

TRANSITIONING TO A CIRCULAR TEXTILE ECONOMY IN AUSTRALIA

Summary of Findings

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The need for a circular economy in textiles

circu

THE PROBLEM

8%

of global greenhouse gas emissions are caused by the textile industry⁸

Globally the textile industry emits about **10%** of all carbon emissions⁶

20% of global waste water is produced by the textile global industry¹

\$28.5B(AUD)

is the amount Australian consumers spend on fashion each year⁴

1 in 6

people are employed in the global fashion supply chain⁵

220,000

people are employed in the fashion industry in Australia⁴

An estimated **6000kg** of clothing and textiles is dumped in landfill every **10 minutes in Australia**²

Only 1% of the total collected garments are recycled⁷

100Billion

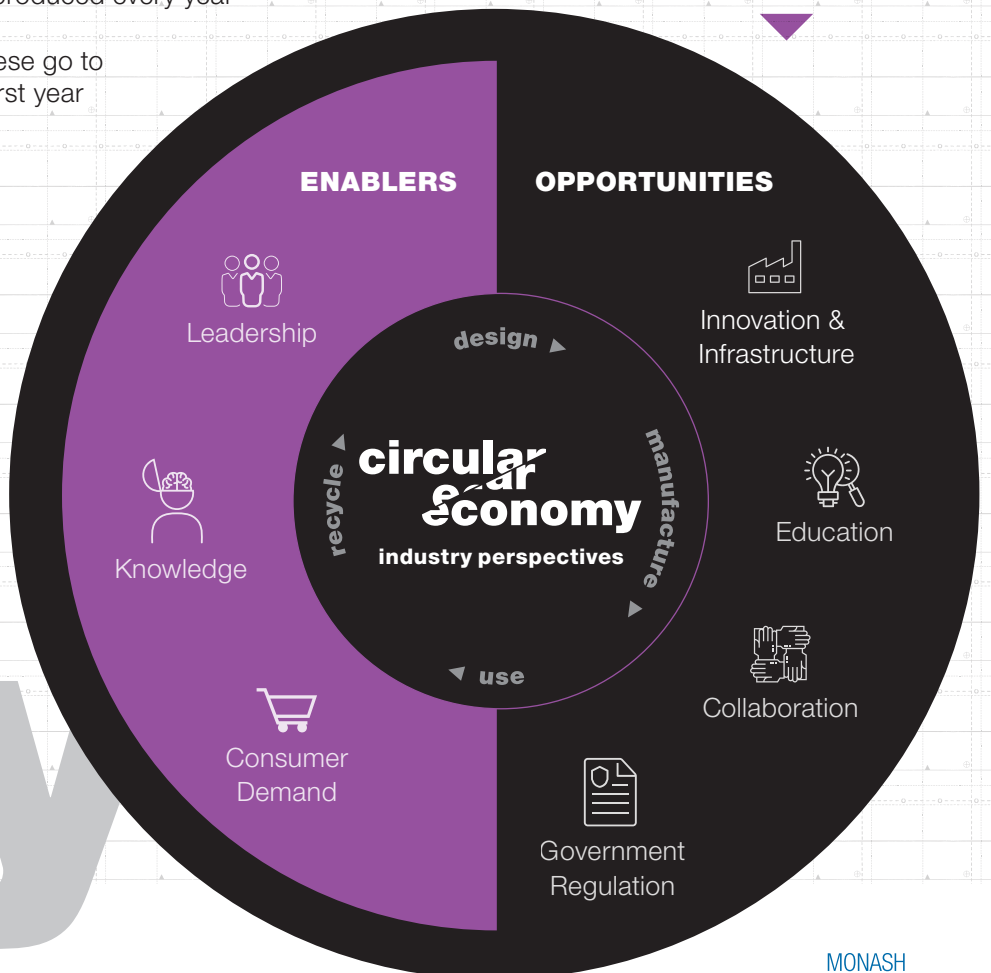
garments are produced every year

33% of these go to landfill within the first year of purchase¹⁰

THE OPPORTUNITY

\$500B(USD)

economic opportunity by transforming the way clothes are designed, sold, and used⁹



EXECUTIVE SUMMARY

This report presents a summary of findings from a series of interviews conducted with a select number of industry members from both large manufacturers, retail organisations and small to medium enterprises (SMEs), coordinated in partnership with the Australian Fashion Council. This project was funded by Department of Environment, Land, Water and Planning (DELWP), and Monash Sustainable Development Institute.

The study investigated sector insights in three areas: the encapsulation of sustainability and circular economy by the Australian Textile, Clothing and Footwear (TCF) industry; current priority for sustainable and/or circular economy initiatives including enablers and barriers; and potential opportunities (that may or may not already exist) which could assist or facilitate the Australian TCF industry to transition to a circular economy model.

Sustainability and circular economy in the Australian TCF industry

The interviews revealed a range of responses as to what a circular economy in the TCF industry includes, or should include, going forward. Some interviewees focused across the whole lifecycle of the product, seeing circularity as including inputs, manufacturing process, use behaviours and waste or end of life. However, this view was not universal with a small number of interviewees seeing circularity as comprising only the waste stream and/or recycling.

A consistent response from interviewees was that it is challenging in the Australian context to identify successful examples in textile circularity, particularly in terms of commercial viability. Successes mentioned included: the reduction in the quantity of virgin plastic used in manufacturing; take back schemes; and the recent developments around separation of fibres. For the interviewees themselves, the most common approach, albeit one with differing levels of commitment, to circular economy was a focus at the input stage. This included material selection and design, certification and product sourcing, manufacturer selection and supply chain management.

Enablers and barriers

Interviewees were asked what factors or circumstances had made the implementation of circular economy/sustainability initiatives easy or difficult within their organisations. Frequently mentioned enablers included leadership (which also encompassed strategy development and instituting targets), growing consumer awareness or consciousness, investment in a circular economy knowledge base, and access to relevant information sources. Other interviewees reported the opposite in terms of barriers: a lack of consumer awareness and consciousness, an under-developed circular economy knowledge base, and an inability to gain access to relevant information. Additional barriers included: the inherent complexity of implementing changes, lack of infrastructure and innovation, and limitations of scale, including access to sustainable materials and financial support for increasing innovation. Most telling perhaps, was the resounding response from interviewees regarding barriers to implementing a circular economy: there are no *“complete solutions yet.”*

Opportunities

When interviewees were asked to consider or propose future opportunities for the TCF industry, responses included:

1. **Innovation and infrastructure:** at both the input and output stage.
2. **Education:** covering consumers, future industry professionals, and designers, as well as knowledge sharing between industry, universities and research institutions.
3. **Government regulation:** covering input, labelling and licensing.
4. **Collaboration:** within the TCF industry sector, and across other sectors.

Recommendations

As the agency responsible for developing circular economy initiatives in Victoria, this study highlighted an opportunity for DELWP to build on the demonstrated interest of the TCF industry and incorporate the TCF industry into its current work on a circular economy.

Specific recommendations are:

1. That the TCF industry be included in Victoria's circular economic policy and action plan:
 - a. TCF industry inclusion is necessary to ensure we are making efforts to address the waste challenge in Australia and achieve the Sustainable Development Goals (SDGs), in particular SDG 12: Responsible Consumption and Production; and
 - b. TCF industry should not be looked at in isolation as there are links and benefits to other industries and collaborative efforts are integral to achieving the required systems transformation.
2. Provide a clear definition of circular economy for the TCF industry that includes priority targets covering the types of materials that can be used for textile product manufacturing, and timelines to meet targets.
3. Support access to open source information, covering in particular the life cycle assessment of different materials and procurement providers.
4. Support consumer education, co-designed with industry, that covers all aspects of the circular economic cycle, including inputs, production, use (care and repair) and end of life options.
5. Support research investigating consumers' attitudes towards sustainability and consumer behaviours impacting transitions to, and adoption of, circular economy TCF products.
6. Support for increased collaboration between industry, research and government organisations with the explicit aim of research and development in renewable materials and end of life recycling opportunities.
7. Fund innovation and offer financial support to Australian organisations and businesses that are finding solutions to these problems in order to support commercially viable and scalable solutions locally.

BACKGROUND

The global Textile, Clothing and Footwear (TCF) industry contributes \$2.5 trillion to \$3 trillion to the world economy (Textile Exchange & KPMG, 2018). It is also estimated that 1 in 6 people in the world work in the global fashion supply chain (GCNYU Fair Fashion Center, 2019).

But the industry's economic contributions come at a significant cost. The current linear model of production in the TCF industry poses significant environmental risks with negative impacts on natural resources. The TCF industry is the third highest emitter of carbon, accounts for 8% of global greenhouse gas emissions (Quantis, 2018), produces 20% of global water waste (UNECE, 2018), uses 5 trillion litres of water a year for fabric dyeing, and uses mostly virgin inputs to produce clothing, with less than 1% of the materials used to produce clothing that is recycled into new clothing (Ellen MacArthur Foundation & Circular Fibres Initiative, 2017).

Along with production, the consumption of TCF products also has a significant negative impact on our environment, particularly given that consumers are purchasing more clothing and textile products, yet they are using them less and keeping them for half as long. Of the 100 billion garments produced globally every year, an estimated 30% go to landfill within the first year of purchase (Ellen MacArthur Foundation & Circular Fibres Initiative, 2017), and up to 85% of the textiles (21 billion tons) are sent to landfill each year (UNECE, 2018).

Some of the trends and figures related to the TCF industry in Australia include:

- Australians are generating more commercial and industrial waste per capita than other OECD member countries (Victorian Government, 2019)
- Consumers spend A\$28 billion a year on fashion in Australia (Fashion United, 2019)
- 220,000 are employed in the fashion industry in Australia (Fashion United, 2019)
- Australia exports A\$6 billion in TCF products annually (Fashion United, 2019)
- A large percentage of clothing and textiles in Australia are imported (Neil, Bishop, & Simpson, 2017)
- An estimated 6000kg of clothing and textiles are dumped in landfill every 10 minutes (Milburn, 2017)
- The enormous volume of discarded textiles is overwhelming charities (Payne & Binotto, 2017), and
- In one Victorian council study, textiles were reported to make up 3% of household waste. This was greater than glass (2%), steel and aluminium (2%), and on par with plastic (3%) (Victorian Auditor-General, 2019)

All TCF stakeholders - industry, consumers and government - are increasingly aware of the negative impacts of the current 'take-make-waste' linear model of production and consumption, and, globally, there is growing evidence of a willingness to move to a more sustainable production and consumption model, including inputs and end of life management of goods. Increasingly, and especially with the adoption of the Sustainable Development Goals framework, countries are considering, or are instituting, circular economy models that will also assist with meeting the targets and indicators of Sustainable Development Goal 12: Responsible Consumption and Production. However, there appears to be a gap in knowledge around what the TCF industry (as well as other industries) in Australia are doing to approach this transition, and whether there is consensus on exactly what to do.

At the time of this research, the Victorian Government's Department of Environment, Land, Water and Planning (DELWP) was developing a circular economic policy and action plan for Victoria that "*will identify fundamental longer-term improvements regarding how we use resources and manage waste generated by a growing population*" (DELWP 2019).

The program of work would "*outline a suite of specific proposals for how we can improve material use throughout the economy. This could include regulations, incentive programs, innovation support and/or education*" (DELWP 2019). The final circular economic policy aims to:

"...outline the Victorian Government's vision for how materials are used and managed throughout the economy and provide long-term direction and certainty for Victorian businesses. The policy will establish

goals for the Victorian waste and resource recovery system so that it effectively supports a circular economy. It will also clarify the role of waste to energy technologies in that system” (DELWP, 2019).

The development of a circular economy policy and action plan in Victoria is an opportune time to investigate what the appetite is in the Australian TCF industry to adopt circular economy principles and identify what factors are needed to support a transition (i.e., resources, levers, collaborations, policy). To contribute to the policy development process, the DELWP Waste and Resource Recovery, Climate Change Division engaged researchers from the Monash Sustainable Development Institute (MSDI) whose proposed research was to collaborate with the TCF industry to understand the enablers and barriers for the Australian TCF industry to transition to a circular economy model of production.

STUDY OBJECTIVES

This report aims to contribute to an understanding, for both the Victorian government and the Textile, Clothing and Footwear (TCF) industry in Australia, of the needs and interests of Australia’s TCF industry to transition to a circular economy model of production.

This report presents a summary of findings from a series of interviews conducted with a select number of industry members from both large manufacturers, retail organisations and small to medium enterprises (SMEs), coordinated in partnership with the Australian Fashion Council.

This needs assessment focused on sector insights within three broad objectives:

1. Develop an understanding of how the TCF industry in Australia defines sustainability and circular economy.
2. Engage with industry members to identify the sustainable and/or circular economy initiatives that are a priority for their organisation.
3. Identify the opportunities that may facilitate Australian fashion brands and retailers to adopt a circular economy model of production.

METHOD

To gain a comprehensive understanding of the current state of play in the TCF sector in Australia, acknowledging at the outset that the TCF sector is not a homogenous group, an exploratory qualitative approach was adopted. Interviewees were sourced through the Australian Fashion Council, who approached a number of their members via an email call out asking for participation (27 direct emails to industry members, and 1 group email to members and alumni of an industry incubator program). A total of ten TCF retail organisations and manufacturers agreed and were available to interview.

Data was collected through semi-structured interviews with individuals (except one small team of two). A copy of the interview guide is provided in Appendix 1. The questions were designed to elicit knowledge of circular economy principles, current business approaches, circular economy success stories, enablers and barriers, and future priority areas that interviewees believed could assist with transitioning.

Each interview lasted between 45-60 minutes, and was recorded with permission of the interviewees. Interviews were transcribed and then imported into the qualitative data analysis software package NVivo to identify patterns of meaning that provide insights to the research questions informing the project. Patterns were identified through an inductive process of data familiarisation, data coding, theme development and revision, where codes and themes were directed by the content of the interviews.

An analysis of the NVivo outputs, along with direct transcript reading, was undertaken jointly by the co-authors and this resulted in a framework of overarching themes. These themes are presented as sub-headings in the following Results section. The subsequent discussion section draws on the findings and contextualises the findings with relevant literature to make some formative recommendations.

RESULTS

In this section, we have grouped and summarised the main themes that emerged under each of the interview questions. The six overarching themes include: definition of circular economy; state of play of the sector; enablers; barriers; and opportunities.

Profile of Interviewees

Of those interviewed, 2 represented micro business, 5 represented SMEs and 3 represented large enterprises. The majority of the interviewees (6) had 20 or more years in the industry, including two with 30 years. Two interviewees had less than 10 years in the TCF industry, but came with experience from other production industries, including cosmetics. More than half, 6 of 10, had global or international experience. Three interviewees were founders of their organisation. Other interviewee roles ranged from Chief Operating Officer to Head of Sustainability, Advocacy and Sustainability, and some had Circular Economy in their job title or portfolio. Seven of the organisations were either founded, or had their head office based, in Victoria. Two organisations were based in New South Wales and one organisation was located in Queensland.

Definition of Circular Economy and Success Stories

The definition of circular economy, articulated at the beginning of the interviews, was:

“an economic system that replaces the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production, distribution and consumption processes...with the aim to accomplish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.” (Kirchherr, Reike, & Hekkert, 2017).

While there was not a specific question asking interviewees to define circular economy, it was evident within the industry that there exists a range of interpretations as to what a circular economy includes. Some interviewees focused across the whole lifecycle of the product, seeing circularity as including inputs, manufacturing process, use behaviours and waste or end of life. In contrast, a small number of interviewees held the view that circularity comprises only the waste stream and/or recycling. The disparate definitions could prove to be an impediment when it comes to developing feasible solutions and/or promoting opportunities. Therefore, developing a common understanding will be important in any future government policies implementing circular economy business and production models.

There was also some discussion over whether a circular economy in textiles needs to be broadened in scope, and looked at in conjunction with other industries:

“Circularity is not just about turning a garment back into textile or another garment - it can be anything else aside from landfill. This is particularly the case in Australia where there is no textile manufacturing – it will have to go to another industry”

Interviewees were asked to describe successful examples of circular economy principles in the Australian TCF industry. Most interviewees found identifying successful domestic examples hard, at least in terms of commercial viability. Successes that were mentioned included: the reduction in the amount of virgin plastic used in manufacturing; take-back schemes; and the developments around separation of fibres. BlockTexx, an innovation business that is separating post-consumer polyester and cotton fibres, based in New South Wales was the most common example mentioned. The limited number of local successes identified, however, did not equate to a lack of discussion around the awareness of the impacts of the current linear model of production, nor the sense of urgency of adapting circular principles.

Current Circular Economy Approaches

Of the 10 interviewees, eight identified sustainability initiatives that are already being implemented in their organisation. These responses ranged in level of complexity of approach. The two participants who reported

no specific environmental sustainability or circular initiatives highlighted instead the quality of production and durability of their products.

The sustainability or circular economy related initiatives reported by interviewees focused predominantly on managing inputs, including material selection and design, certification and product sourcing, manufacturer selection and supply chain management. To a lesser extent, interviewees highlighted a focus on gaining access to scalable and commercially viable solutions for waste management and end of life alternatives. Consumer awareness and industry collaboration were also noted as themes.

Although many interviewees reported being engaged in one or more of these areas, there appears to be a range in the level of commitment to pursuing a circular economy model of production. For some, the concept is not central to the business. For others, however, circular economy principles are either already core, or are becoming increasingly core, to their overall business. In terms of changes to production, focus areas included improved material selection at the design stage, which incorporated sourcing and investing in recycled, recyclable or sustainable materials.

Multiple interviewees mentioned the use phase of products. Examples of encouraging better use of the products include: increasing consumer awareness of the impact of TCF products; advise on how to repair and reuse products and ensuring that, when it is time to retire products, clear options are provided and available. One organisation had implemented additional labelling on the inside of garments, which provided more detailed information for the consumer to extend the life of the garment.

End of life alternatives that were most spoken about included: take-back schemes; separating fibres; and recycling. One organisation had already piloted a take-back and resell program which was very successful but had yet to be scaled, and the majority of interviewees articulated a waiting game in so far as take-back schemes because all they could currently do was stockpile. Recycling and the need for scaled recycling was a dominant theme in the responses.

Enablers

Interviewees were asked what factors or circumstances have supported the implementation of circular economy/sustainability initiatives that are currently being pursued or invested in by their organisation. The responses can be thematically clustered into three key areas: leadership (including strategy and targets development), knowledge base and access to information, and consumer awareness or consciousness.

1. Leadership

A number of interviewees reported that leadership on sustainability within their organisation is paramount, including support and understanding of the issues at the executive and board level in public companies and commitment by founders in privately owned businesses.

“Number one is, I think, leadership. I think a lot of the programs that we’re doing now...we have 100% backing by the leadership team. So the CEO, CFO and the executive team...”

Leadership by the organisation around the issue of sustainability more broadly was also highlighted as a pull factor in terms of attracting and retaining employees to work for the organisation and, for some, seen as part of a brand’s global responsibility.

Composing, drafting and implementing endorsed program initiatives or targets linked with circularity or SDG targets were referenced as evidence of a commitment to leadership and vision. Many of the organisations published their strategy or goals to the public, while others internally circulated strategies and goals and/or made formal commitments.

2. Knowledge Base

Almost all of the interviewees described a significant investment in the organisation's knowledge base, along with a commitment to research sustainability initiatives and circularity to support internal leadership and understanding of circular economy.

Maintaining an organisation's knowledge base was consistently identified as a requirement including regular investment in recruitment of experienced and knowledgeable professional staff, as well as new positions created to bring talent in-house and professional development for staff.

"We're doing it all in-house. My role was created to do a lot of this research, so my role as an ethics and sustainability role, was new. A couple of years ago, they did get a consulting firm in, to just do a bit of an audit and review of the business and supply chain and come up with a list of priorities. And they were deciding whether they wanted to then continue to outsource the implementation of the recommendations or bring it in-house. They decided to bring it in-house"

3. Consumer Awareness

Multiple interviewees reported on the influence that a more conscious consumer has on how a business operates, including whether a business adopts a circular economy approach. Although most interviewees acknowledged that there is evidence to suggest that a growing number of consumers are interested in transparency, a number of interviewees expressed that consumers still lack adequate information about the materials and manufacturing processes involved in making TCF products, as well as what occurs when items are washed and, ultimately, disposed of. Linked to this, a number of responses called for increased consumer education, notably on the environmental impact that consumption can have.

Barriers

Interviewees were asked what factors or circumstances have hindered the implementation of circular economy/sustainability initiatives in their organisations, and more broadly in Australia. The resounding response was that there are no *"complete solutions yet."*

The barriers described can be clustered into five themes: complexity, access to information, consumer behaviour, lack of infrastructure and innovation, as well as limitations of scale.

1. Complexity

The sheer complexity involved in embarking on a journey towards circularity in the context of an already extensive and layered system was outlined. For example, interviewees described the challenges involved where a solution or an alternative to a high impact problem is identified, only to learn of further challenges with the so-called solution. The context of an expansive TCF supply chain was identified as innately complex whereby one transition or substitution was not easy to implement even when the organisation had the conviction to do so.

2. Access to Information

Interviewees described a considerable need for coordinated access to information as well as growing their own in-house knowledge base. Options proposed included an open source database of materials that covers inputs and end of life options; as well as collaboration between apparel brands in coordinating leadership and understanding in the Australian context (e.g. who is doing what).

"Transparency is simple and easy to understand in terms of that environment. It's focusing on how sustainable materials mix. It's focusing on our water [and] chemicals use, our greenhouse gas emissions, power and waste and things like that."

3. Consumer Behaviour

Interviewees reported that what consumers choose to purchase and what consumers see value in or de-value directly impacts those working to create better products. Although conscious consumers may support the transition by the TCF industry towards more sustainable products, the perceived lack of consumer awareness is seen as a critical barrier to implementing more circularity.

“We’ve got to be led by what the consumer is looking for – we can help, we can inform them, but we can’t dictate to them that they will buy things a certain way because of the way we can get rid of them at the end.”

This was also seen as a key issue when it comes to improving the use phase of TCF products, which appears to be a less explored aspect of implementing circularity within the interviewees’ organisations.

“The use phase of our clothing is so important but this is not being addressed.”

Consulting behavioural science to drive the endorsement of conscious consumption may be key to accelerating a local push for circularity (Lauren, Smith, Louis, & Dean, 2019).

4. Lack of Infrastructure and Innovation

Every interviewee noted the lack of infrastructure and innovation in the textile manufacturing space as a critical barrier. The limited on-shore manufacturing capability in Australia is seen as problematic when it comes to developing and scaling innovative solutions locally including implementing end of life alternatives that have circular economy principles embedded - that a product is recycled again and again (e.g. scaled waste collection of materials for recycling). This barrier also impacts on other parts of a circular economy approach, for example, a take-back scheme:

“So an interesting view on how the circular economy is moving at the moment is that there are take-back programs that exist, but we still don’t have the infrastructure to do anything with it.”

Furthermore, even when recycled material is invested in, the current nature of the recycling industry is limited in so far as integration across industries or product categories. To this end, DELWP’s issues paper probing the development of a circular economy policy in 2019, underlines the risk posed by textile waste streams, as the lack of an adequate recycling infrastructure inhibits the transition towards a circular textile economy.

5. Limitations of Scale

Having access to standard or innovative solutions was identified as challenging for the smaller Australian TCF businesses. These smaller businesses also noted that they often have to do the research for sourcing inputs on behalf of their suppliers, because they don’t have the influence of scale that would compel their supplier to otherwise change.

“So some of the solutions aren’t that affordable for us, even though we’d love to implement them, because of our scale. Also, not always having the clout or the influence with the suppliers because of our size and our order size. And so the suppliers that we are working with, we find there’s a lot of pushback. So what we’re finding is we’re having to do a lot of the work for them in terms of the sourcing and then just, really hand it to them”

Interviewees reported little to no financial support, such as government grants, that their business would be eligible for to support a transition to circularity or to scale their innovative sustainable and circular approaches within their business processes (i.e. zero waste).

Opportunities

Despite the numerous barriers, interviewees had a number of ideas and approaches to encourage uptake of circular economy principles in the Australian textile industry at all stages of the product life cycle. The opportunities identified by interviewees are summarised in this section.

1. Innovation and Infrastructure

The opportunities for innovation and infrastructure exist at both the input and output stage. For inputs, there are opportunities to build more responsible supply chains and scale the sourcing of sustainable materials. At the end of life stage, infrastructure for the collection of textile waste was mentioned, (including home collections, kerbside collections or centralised collection points). However, the biggest opportunity (which also happened to be the biggest barrier) is with investment (national or local) in textile recycling manufacturing (technologies/systems). Calls were also made for further research to be done in Australia to expand the available sourcing of sustainable or circular materials, including raw fibres. Finally, opportunities for new business “types” were mentioned, as the industry shifts to a circular production model. These could include: re-commerce (where labels take back and re-sell own clothes); remaking; upcycling; and collection/sorting facilities that separate the clothing fibres.

2. Education

The interviewees identified education at all levels as a significant opportunity. To begin with, consumer education is a must:

“Educating consumers on what raw materials are used in their clothing, what the issues are, how to care for them and what to do with them and that [buying] less is more.”

There is also an opportunity to educate future industry professionals, in particular educating designers as part of their studies. Finally, knowledge sharing (and even product samples for design and testing) between industry and universities or research institutes was an identified opportunity to increase research and development on all aspects of the system (ie.CSIRO’s work in Cotton).

3. Government Regulation

Government regulations can support businesses to transition to a circular economy. Opportunities for regulation mentioned by interviewees included:

- Input regulation: *“the current system does not go far enough in terms of banning certain substances in the system; if we had regulation change it would then force other businesses to import only quality inputs”;*
- Standardised labelling: *“covering, for example, ingredients used, including consistency of terms, instructions on use (i.e. washing), and instructions on end of life”;* and,
- Licences for developing products: *“I think there has to be [sustainability] governance over [products] rather than just a retailer saying we want to go to market with these [products] because we think it’s strong and customers will resonate with them. Well, I think there’s got to be some mandates and laws behind what we’re all doing.”*

Additionally, “while increasing levels of commercial and industrial waste are being recycled, policies are required to ensure that waste recycling is a feasible and desirable option for business and industry” (Transforming Australia 2019).

4. Collaboration

Interviewees reported that embarking on circular economy business models is not something that the TCF sector can do alone, and so collaboration is key:

“But you need to involve everyone. Got to involve the charities, the government, university, retailers, everyone in the supply chain as well. So I think that’s what we forget... you also need to focus on China, Bangladesh. Where we manufacture is vital.”

Suggested collaboration opportunities included creating a textile innovation and recycling park, developing a shared knowledge base of who is doing what and where across Australia; and regular meetings with key representatives from across all states to support a collaborative approach to progress circular economy thinking, processes and products in a structured, organised format.

DISCUSSION AND RECOMMENDATIONS

The aim of this study was to contribute to a formative understanding for both the Victorian government and the TCF industry in Australia of the enablers, barriers, and opportunities to transition to a circular economy model of textile production.

Based on the interviews, while there is interest and appetite for a circular economy approach to be applied to the TCF industry in Australia, there are different focus areas within the sector, specifically whether the various components that constitute a circular economy approach apply equally across a product lifecycle or system.

The Ellen MacArthur Foundation (2017) states that in order for a transition to a circular textile economy to occur, the following four aspects need to be addressed:

1. Phase out substances of concern and microfibre release;
2. Transform the way clothes are designed, sold, and used to break free from their increasingly disposable nature;
3. Radically improve recycling by transforming clothing design, collection and reprocessing; and
4. Make effective use of resources and move to renewable inputs.

A true circular economy is broader than only considering the inputs (i.e., material selection) and is also broader than only considering end of life options for textiles. However, because the TCF industry in Australia is not a homogenous group (it includes on-shore manufacturers, offshore production, larger retailers who predominantly import) with a range of business drivers and objectives, there appears to be a variety of opinions as to what should be included in a TCF circular economy. Some see waste or end of life as the only issue, others are focused on the inputs, and then there are those who consider the entire life cycle. Consequently, we are seeing a divergence of focus around circularity which may hamper future efforts.

Australia has shown a variety of circular initiatives in other sectors, such as electronic and household waste. Circular economy in textiles should not be looked at in isolation given that collaborative efforts have proven to be imperative for a systemic transformation (Lehmann, et al., 2018). In 2018, the Australian government released the National Waste Policy (Australian Government, 2018), which urges the country to move away from a linear to a circular model, preserving the long-term value of resources. Consequently, organisations in the TCF industry can play a critical role in achieving the SDGs due to the sector's vast size and scope (Textile Exchange & KPMG, 2018). However, Grainger-Brown and Malekpour (2019) stress the need to provide firms with the strategic tools and guidance to facilitate implementation.

As international momentum increases towards achieving the SDGs, in particular SDG 12: Responsible Consumption and Production, it is expected that increased attention will be placed on the role that a circular economy could play across all industries, including the TCF industry. As noted previously, the negative impacts of the TCF industry are well documented and pressure is mounting for a systems shift to occur. Because of this, we recommend that the TCF industry be included in Victoria's circular economy policy and action plan. This is important for several reasons, including:

- the amount of textile waste in Australia is higher than average amongst OECD economies and is expected to continue to grow as population increases;
- the critical waste challenge in Australia and the opportunity to develop a manufacturing and/or innovation hub around textile recycling;
- the sustainable management of natural and recovered resources;
- the links and benefits to other industries - developing a circular economy for TCF will draw on solutions that are not specific to one industry alone and vice versa; and
- the opportunity to provide leadership on meeting SDG 12 locally and to draw parallels with other issues of global significance.

Additional recommendations that the Victorian government should consider as part of the policy document, or as action items, are to:

- Provide a clear definition of circular economy for the TCF industry that includes priority targets which cover the types of materials that can be used for textile products manufacturing, and timelines to meet targets;
- Support access to open source information, covering in particular the life cycle assessment of different materials and procurement providers;
- Support consumer education, co-designed with industry, that covers all aspects of the circular economic cycle, including the inputs, production, use behaviour (care and repair) and end of life options;
- Support research investigating consumers' attitudes towards sustainability and consumer behaviours impacting transitions to, and adoption of, circular economy TCF products;
- Support for increased collaboration between industry, research and government organisations with the explicit aim of research and development in renewable materials and end of life recycling opportunities; and
- Fund innovation and offer financial support to Australian organisations and businesses that are finding solutions to these problems in order to support commercially viable and scalable solutions locally.

Finally, it is recommended to consider acknowledging that any transition is not simply about implementing roadmaps: interventions must carefully puncture into movements along a transition curve, aiding the industry to progress towards the next phase of change (Buchel, Roorda, Schipper, & Loorbach, 2018). Therefore, an evolution to a circular economy model of production for the TCF industry warrants the consideration of developing a guiding vehicle to coordinate cross-industry initiatives and innovative capabilities and to facilitate the adoption of disruptive interventions. In this, the Victorian Government may be well placed to position itself as a leading actor going forward.

While this report can contribute to a formative understanding of the TCF industry in Australia, the number of interviews was limited to 10 and coverage of some parts of the sector is missing. We would therefore not recommend generalising these findings to the whole sector, especially given that the TCF industry is not homogenous. Instead, this report should be read as providing a first step towards understanding the interests of the TCF sector in Australia to transition to a circular model of production.

This report has been designed as an outcome of Phase 1 of an anticipated three phase research project. The proposed Phase 2 component is expected to explore obstacles and opportunities facing all stakeholders (e.g., via an online survey), while the proposed Phase 3 component will focus on developing a set of recommendations to transition to a circular textile economy in Australia. Phase 3 consists of summarising the levers, potential collaborations between industry, researchers, and government policy makers, and proposing pathways that could support such a transition. In its entirety, this research aims to contribute to greater evidence-based decision making for policy development, where possible, and inform business strategy development within the TCF sector more broadly.

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APPENDIX 1: INTERVIEW GUIDE

1. Interviewee Profile
 - Position:
 - Years of experience in the industry:
 - Global or Australian experience (or combination):
2. Let's start with a broader question. What are some of the success stories you've seen in the fashion industry when it comes to circular economy or sustainability initiatives?
 - Why are they wins?
3. How important are circular economy or sustainability principles to your brand/business? PROBE:
 - Is sustainability a feature of the [brand] business model?
 - Does your organisation have a process by which to identify impacts on the environment from the brand's clothing production?
4. What is [brand] currently doing when it comes to circular economy or sustainability initiatives? PROBE (if required):
 - How does [brand] go about implementing sustainability initiatives in [brand] business?
 - Does [brand] have a take back scheme, would there be potential for one?
 - How does [brand] information manage the supply chain/ manufacturing for transparency? Does it include all three tiers? How important is it for the business ethos to manage and maintain this information?
 - What are the attributes that materials are selected for in the design and production phases? Does [brand name] consider the material selection in terms of its reusability/recyclability?
 - What role, if any, do you/does [brand] play in sustainable education for the consumer and/or trying to impact your customer/consumer behaviour?
5. What factors or circumstances have supported the implementation of such initiatives?
6. What factors or circumstances have hindered the implementation of such initiatives?
7. Thinking about the future, what do you see as some of the key opportunities for the [brand] to transition to a circular economy? PROBE:
 - Does [the brand] identify profitable innovations that align with sustainable or circular aims?
 - How far are you wanting to take sustainability initiatives - would moving to a circular economy model across the sector be possible/profitable for you?
8. Thinking about the future, what do you see as some of the key challenges for the [brand] to transition to a circular economy? PROBE:
 - How hard is it to access renewable fabrics/what is the availability of renewable materials/fabrics?
 - What are some of the barriers the brand comes up against?
9. Based on your experience, what are some of the critical gaps that need to be addressed (by industry, government) to facilitate the fashion industry in Australia to transition to a circular economy? PROBE:
 - What levers, policies, resources, interventions, partnerships are required?
 - What would influence [brand] to change how [brand] produces? Is it personal/brand ethos/consumer/market share/economics?

We have reached the end of our questions. This is an opportunity for you to tell me any thoughts you had that you might not have had the chance to share with me earlier. Do you have anything else to add?

Thank you for participating. /