knit sweater emits approximately 27 times more greenhouse gases than a cotton knit sweater. Recent claims from PETA (Collective Fashion Justice, n.d.) and the Higg Index suggest that wool has the third-highest climate impact of any material, after silk and alpaca wool. However, the Higg Index, developed by the Sustainable Apparel Coalition (SAC), has been challenged for its governance and methodology (Tabuchi, 2022). Notably, the Higg Index is supported by major brands that heavily rely on polyester and oil-derived fibres and critics argue that polyester is represented as having a lower environmental impact (Deeley, 2022). The Higg Index has been rejected by companies such as Kering, Adidas, and the Norway Consumer Authority (Kent, 2022), and criticised for only measuring impacts from cradle to factory gate, neglecting waste pollution at the end of a garment's life and failing to account for wool's biodegradability post-consumer use (Laitala et al, Klepp & Henry, 2018).

While LCAs offer valuable insights, they can be misleading if they do not consider end-of-life impacts. For example, the Woolmark Company's Global Wardrobe Study (2018) found that wool garments last over 50% longer on average than cotton garments, stressing the importance of including the use phase in LCA studies. The environmental impact of woollen garments is significantly influenced by their frequency and duration of use i.e. increasing wear from 109 to 400 times can reduce impact by up to 68% (Wiedemann et al., 2021). Additionally, the International Wool Textile Organisation (2020) highlights that wool has been "readily recyclable" for over 200 years, with fibres often being mechanically shredded and respun into new yarns or for industrial uses like insulation. However, academic focus on upcycling wool waste into new textiles or garments is emerging (Martin & Herlaar, 2021; Surjit, 2024; Wiedemann et al., 2022). While wool's environmental impact is significant and complex, a holistic assessment that accounts for its full lifecycle, including biodegradability and garment longevity, is crucial to gain a more accurate and holistic understanding of its impact.

CASE STUDY

This case study follows M.J. Bale's value chain: from fibre producers to manufacturers to consumers. Founded in 2009 by Matt Jensen, M.J. Bale specialises in high-quality menswear, covering a wide range of styles, including formal wear, business attire, casual wear and accessories. M.J. Bale is particularly known for their tailored suits which use premium materials, such as merino wool, and offers ready-made and bespoke tailoring options. The brand's sustainability strategy is rooted in its commitment to natural fibres and their provenance. According to Athena Savvas, M.J. Bale's Sustainability Manager (personal communication, August 10, 2024), over 90% of the brand's materials are derived from natural sources, including single-source wool, cotton and linen, with synthetic fibres being minimal and primarily used for functional purposes such as stretch in chinos and recycled nylon in swimwear.

FIBRE PRODUCTION

M.J. Bale sources wool from farmers who view themselves as "land custodians, the carers of their lands and their animals" (A. Savvas, personal communication, August 10, 2024). In 2016, M.J. Bale partnered with Cameron, owner of Kingston Wool Farm in Tasmania's Midlands. The Cameron's family has managed Kingston since 1821, with current land extension dating back to 1905 (S. Cameron, personal communication, April, 16, 2018). Kingston wool is renowned for its superfine quality, with fibres ranging from 13.5 and 16 mm microns (fig. 02), and its long staple length. The farm's 3,000-hectare property is partially preserved in a pre-colonial state, serving as a biodiversity hotspot with 8% of Tasmania's endangered plant species (S. Cameron, personal communication, April, 16, 2018). Ethical land management practices at Kingston include limited sheep numbers and rotation between pastures which follows self-herding or self-shepherding practices (Massy 2017) as well as reducing the need for mulesing, which Cameron stopped around 2008, and chemical fertilisers (S. Cameron, personal communication, April 16, 2018). Savvas noted the sheep with the highest quality wool are those left out to graze,

Fig. 02

adding that shearing benefits the sheep, preventing the wool from becoming matted and dirty, and seasonal shearing ensures the sheep have more warmth during the winter months (A. Savvas, personal communication, August 10, 2024). Sheep at Kingston Wool Farm are managed with an emphasis on their well-being, following the Five Freedoms principles of animal welfare—freedoms from hunger, discomfort, pain, fear and distress—developed from the Brundell Report in 1965 and adopted by the World Organisation for Animal Health (WOAH) in the "Terrestrial Animal Health Code" (WOAH 2024). These principles have evolved into the Five Domains of animal welfare (Mellor & Burns, 2020).The focus on sheep welfare at Kingston aligns with M.J. Bale's values and contributes to the production of ethical wool.

TEXTILE AND GARMENT PRODUCTION

M J. Bale sources exclusively Australian wool for its garments, Savvas explained: "it's purchased through the usual kind of process. We work back with our fabric suppliers to be able to do that. And we work with several others of a similar calibre of VBC, particularly in Italy, to provide us with high quality fabrics" (A. Savvas, personal communication, August 10, 2024). Vitale Barberis Canonico (VBC) is a wool mill that has been in operation since 1663, and is an important node in the manufacturing of M.J. Bales' garments. Still in the hands of the original family, VBC oversees all phases of wool processing, from washing to weaving and finishing. Kingston, one of the 3,000 farmsteads supplying wool to VBC, is part of a broader network of wool producers located in Australia, New Zealand, South Africa, China, Argentina and Uruguay. VBC demonstrates its commitment to sustainability through sourcing from farms with strict animal welfare practices, transparent supply chain information via digital passports and a waste management system that recycles or partially recovers 97% of textile waste (Vitale Barberis Canonico 2023, 2024). In terms of garment manufacturing, M.J. Bale's suppliers are located in countries like China and Japan and "reuse off cuts in their local economies to reduce waste and operational costs" (A. Savvas, personal communication, August 10, 2024). In Japan, M.J. Bale suits are manufactured by the tailors in the Iwate prefecture known for its heritage tailoring. These shared values and coordinated efforts not only enhance product quality, but facilitate collective action in addressing key challenges such as waste reduction, animal welfare and resource efficiency.

CONSUMER ENGAGEMENT

M.J. Bale's circularity strategy focuses on extending garments lifecycles, recognising that "in circularity, there is no one solution" (A. Savvas, personal communication, August 10, 2024). Savvas noted that previously, the brand's responsibility ended at the point of sale (A. Savvas, personal communication, August 10, 2024). However, as the brand's sustainability strategy evolved, M.J. Bale recognised the need to extend its responsibility: "we just had our 15th birthday. You know, the truth of that matter is, it means that there are probably garments that have the M.J. Bale logo on it that are no longer being worn" (A. Savvas, personal communication, August 10, 2024).

The ReBale initiative is a key component of this strategy, accepting all wool garments, regardless of condition, for either recycling or repurposing. Returned garments are assessed and categorised into "wearable" and "unwearable" (A. Savvas,

personal communication, August 10, 2024). Wearable items are considered for donation or resale through charity partnerships, while unwearable items are sent to partners like UPPAREL in Melbourne to be downcycled. Savvas highlights the practical considerations of this approach:

"It would be very hard to think about trying to collect all our jumpers here, just to send them back to Italy, just to get them back here again. So it's trying to explore what is also the least impactful way of being able to put our garments into more of a circular loop" (A. Savvas, personal communication, August 10, 2024). This program reflects the brand's recognition of its ongoing responsibility for its products: "with ReBale, we've decided to accept all M.J. Bale products ever purchased with our label on it, coming back to the idea that it has our logo on it, and so therefore it's our responsibility" (A. Savvas, personal communication, August 10, 2024). Consumers are incentivised to return their wool garments via loyalty points. Savvas acknowledged "there are challenges of caring for men's suits, including sizing changes and repair difficulties", and emphasised the importance of educating consumers on garment care (A. Savvas, personal Despite wool's recyclability, Australia lacks skills and infrastructure to fully capitalise on these opportunities. Current limitations in machinery and trained personnel pose challenges to scaling up these efforts: "scale is necessary for textile recycling, with one machine or training people not enough" (A. Savvas, personal communication, August 10, 2024). Deconstruction and repurposing old clothing were mentioned as a "potential for redesigning and reusing materials, but [there are] limited skills in Australia to do this" (A. Savvas, personal communication, August 10, 2024). This gap in the value chain represents a significant challenge for advancing circularity in the Australian fashion industry.

DISCUSSION

M.J. Bale's collaboration with Kingston Farm in Australia and Italian mill, VBC, highlights the importance of value-shoring through the shortening of value chains founded on shared values of heritage, ethical production and traceability. Despite the global nature of this value chain, M.J. Bale's emphasis on single-origin wool and local connections anchor the production process in shared values of provenance, craftsmanship and care for the environment. Kingston Farm, which has been family-owned and operated since 1821, exemplifies how heritage and local knowledge contribute to sustainable wool production. Similarly, VBC's presence in the Biella district, where wool processing has deep roots dating back 360 years, reflects the importance of place and tradition in creating high-quality products.

The complex value chain of wool - produced in Australia, processed in Italy, and tailored in Japan or China – carries ethical and environmental considerations at each step. This collaboration prioritises locality, traceability and animal welfare, addressing the normally obscured totality of wool as a hyperobject (Morton, 2013). In other words, these shared values allow the three companies to collaborate on sustainability goals even though they operate in different geographical locations to reduce the time space of wool as a hyperobject. The collaboration highlights a crucial point: relocating manufacturing to Australia is not always feasible due to the high cost of infrastructure and skills. For example, M.J. Bale benefits from VBC's local knowledge, craftsmanship, and established recycling systems in the Biella district, which cannot be easily replicated elsewhere. The value of such partnerships lies in recognising the necessity of the global value chain while striving to improve sustainability practices across all nodes. This also aligns with growing demands for accountability in fashion, brings together diverse local practices into a more cohesive and visible global process.

The ReBale initiative marks a move towards closing the loop and extended product responsibility, with M.J. Bale accepting all wool garments for recycling or repurposing. However, the lack of sufficient recycling machinery and trained personnel in Australia has hindered broader adoption of processing practices. Savvas emphasises the need for localised solutions to reduce the environmental impact of using overseas reprocessing infrastructures. Despite the inherent recyclability of wool, the absence of large-scale facilities and trained workers in Australia means that the potential for wool recycling remains largely untapped. Savvas highlighted the need for industry-wide collaboration to build the necessary capabilities to support circularity at scale. These challenges exemplify the complexity of implementing circularity at a systemic level, especially in a globalised industry where wool production and garment manufacturing are deeply global and entangled with historical,

cultural and economic factors.

CONCLUSION

The interactions between humans (farmers, workers, consumers) and non-human elements (sheep, land, climate) within the wool industry-illustrate the entangled relationships that define wool as a hypberobject. Hyperobjects, by their very nature, resist simplification and call for global cooperation to address the issues related to production, trade, ethics and environmental impact. The case study showcases how a collaboration between an Australian wool grower, an Italian mill, Japanese tailors and an Australian fashion brand can establish environmentally conscious practices by promoting biodiversity reconstruction through local knowledge, with due consideration for the well-being of non-humans (animals) at the heart of the complex wool supply chain. M.J. Bale's efforts to engage consumers in circular practices and collaborate with suppliers on waste reduction reflect a commitment to circularity. However, challenges persist in scaling these efforts, particularly in recycling infrastructure and developing robust deconstruction and repurposing capabilities. Wool alone cannot challenge the dominant global textile and garment industry but can highlight the need to care for human and non-human impacts of our clothing. Value-shoring, exemplified by M.J. Bale's long-term partnerships built on trust and shared values, emerges as a collaborative strategy to address the complex challenges of globalised production that individual entities cannot solve alone.

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