

**WALKING THE CHAIN:
THE SOCIAL CONSTRUCTION OF
AUSTRALIAN COTTON'S SUSTAINABLE
VALUE**

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Abstract

The Australian cotton industry is committed to improving on-farm sustainability; however, as the raw material travels through the ‘value adding’ stages in the globalised fashion and textile industries, it is uncertain how its ‘sustainable value’ is transferred into the final product. The central aim of this research is to analyse how the Australian cotton industry can understand where sustainable value is created along its value chain, as well as opportunities to create value. To explore this question, a tailored tool was developed that combines value chain analysis methods with value mapping interview techniques. This involved ‘walking’ the chain from fibre to finished fashion product to disposal. A total of 21 stakeholders were interviewed across two Australian cotton value chains from growers to retailers through to actors that collect discarded garments. Participants identified what sustainable value is, how it is created, who it benefits both in and beyond the chain (including local communities, the environment and consumers) and where future opportunities to create further value may lie. This study delivers three original contributions to the knowledge surrounding how sustainability is valued within the fashion value chain. First, the development of a method and approach which offers an alternative way of understanding sustainable value through ‘asking’ actors exactly what they value and why, and then connecting these insights to better understand sustainability across the entire chain. Second, through mapping the Australian cotton value chain, it identifies actors’ experiences and perceptions of sustainability which have previously been unexamined, noting where these perceptions converge and diverge. It pinpoints the complexities that face the Australian cotton industry’s transfer of sustainable value within global value chains, such as the separation between raw material producers and retailers, as well as locked in practices (i.e. blending fibres) which inhibit traceability and circularity. The results demonstrate a need to create a shared understanding of ‘on-farm’ sustainability. The study identifies elements to best do this through substantive (Life Cycle Assessment data) and symbolic (visual storytelling) sustainability messages – and proposes how these can be co-created with stakeholders. From this, the study offers a third contribution by extending understandings around sustainability and its value within the context of fashion and textile value chains, and identifies practices that can be taken up more broadly to further sustainability within the industry.

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List of Abbreviations

ACCC	Australian Competition and Consumer Commission
ACVC	Australian Cotton Value Chain
BCCU	Better Cotton Credit Unit
BCI	Better Cotton Initiative/Better Cotton
BHP	Broken Hill Proprietary Company Ltd
CA	Cotton Australia
CMT	Cut Make Trim
CRDC	Cotton Research and Development Corporation
CSR	Corporate Social Responsibility
CVMT	Cambridge Value Mapping Tool
GCC	Global Commodity Chain
GMO	Genetically Modified Organism
GOTS	Global Organic Textile Standard
GPN	Global Production Network
GPS	Global Positioning System
GVC	Global Value Chain
GVCA	Global Value Chain Analysis
IFE	Institute for Future Environments
IFOAM	International Federation of Organic Agriculture Movements
IPCC	International Panel on Climate Change
LCA	Life Cycle Assessment/Analysis
LCI	Life Cycle Inventory
MDB	Murray-Darling Basin
MFA	Multi-Fibre Agreement
MMF	Man-made Fibres
myBMP	Best Management Practices
NGOs	Non-Government Organisations
OBM	Original Brand Manufacturing
ODM	Original Design Manufacturing
OECD	Organization for Economic Cooperation and Development
OEM	Original Equipment Manufacturing

PEF	Product Environmental Footprint
QUT	Queensland University of Technology
RFID	Radio Frequency Identification
SAC	Sustainable Apparel Coalition
SDGs	Sustainable Development Goals
SVAT	Sustainable Value Analysis Tool
SVCA	Sustainable Value Chain Analysis
TBL	Triple Bottom Line
TLBMC	Triple Layer Business Model Canvas
UN	United Nations
USDA	United States Department of Agriculture
VCA	Value Chain Analysis
WTO	World Trade Organization
WWF	World Wildlife Fund

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: QUT Verified Signature

Date: 14 August 2022

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Chapter 1: Introduction

Cotton is the most significant natural fibre in the world, evidenced by its 24% market share amongst fibres for fashion and textiles products (Textile Exchange, 2021), and its provision of a livelihood for an estimated 250 million people globally (International Cotton Advisory Committee and Food and Agriculture Organization, 2015). At the same time, the cotton industry's use of pesticides, water consumption, and evidence of modern slavery conditions in its global supply chain demonstrates sustainability concerns. Importantly, shifts in consumer fashion preferences toward more sustainable fibres, as well as an increase in sustainability initiatives and regulation, has put sustainability on the Australian cotton industry's agenda. However, cotton's sustainable value has many implications and meanings, from growing practices all the way through to its reuse and disposal.

Cotton production is at the start of long, complex and globalised fashion and textile value chains, and how cotton's sustainable value is perceived and experienced by actors in these chains is not yet known. Furthermore, when it comes to the meaning of sustainability in fashion, definitions remain contested and there is no industry standard (Henninger et al., 2016). Within this thesis, I take the concept of sustainability as encompassing economic, social and environmental aspects. While most value chain actors agree that sustainability (whether economic, social and/or environmental) must be addressed, it is unclear what value this may create and who for. To address this gap, this study asks: How is sustainable value understood, created and captured by the Australian cotton industry and its value chain stakeholders? In turn, this research seeks to explore in detail what sustainability means in the context of the value chain members perspectives, as well as where sustainable value is created within the Australian cotton industry. Additionally, this study also aims to identify opportunities for the Australian cotton industry to create sustainable value along its value chain.

1.1 BACKGROUND TO THE PROBLEM

The cotton industry plays an important economic and social role in Australia, generating \$2 billion dollars in exports per annum and employing approximately

10,000 people across the industry working on 1436 cotton farms across New South Wales (NSW), Queensland (QLD) and Victoria (VIC) (Cotton Australia & Cotton Research and Development Corporation, 2019; Cotton Australia and Cotton Research and Development Corporation, 2014). To ensure responsible and sustainable production practices across these regions, the industry established the Best Management Practices (myBMP) program which standardised ten key areas of ‘best farming practices’¹ through learning modules and self-assessment tools (Cotton Australia, 2016; Cotton Australia and Cotton Research and Development Corporation, 2014). Recognising the value of sustainability, the Cotton Research and Development Corporation (CRDC), a partnership between the Commonwealth Government and the Australian cotton industry, has been investing in research on reporting and measuring on-farm sustainability, as well as improving value chain competitiveness, transparency and understanding (Goal 2.3.2) (Cotton Research and Development Corporation, 2018, p. 28). This project contributes to the Australian cotton industry’s value chain strategy and the CRDC has funded a top-up scholarship for this study.

Cotton production is the first stage of the global cotton value chain, which includes the following phases: growing cotton, ginning, spinning cotton into yarn, textile manufacturing, garment manufacturing and retailing. The Australian cotton industry is an upstream supplier of raw materials for retailers downstream, and each step along this supply chain adds value to the cotton, hence the term ‘value chain’. Over the past 30 years, the Australian fashion manufacturing industry has been slowly ‘hollowed out’. With little onshore manufacturing remaining, Australia imports higher value finished textile and fashion products, chiefly from Asia. As a result, the Australian cotton crop is entirely export-oriented², selling 99% of production as bulk commodities, differentiated based on quality parameters (Cotton Australia, 2016, 2018a). However, as the raw material travels through the value adding stages in the globalised textile and fashion industries, it is uncertain how and whether the

¹ The myBMP (2021) program consists of ten modules, including biosecurity, energy and input efficiency, fibre quality, human resources and work health and safety, integrated pest management, sustainable natural landscape, pesticide management, petrochemical storage and handling, soil health and water management.

² After the raw cotton is grown and ginned onshore, it is then sold by merchants to spinning factories offshore. Customers of Australian cotton include China, Indonesia, Thailand, Korea, Bangladesh, Vietnam and Pakistan (ABARES 2014 in Cotton Australia, 2016).

‘sustainable value’ of Australian cotton is transferred³ into the final product. For example, sustainable value is created on-farm and passed along the chain, starting with the yarn, textile and garment manufacturers (middle chain actors) and then the retailer and consumer. In this way, cotton’s sustainable value moves down the chain, but is received at different points in the chain. Equally important is exploring the reasons why sustainable value is transferred or not transferred. As the value chain traverses local, national and international locations, a critical exploration of the dynamics within value chains is required.

The global fashion and textile industries are under pressure from non-government organisations (NGOs), governments and consumers to implement strategies that address environmental and social issues. Brands and retailers are looking to prove sustainability across all fibres and production processes through partaking in industry ratings (e.g. the Ethical Fashion Report by Baptist World Aid) and using metrics and tools (such as the Sustainable Apparel Coalition’s (SAC) Higg Material Sustainability Index (Higg MSI)). The European Union’s Product Environmental Footprint (PEF) was developed to address the proliferation of different standards which made ‘green’ claims confusing (Pesnel & Payet, 2019). The PEF uses a life cycle approach to measure the environmental performance of products, which can then be used to make credible claims, as well as enabling comparable environmental reporting (Pesnel & Payet, 2019). Although the PEF is not mandatory yet, initiatives that seek to measure sustainability are gaining momentum and becoming key drivers for change. As such, actors in supply chains must be able to help businesses deliver on these intentions and report on what impacts a supply chain has in order to maintain competitive market access. In other words, global fashion value chains, which Australian cotton is a part of, are making more and more demands around sustainability; thus, it is no longer enough for the Australian cotton industry to produce fibre and ship it, they must also be ready to provide key stakeholders with the sustainability information they require. Further compounding this challenge is cotton’s market share being encroached upon by polyester (52% of global fibre production),

³ It must be acknowledged that this thesis draws on the idea of ‘transferring’ or ‘transference’ of sustainable value as developed in Ecker’s (2010) PhD thesis on Australian food and fibre supply chains. Here, Ecker (2010) uses the word ‘transfer’ to refer to how sustainability values move up and down the chain, and from one actor to another.

which is inherently non-renewable (Textile Exchange, 2021). In addition to this, retailers and consumers are looking for up-to-date information about fibres and their sustainability impacts to make purchasing decisions, but perceptions of cotton's sustainability are challenged by misinformation which ultimately undermines the sustainable value of cotton as a fibre (Transformers Foundation, 2021). In turn, providing evidence for cotton's sustainability has become more pressing.

I argue that exploring Australian cotton's sustainable value requires a whole of chain perspective, from converting fibres (cradle) into products, through to their end of life (disposal). To do this, this study examines value chains that use 100% Australian cotton. While Australian cotton goes into numerous products globally, this study focuses on fashion products, rather than other cotton products (such as sheets or towels), for two reasons. First, fashion is the biggest market for cotton, with approximately 41% of cotton destined for the garment textile industry, 25% to home-furnishing, 21% to cottonseed processors, and 13% for other markets (Aravanis, 2017). Second, there is intense consumer, NGO and government scrutiny on the fashion industry and its supply chains, as there are sustainability issues at every stage and for every raw material (fibre) choice. Fashion products also have a high cultural and symbolic value for consumers, which is communicated through fashion retailers' marketing and branding. Fashion's emphasis on changing aesthetics means there is a high turnover of products, which causes environmental impacts such as textile waste and resource depletion, as well as social issues around labour practices (Caniato et al., 2012; Fletcher & Grose, 2012; Kozłowski et al., 2012; Ren, 2000; Winter & Lasch, 2016). While there are approaches to sustainable material and garment design (Black, 2008; Fletcher & Grose, 2012; Gwilt, 2014), these are challenged by a lack of visibility and traceability due to the outsourcing of production (Karaosman et al., 2017; Mihm, 2011). Adding to this, fortunes in the fashion industry are polarising in nature and there is an incredible concentration of power held by fashion companies and retailers. For example, fashion retailers garner the highest economic value within the chain. A 2011 report by O'Rourke Group Partners LLC found that retailers' mark-ups make up 60% of the total price (Westwood, 2013). Additionally, McKinsey (2019b) found the top 20 fashion companies accounted for 97% of the profit, which demonstrates an unequal playing field that 'squeezes out' other players. Given the current plethora of issues and attention on global fashion value chains, there is a need to understand the attitudes and

perceptions of Australian cotton's sustainable value and take into account the views held by manufacturing and retailing value chain actors, in addition to farmers. To achieve this, an approach that considers the whole fashion value chain is required.

1.1.1 Understanding value chains

Although this study is focused on the Australian cotton 'value chain', the terms 'supply chain' and 'value chain' are both used in this thesis. Coined by Porter (1985), a value chain is often defined as the stages of value-adding activity that transform a raw material into a product, whereas the term 'supply chain' refers to the broader system of logistical activity and processes and is used to describe the wider production and consumption system (Cortada, 2011). The difference is that the value chain is chiefly customer-focused and is concerned with competitive advantage and creating value for customers. Value Chain Analysis (VCA) is a method that has been developed to examine how value chain can activate 'adding value' or better align to consumer value. It is also important to note here that the term value chain is loaded with economic meaning in the literature. This emphasis on 'economic' value focuses on maximising 'economic values' at each stage. VCA has been expanded to Sustainable Value Chain Analysis (SVCA), which includes frameworks and tools to assess and track environmental impacts along the chain. Although environmental impacts and economic dimensions are undoubtedly important, this approach provides only a narrow focus on metrics (such as reduction of inputs) and on economic value, and in turn, only a one-dimensional understanding of sustainability along the value chain can be garnered from this approach. For these reasons, there is a need to re-examine how sustainability is valued and conceptualised within value chains.

While literature exists on sustainable value and Section 2.1. explores sustainability in greater detail, the experience of how value chain members construct sustainable value has not been investigated and this study seeks to address this gap (Cardoni et al., 2020; Mehera, 2017, 2019). In addition to this, when investigating constructions of sustainable value, it is difficult to disentangle the associated neo-liberalist globalised free markets from the political and economic context of competitive productivism, which has led to a focus on monocropping and

specialisation in agricultural production in Australia (Lawrence et al., 2013)⁴. This construction of sustainability has primarily focused on market forces and economic outcomes such as activity and productivity, for example increasing the volume of production while reducing inputs that are needed such as water, land and pesticides. Much of the research to date around sustainability in the Australian cotton industry has focused on resource productivity. For example, innovation in research and development over the past decade has seen Australian cotton growers reduce insecticide use by 97% and improve water usage by 48%, and produce yields three times the world average, meaning Australian cotton is highly land and resource efficient (Cotton Australia & Cotton Research and Development Corporation, 2019). While these achievements are important to recognise, this study is interested in the connection between ‘on-farm’ sustainability and value chain demand and expectations. Therefore, whilst there is a key focus on the ‘on-farm’ sustainability which provides the background for this study, this study focuses on how these values are transferred along the value chain and given meaning, which has previously been unexamined. In turn, this project conceptualises that sustainable value creation occurs when economic, social and environmental values associated with cotton production can be transferred to key stakeholders in the value chain, as well as customers⁵. There is also a need to understand the Australian cotton value chain context as part of this because sustainability in the cotton industry is difficult to define in a broad sense. Therefore, developing an in-depth understanding of the dynamics of the Australian cotton value chain is key.

A way to do this is through following the VCA method, which involves following single chains and mapping material and information flows, as well as

⁴ Neo-liberalism has been described as providing a ‘solution’ for market-orientated policies which foster strongly competitive industries through abolishing trade restriction and subsidies such as guaranteed pricing and quotas, which in turn leaves farmers unprotected against global market forces (Dibden et al., 2009; Hall, 2011). However, this is different to cotton production in the United States, where farmers are subsidised, which has resulted in depressing the world prices of cotton (Hamblin, 2009). It is also important to note that the neo-liberal approach has been criticised for its limited power in correcting market failures such as pollution, soil erosion and biodiversity loss (Hamblin, 2009; Lawrence et al., 2013).

⁵ It must be acknowledged that this conceptualisation of Australian cotton’s sustainable value draws upon the work of Ecker (2010, p. 234) who defines a sustainable food and fibre supply chain as: “a sustainable food or fibre product supply chain occurs where supply chain actors adequately manage social and environmental impacts and are able to create, hold and transfer environmental, social and economic sustainability values associated with production and consumption along the supply chain, including to consumers”.

relationships, to understand its structure and underlying constraints and potential areas for improvement (Soosay et al., 2012). As mentioned above, the global cotton value chain is made up of five main segments: cotton growing; yarn, textile and garment production; and retailing. Although this study maps the stages and processes involved, the focus is on mapping the ‘socially constructed’ landscape of sustainability within the Australian cotton value chain based on interviews with value chain members. In order to understand how sustainable value is socially constructed, value mapping, a technique developed from the Cambridge Value Mapping Tool (CVMT), will be used to identify where sustainable value is created, captured, uncaptured, destroyed or missed, as well as areas for opportunity, and to which stakeholders it has value to. The CVMT in this study has been adapted to include Australian cotton stakeholders. As part of this, an in-depth analysis of what sustainable value is, how it is created, who the most important stakeholders are, and their relationships with others along the value chain is undertaken using thematic analysis. Through the application of this tailored tool, the study will be able to identify what sustainability means to Australian cotton value chain stakeholders and why it matters.

1.2 RESEARCH STRATEGY

A value chain approach that involves all participants materially connected in the system, combined with value mapping interview techniques, allows for rich exploration of how sustainability is valued in the chain, as well as an exploration of the wider settings and contexts to reveal the systemic aspects of sustainability. In order to study the complexity of the context under investigation, the methodological foundations underlying this study are phenomenological and social constructionism. These ontological and epistemological stances are interested in understanding a person’s experience of a phenomenon – which in this instance is the transference of Australian cotton’s sustainable value along the fashion value chain. A qualitative methodology was considered the most suitable in addressing the aims of this research, especially for gaining a holistic account of value chain participants’ experience. In turn, the research questions that underpin this qualitative study are open-ended and exploratory in nature. As stated earlier, the main overarching research question of this thesis is: How is sustainable value understood, created and captured by the Australian

cotton industry and its value chain stakeholders? Sub-questions to further explore sustainable value include:

1. Who are the most important stakeholders, what are their relationships with others along the value chain, and how do they define sustainable value?
2. Where in the Australian cotton value chain is sustainable value created, captured and uncaptured?
3. What are the opportunities and barriers for sustainable value creation?

Data for this study was collected from two Australian cotton value chains using a qualitative approach of semi-structured interviews guided by the CVMT tailored to Australian cotton stakeholders. This involved a total of 21 study participants, consisting of growers, ginner, traders, agents, spinning mill, textile and garment manufacturers, through to niche and mass-market Australian retailers. Pre-harvest actors, such as cotton seed distributors, are not the focus of this study, although relevant information is provided when necessary for context and meaning. To analyse the data, I segregated the interviews into their value chains and used a deductive approach based on sustainable value categories, and then an inductive approach to identify themes, meanings and patterns. This study assumes that participants understood or were aware of sustainability issues facing the fashion industry and that responses provided were truthful to the best of their knowledge and experience.

This study focuses on Australian cotton value chains, which have their own dynamic due to location and chain structure. This research will contribute to a better understanding of how sustainable value is constructed and perceived by stakeholders in cotton value chains. However, the findings cannot be representative of all cotton value chains, or indeed of the entire Australian cotton industry. Aspects of the findings, such as the Australian cotton value chain map, that can be generalised across the Australian industry. However, different cotton regions may have a different value chain structure.

1.2.1 Significance and contribution

This cross-disciplinary study explores the intersection of agriculture, fashion value chains and sustainability, with the aim of contributing to current discussions around conceptions of sustainability in the global fashion and Australian cotton industries. This thesis aims to contribute to a growing body of knowledge about sustainable value, and particularly addresses the research gap in the current fashion sustainability field, namely the lack of an in-depth understanding of value chain influences and constructions of sustainable value.

The study makes three original contributions. First, it will contribute to industry knowledge about fashion value chains and develop a theoretical framework and method to understand ‘who’ is capturing value from sustainability and why. To achieve this, the study contributes a tool to identify sustainable value in the context of global textile and fashion supply chains. This tool has the potential to temperature-test who values sustainability, and what value they place on it (i.e. willingness to pay a premium). Second, through mapping the Australian cotton value chain, it identifies actors’ experiences and perceptions of sustainability which have previously been unexamined. Third, the findings will extend scholarly knowledge and contribute to building a holistic understanding of the dynamics of sustainable value in value chains. Enriching scholarship on sustainable value through empirically grounded research is critical as there is a need to bridge actors’ understanding of all issues in value chains. In this regard, this study aims to make important theoretical and practical contributions to knowledge through providing evidence that sustainable value is socially constructed and therefore a variable experience.

This identification of Australian cotton’s sustainable value may be used to inform the industry’s marketing and value chain strategy. Deepening the industry’s understanding of the different kinds of value that can be captured from social and environmental sustainability at each point in the supply chain will help clarify Australian cotton’s sustainable value proposition, as well as key opportunities for future progress. One question is whether tangible economic value is captured from sustainable practices, or if these practices have other forms of value. For example, the economic value could be in the form of value chain customers (i.e. from merchants to retailers) willing to pay more for cotton that is ethically produced and traceable. Alternatively, being sustainable could be an essential expectation for market access in

the future; hence having value for market access but attracting no economic premium. Additionally, this research identifies misconceptions and outdated assumptions made by value chain members around Australian cotton. Understanding sustainable value creation is important as it can be a catalyst of change and collaboration, create value propositions and help businesses along the chains deliver on sustainability intentions in a globally competitive marketplace that is increasingly scrutinised on sustainable impact. Previous research has shown that understanding sustainable value is a business opportunity (Hart & Milstein, 2003, p. 56) and can provide “long term competitive advantage” (Fearne et al., 2012, p. 575). The outcome of this research project will be a framework that outlines how the Australian cotton industry can create sustainable value within its value chain. This framework will assist the Australian cotton industry in making a positive contribution to society and the environment, as well as its future competitiveness in the global marketplace.

1.2.2 Motivation

My motivation for engaging in this current research project stems from my background as a research assistant, as well as my personal interest in better understanding the real-world challenges currently facing the global fashion industry. I also came into this project with my own experience of working in front-line retail with Australian fashion brands. In these roles, I witnessed first-hand the relentless pace of fashion’s wasteful practices, but felt helpless in making any meaningful changes. I carry these experiences into my role as a researcher, but with the ambition to ensure that any knowledge generated from the findings of this research can be integrated into the fashion industry. In other words, my goal with this research project is to contribute to the body of knowledge around the pathways that are needed to move sustainability forward.

This project is aligned with two Cotton Research and Development Corporation (CRDC)-funded research projects in which I was employed as a research assistant: 1) [Agri-Intelligence in Cotton Production Systems – Stage 1](#) (QUT1701) (Payne, Mellick, Simpson, et al., 2017), and 2) [Improving the ability of the Australian cotton industry to report its sustainability performance](#) (QUT1705) (Payne, Mellick, & Peterson, 2017). In the first project (QUT1701) we investigated how data flows along the value chain and assessed how it could be used to inform on-farm decision making.

In the second project (QUT1705) we examined economic, social and environmental issues of concern for the fashion industry and used this information to identify sustainability indicators of greatest relevance to Australian cotton growers. The data collected in these projects included a series of in-depth interviews with 29 Australian cotton growers and 32 value chain stakeholders including ginners, marketers, textile and garment manufacturers and multinational retailers. It was through these projects that I gained a deep understanding of the cotton value chain, as well as an unwavering respect for the Australian cotton industry. These projects alerted me to the complex nature of sustainability on-farm, as well as the challenges around reporting sustainability messages to key stakeholders. They also gave me a chance to expand my world view and transform my thinking about sustainability beyond measurable indicators and inputs, to considering how our understanding of sustainability comes from our individual lived experiences. This underpins my desire to explore the behaviour and experiences of sustainable value associated with fashion production from the perspective of actors involved in the value chain.

1.3 THESIS OVERVIEW

This opening chapter has sought to provide a brief background to the study, as well as aims and objectives. Chapter 2 provides a literature review which discusses the central themes of sustainability, value chains, value and the fashion industry. As this study is focused on the socially constructed experience of sustainability, the aim of Chapter 2 is to identify the current theoretical understandings of sustainability and its value. It proposes that actors within the chain address sustainability on a spectrum from weak to strong, which provides a framework to understand sustainability and its value within Australian cotton value chains. The second aim of this chapter is to conceptualise how value chains operate. This chapter draws on VCA and Global Value Chain (GVC) approaches as frameworks to understand the power and governance of global fashion and textile value chains, and more importantly, how actors within chains shape and influence perspectives on sustainability. The third aim of the second chapter is to review methods and tools used to analyse sustainability and value in business models and chains, and arrive at a framework best suited to examining the social construction of sustainable value within Australian cotton value chains.

Following the literature review, Chapter 3 provides the methodological approach and describes the research methods employed for data collection and analysis, as well as the procedures in place to ensure the validity and reliability of the study. As discussed above, this study is designed to follow discrete, connected value chains, from fibre to fashion product, to gain a holistic view of sustainability within Australian cotton value chains. The chapter also contextualises the phenomenological and social constructionist frameworks which have informed this doctoral research. Participants' details, ethical considerations and the role of the researcher are also explained in this chapter.

Chapter 4 builds an analysis of the present state of the Australian cotton industry and contextualises the industry within the wider global cotton system. This will be used to highlight the novelty of the two chains examined in the study. Chapters 5 and 6 present case studies of two Australian cotton value chains, referred to as ACVC 1 and ACVC 2. Specifically, these chapters provide a rich account of both chains' characteristics, and stakeholder perceptions of sustainable value and relationships. These cotton value chains are examined with reference to current theoretical and industry understandings around sustainability.

Chapter 7 compares and contrasts the two Australian cotton value chains and discusses how participants perceived sustainability and its value. The main aim of this chapter is to synthesise findings and review participants' experiences, constructions and understandings of sustainable value. The chapter identifies three central themes, including value chain power dynamics, communication of sustainable value, and Australian cotton's im/materiality and circularity value.

Chapter 8 presents conclusions and project outcomes, outlines key factors for sustainable value as observed in the study, and makes recommendations for the Australian cotton industry to improve the capture of sustainable value. The adoption of these recommendations could result in a more effective transfer of sustainable value to key stakeholders. Theoretical, methodological and practical contributions of the study are also described in this chapter, as well as the study's limitations, with reference to recommendations for future research and practices.

1.4 CONCLUSION

The Australian cotton industry is at the beginning of the long, globalised chain of fashion production. As concerns around sustainability grow, every actor along the chain will play a critical part in taking action. To effectively deliver on sustainability intentions, more collaborations and partnerships along the value chain are required. Yet it is unclear what definitions of sustainability are, and if these definitions are shared. To address this gap, this study asks actors within fashion value chains about their experience and perception of Australian cotton's sustainability – specifically what they value and why. These insights will lead to a better understanding of sustainability within the entire chain, as well as reveal where perceptions converge and diverge. The following chapter examines the themes of sustainability, value chains, value and the fashion industry in greater depth.

Chapter 2: Literature Review

The research gap this study seeks to examine is the social construction of sustainable value via attention to Australian cotton value chain stakeholder experiences and perceptions. This chapter reviews existing understandings that define the areas of scholarly research: sustainability, value chains, value and the fashion industry. Section 2.1 seeks to map the background of sustainability, consider the various views of sustainability, and question what is to be sustained and for whom. This doctoral thesis takes a long-term view of sustaining the Australian cotton industry. Section 2.2 considers the critical context in which fashion operates as a global value chain and is chiefly concerned with understanding how a chain can be defined as an object of study. Section 2.3 deconstructs notions around value and sustainable value, particularly how value is created and captured in a business and value chain context. It then shifts to reviews of existing methods and tools that assist in creating sustainable value within business models and value chains, finding that current tools only assist partially. This section identifies, and seeks to rectify, the absence of an integrated framework through which to explore how sustainability is valued in fashion value chains via analysis of the Australian cotton value chain. Section 2.4 concludes the chapter, and links to the following chapter on Methodology.

2.1 SUSTAINABILITY

There is no consensus on what sustainability means. The literature surrounding sustainability is largely focused on sustaining humans within the bounds of Earth's carrying capacity, all the while distributing resources intra- and intergenerationally. The twenty-first century is characterised by the converging nature of sustainability

challenges that include climate change⁶, biodiversity loss⁷ and water scarcity⁸, all of which threaten the environment and human society (Rockström et al., 2009). This period of time is called the Anthropocene Epoch, defined as the geological time in which humans dominate the Earth and have a significant impact on the planet's climate and ecosystems (Steffen et al., 2018). The world's population is expected to reach 9.7 billion people by 2050 (United Nations Department of Economic and Social Affairs, 2019). The key environmental impacts of the human population are related to the consumption and production of natural resources. For example, food resources require the use of land for agricultural purposes, which in turn has led to deforestation and biodiversity loss, soil health problems such as erosion and salinisation, water management and scarcity issues, as well as over hunting and fishing (Diamond, 2005). The rising population also brings with it cascading issues such as food shortages, starvation and conflict over scarce resources, as well as the desire for increased standards of living, greater disparities in wealth distribution, and the imperative for continued economic growth (Diamond, 2005; Steffen et al., 2015; Steffen et al., 2018). The problem of climate change brings a sense of urgency to the discussion of sustainability⁹; but the firmer the science has become, the more contested the views have become on how to act. Climate change has been deeply politicised worldwide,

⁶ Climate change is caused by increased greenhouse gas (GHG) emissions, such as carbon dioxide and methane. The GHG enrich the atmosphere which causes rising temperatures, warming of oceans, and increased extreme weather events. The causes of rising emissions are deforestation, farming livestock and burning of fossil fuels (such as coal, oil and gas) which are produced from fossilised organic matter (plants and animals) that release combustion.

⁷ For example, around 1 million animal and plant species are now threatened due to climate change (United Nations Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2018).

⁸ For example, it has been estimated that water withdrawal has increased 1.7 times faster and this is one of the pressures on renewable water resources (Food and Agriculture Organization, 2016).

⁹ Reports about the hottest temperatures, 'black swan' bush fires, longer droughts and declining species are some of the impacts of climate change that are featured in daily news headlines. The global community is aiming to keep global temperatures below 2 degrees Celsius above pre-industrial levels, as proposed in the Paris Agreement adopted in 2015 (United Nations, 2021). The International Panel on Climate Change (IPCC) (2018a) revealed that an increase of 2 degrees will bring a greater chance of extreme, dangerous and catastrophic changes to the global environment which will increase the intensity of weather events such as storms, wildfires and droughts. However, current global average temperatures are 0.85 degrees higher than pre-industrial levels (late 19th century), and the world "is likely to reach 1.5 C above pre-industrial levels between 2030 and 2052" (Intergovernmental Panel on Climate Change, 2018b). The solution lies in reducing emissions from fossil fuels globally; however, many sources of carbon emissions are locked in. On the other side of this are nature's feedback loops, which either increase (positive feedback) or decrease (negative feedback) the effects of climate driver forcing, such as GHG emissions (NASA Science, 2021). This points to a need to understand the problem as a whole, which is related to work undertaken by Donella Meadows in *Thinking in Systems* (2008, p. 170).

resulting in debate and denial, rather than action. Problems have emerged with the current modes of global production and consumption, and the connection between the Anthropocene carnage and the fashion industry is deep. For example, the United Nations (UN) Climate Change (2018) estimates that the fashion industry emits more carbon dioxide (CO₂) pollution than the combined total of the aviation and maritime industries; while Good on You (2019) cites transport as the biggest contributor to carbon emissions, estimating that a single garment can travel to as many as ten countries as it is being assembled. With carbon emissions set to grow, the recent UN Fashion Industry Charter for Climate Change (2018) called for signatories to commit to emission reductions¹⁰ (United Nations Environment Programme, 2019). Furthermore, if these issues are not addressed, the wellbeing of future generations will be severely compromised. For example, Rockström et al. (2009) invoked the concept of the planetary boundary¹¹ to define environmental limits in which the Earth's system can support humanity, which if crossed, increases the likelihood of irreversible environmental change. All these challenges bring wide systemic social issues and threaten our ability to live within Earth's carrying capacity; however, these concerns are not new.

2.1.1 Background

'Sustainability' and 'sustainable development' emerged in the 1960s in international forums, discussions, and texts¹², and since the 1970s, there has been a steady and slow movement to include sustainability on the international agenda (International Institute for Sustainable Development, 2012). *The Limits to Growth*

¹⁰ It should be noted that the sustainable cotton program, BCI, recently became a signatory on July 5, 2019 (Fibre2Fashion, 2019a).

¹¹ The nine planetary boundaries include: 1) Stratospheric ozone depletion, 2) Loss of biosphere integrity (biodiversity loss and extinctions), 3) Chemical pollution and the release of novel entities (such as heavy metals and plastics), 4) Climate change, 5) Ocean acidification, 6) Freshwater use and the global hydrological cycle, 7) Land system change, 8) Nitrogen and phosphorus flows to the biosphere and oceans, and 9) Atmospheric aerosol pollution (Rockström et al., 2009). However, humanity is already operating outside of four boundaries including climate change, loss of biosphere integrity, land-system change, and altered biogeochemical cycles (phosphorus and nitrogen) (Steffen et al., 2015). Although Rockström et al. (2009) acknowledge that actions and choices are critical to addressing 'undesirable outcomes'¹¹, they also state that boundaries exist irrespective of people's values and socioeconomic circumstances, as well as technological expectations and fluctuations in economic growth.

¹² A series of texts in the 1960s documented the impacts humans were having on the planet, including Rachel Carson's *Silent Spring* (1962) and Paul Ehrlich's *Population Bomb* (1968).

report published in 1972 highlighted that human and industrial activities were depleting more renewable and non-renewable resources than the earth was producing (Meadows et al., 1972). The acknowledgement of the world's finite natural resources sparked a response to fix these problems. But it was the United Nations report, *Our Common Future* (also known as the Brundtland Report) that defined the search for sustainability and encouraged countries to work together on sustainable development and take care of resources for future generations (Brundtland & Khalid, 1987). The Brundtland Report (1987, p. 54) defined sustainable development as: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Diesendorf (2000) explains that sustainability and sustainable development are often used synonymously because sustainable development can be viewed as the pathway that leads to sustainability. However, the definition of sustainability provided by the Brundtland report has been subject to several modifications, and as a result, the term has become broadly accepted, but at the same time has become a ‘popular catchphrase’ with little specificity (Mensah, 2019) (this will be discussed in more detail in Section 2.1.2). Diesendorf (2000) further explains that this is because sustainability and sustainable development are contestable concepts rather than scientific measures, and discussion and debate are part of the process of working towards sustainability. Furthermore, definitions around sustainability have been described by scholars as elusive, contested, debatable, ever-changing, vague, overused, confusing and even meaningless (Missimer et al., 2017; Evans & Peirson-Smith, 2018; Henninger et al., 2016). Previous research has also highlighted consumer concerns around greenwashing and found that sustainability messaging can be viewed with scepticism and lead to consumer mistrust (Delmas & Burbano, 2011; Guyader et al., 2017; Peirson-Smith & Evans, 2017; Henninger et al., 2016). Consequently, there is no universally agreed definition of what sustainability means.

As sustainability requires action from the global community, it therefore involves different stakeholders who possess different values, commitments, aspirations, and personal and organisational history, which in turn leads to competing

agendas and contradictions, and ‘wicked problems’¹³ (Rittel & Webber, 1974). At the heart of ‘wicked problems’ associated with sustainable development is the dominant economy in a market-based capitalist society which is based on productivity and consumption – income is measured by money, based on profit, property and market mechanism for trade (i.e. Global Domestic Product). Continual growth is the primary goal of the capitalist economy, but growth (making the economy bigger) is at odds with development (making it better), and as Section 2.1.3 will later discuss, fashion is inextricably bound up with capitalism. Continual growth is a driver of an unsustainable system, and the problem with only counting money is that it ignores the environmental costs (i.e. depletion of natural resources). However, Milne et al. (2006) points out that the Brundtland definition of sustainability does not challenge the notion of growth; rather, it assumes that development and ecological protection can coincide. This has incited criticisms that ‘sustainable development’ is ultimately unsustainable, and instead, we need to ask moral questions around what is to be sustained, how it is to be sustained and who does it serve? Another perspective around this is the ‘politics of unsustainability’, as theorised by Blühdorn (2011, 2017). Blühdorn (2011) argues that actions have been ineffective in addressing issues such as global warming and biodiversity loss; instead, the environmental crisis has been normalised. Blühdorn (2011) called this ‘sustaining the unsustainable’ and references the work of Robert Dahl (2000) to explain the paradox between, on the one hand, acknowledging the urgency of the problem, yet on the other, an unwillingness and inability to address the problem. This reveals the tension between scientific measurements which indicate that human activity is bringing about irreversible changes to the environment, but human worldviews play a key role in bringing about action. Lockie and Pritchard (2001, p. 9) provide an existing theoretical framework that considers how sustainability is socially constructed, and raise questions such as, “what is to be sustained, by whom, and in what condition”. According to Lockie and Pritchard (2001), social science research has approached sustainability through the lens of ‘materialism’ (the biological reality of sustainability) or ‘constructionism’ (actors’ understanding of sustainability).

¹³ ‘Wicked problems’ are complex and challenging problems without straightforward solutions, such as education policy, public health, poverty and climate change. Rittel and Webber (1974) identified 10 characteristics of wicked problems, including: a ‘no stopping’ rule, solutions are either good or bad, there are unending solutions and approaches to wicked problems but solutions are unable to be tested, and that every wicked problem is unique and symptomatic of other problems.

This study follows the ‘constructionist approach’ and considers “the different things that sustainability means to different people”, but does not seek to “figure out” one definition for sustainability (Lockie & Pritchard, 2001, p. 9). Rather, this approach is concerned with “how actors compete to promote their own understandings of what the general principle of sustainability actually means in practice” (Lockie & Pritchard, 2001, p. 9). This indicates that sustainability is a socially constructed concept based on individual actors’ perceptions, values and expectations. To further explore this, and noting that corporations and industries are key elements of the economy and society that affect the sustainability of the planet and society, the following section seeks to establish a framework for conceptualising sustainability in a business context.

2.1.2 Frameworks to understand relationships between sustainability and business

Consumers, governments and NGOs are increasingly scrutinising companies and industries for their sustainability impacts¹⁴. These impacts can be direct (i.e. choice of raw materials, financial arrangements, waste and pollution, employment and work practices) and indirect (i.e. models of consumption) (Diesendorf, 2000). A spectrum of possible sustainability practices, scenarios and responses have emerged. The Brundtland Report was the basis for John Elkington’s (1998) ‘Triple Bottom Line’ (TBL), also known as the ‘3P model’, which further conceptualises sustainability into a Venn diagram, in which profit (economic aspect), people (social aspect) and planet (environment aspect) must be balanced (see Figure 1).

¹⁴ For example, in 2016, the United Nations (UN) developed 17 Sustainable Development Goals (SDGs) for 2030 with the aim of putting economic, social and environmental issues into political, societal and business agendas.

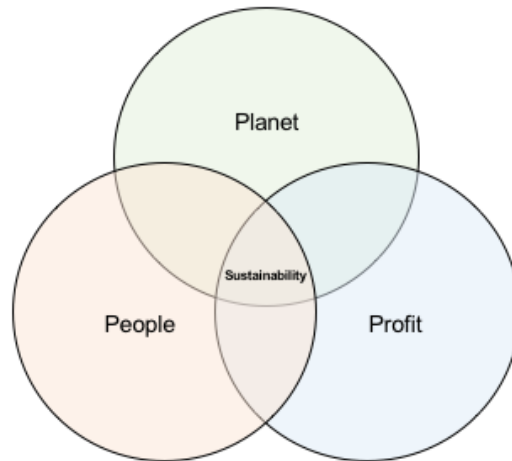


Figure 1: Triple Bottom Line (adapted from Elkington, 1998)

The TBL elements, economic, social and environmental, offer a holistic approach to understanding sustainability parameters. Following the TBL framework above, sustainability and long-term growth within the business context can only be achieved if each aspect is integrated equally, acknowledging that continued success is only possible if the natural resources that all businesses rely upon are not exhausted beyond than their ability to regenerate. TBL has been embraced as the best practice towards sustainability, as well as a win-win for business and society. Savitz and Weber (2007), in ‘The Sustainability Sweet Spot’, explain that sustainability is the overlapping interests shared by financial stakeholders and the public (non-financial stakeholders): “the place where the pursuit of profit blends seamlessly with the pursuit of the common good” (Savitz & Weber, 2007, p. 17)¹⁵ (see Figure 2). However, the ambition of sustainability to simultaneously address longer-term social, environmental and economic objectives is laden with tensions.

¹⁵ Savitz and Weber (2007) further elaborate that the benefits of sustainability are in reducing risk of harm to society, reducing costs and waste by improving processes and in positioning for new markets and services, and also a ‘softer’ side of employee satisfaction and customer loyalty. The authors also make the distinction between ‘sustainable’ and ‘responsible’ companies, with ‘responsible’ companies transitioning to more sustainable practices/products while still meeting the current demands of consumers. Where there is no sustainable option, they concluded that companies should ‘wind down’ their operations as fast as possible. However, this is not a ‘likeable’ option for industries and businesses. Rather, as Diesendorf (2000) points out, we see that some corporations may simultaneously promote and damage sustainability, for example an oil company that is investing in renewable energy.

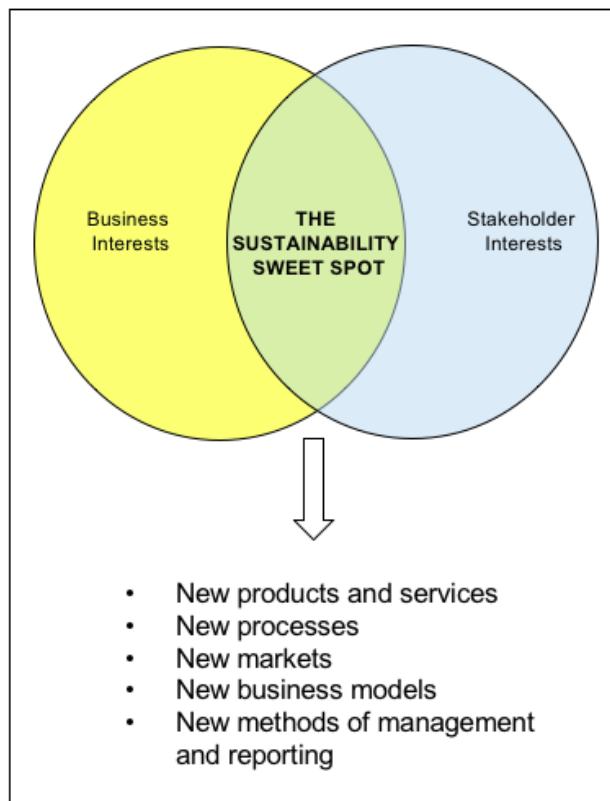


Figure 2: The Sustainability Sweet Spot by Savitz and Weber (2007, p. 18)

Paradox theory has been conceptualised by Hahn, Figge, Pinkse, and Preuss (2018) to explain the ‘paradox’ within the idea of a business case for sustainability, in which the firm economically benefits from addressing environmental and social concerns. The paradox perspective acknowledges and accepts that social, economic and environmental concerns create interrelating, conflicting, competing and divergent tensions that businesses must attend to asymmetrically. Hahn, Figge, Pinkse, and Preuss (2018) propose that ‘working through’ the paradoxes requires continual attention to balancing the concerns, even when presented with options that afford no financial gain. Although the paradox acknowledges that sustainability ‘in the real world’ presents a series of trade-offs, the business case for sustainability operates in narrow terms. To widen the scale, Milne, Kearins and Walton’s (2006) spectrum of sustainability from weak to strong conceptions is a useful way to frame the degree of action corporations take. Based on the analysis of business literature surrounding sustainability, strong sustainability refers to the need to radically reorganise society around ecological stability, and weak sustainability refers to adding in incremental

sustainability practices to clean up business as usual, but only if a business case can be made (Milne et al., 2006). Strong sustainability tends to be based on deep ecology and proposes a radical change to current business practice (Milne et al., 2006). For example, Daly's (1992) approach sees the redistribution of resources for current and future generations within the bounds of supporting ecological life and systems. A strong sustainability approach in fashion may seek to reduce consumption and production, whereas weak sustainability links economic progress with environmental protection in which there is no radical change, limits or constraints to our life. A weak sustainability approach in fashion may focus on 'greening' processes and products, as well as improving working standards. Similarly, the phrase 'sustainability as a journey', when used by companies, evokes the idea of continuous improvement and moving towards serious change and engagement with sustainability elements (such as social, environmental and economic aspects) (Milne et al., 2006). Here, Milne, Kearins and Walton (2006) argue that these improvements are actually minor changes that paradoxically serve in reinforcing business as usual practices (i.e. continued growth and profit ignores the notion of limited and finite resources). In other words, a paradigm of weak sustainability has largely dominated the action and discourse surrounding sustainability.

However, incremental approaches are still important, especially considering the sheer volume of products that are manufactured and the complexity of fashion supply chains which many livelihoods rely on. As Meadows, Randers and Meadows (2005, p. 1250) state: "tiny changes multiplied many times can make a big difference". Nevertheless, Milne, Kearins and Walton (2006) argue that much of the business discourse around sustainability is ultimately 'destination'-less, does not address the core of what is needed to be sustained, and there is more that businesses can do to advance environmental and sustainable progress. In other words, the term sustainability can be attached to goals without a clear action plan or reduced to a catchword for 'business as usual'. Similarly, the term 'symbolic' sustainability has been used to describe how companies present an "image of sustainability" (Cohen, 2019, p. 2), which is a soft approach without hard goals (de Lange et al., 2012; Hyatt & Berente, 2017; Kassatly, 2020b). The term 'substantive' sustainability has been used to describe actions and measurements (Cohen, 2019; de Lange et al., 2012; Hyatt & Berente, 2017; Kassatly, 2020b). This study accepts that sustainability is a paradox

that can be viewed on a spectrum in which businesses and industries engage in weak sustainability within the bounds of business as usual, while strong sustainability is indicative of more radical and disruptive approaches and revisions of production and consumption. Within this, sustainability actions can be ‘symbolic’ and/or ‘substantive’. This study conceptualises sustainability as the TBL’s pillars of people, planet and profit. The TBL has been established as best practice for businesses. For example, both Global Reporting Initiative and BCorp cite the TBL framework, and Milne, Kearins and Walton (2006) affirm that TBL is the most commonly accepted and cited framework for sustainability in business. To understand what this means in the context of fashion, it is necessary to look at sustainability and the fashion industry.

2.1.3 Sustainability in fashion and textiles

The fashion industry is a multi-trillion-dollar global industry, made up of integrated and interdependent industries such as agricultural production (i.e. cotton, wool), manufacturing (textile and garment) and retailing, all of which occur in different locations across the world. The fashion industry faces sustainability challenges related to every stage of garment production, and for every fibre choice (Fletcher & Grose, 2012). Wide-ranging sustainability issues in the fashion industry stem from labour practices, high use of resources, waste generation, and competition to drive prices down and maintain a high level of turnover of products (Caniato et al., 2012; Fletcher & Grose, 2012; Kozlowski et al., 2012; Ren, 2000; Winter & Lasch, 2016). Within fashion and sustainability research, sustainable fashion typically refers to reducing the ecological and societal impacts of fashion practices from production (such as fibre, textile and garment), consumption, and all the way through to disposal. Although the concept of sustainable fashion is widely used throughout academic literature and within industry, definitions remain contested as sustainability practices are numerous and often competing (Evans & Peirson-Smith, 2018; Henninger et al., 2016; Thomas, 2020; Yang, Han and Lee, 2017). For example, sustainable fashion has been used as an umbrella term to describe ethical fashion (referring to human rights) (Niinimäki, 2010; Joergens, 2006), eco fashion (such as natural, organic, green) (Niinimäki, 2010; Yang, Han and Lee, 2017), slow fashion (producing and buying less) (Clark, 2008) and circular fashion (using items that already exist) (Mukendi et al., 2020). The lack of consistency with the term ‘sustainable fashion’ is partly due to

the diverse and highly segmented stages in the fashion industry, which range from raw materials to production to disposal (Jia et al., 2015; Kozlowski et al., 2015). This has led to very narrow understandings and evaluations of sustainability which focus on environmentally friendly and/or ethical materials and production (Niinimäki, 2010). Fletcher (2014, p. XVIII) acknowledges that a singular definition for sustainable fashion is unrealistic, and instead offers that environmental, societal, economic and use contexts must be considered:

I am often asked for a definition of ‘sustainable fashion and textiles’ and while I remain absolutely convinced that sustainability requires not one but many narratives, stories, visions and definitions for different audiences and contexts, I offer a lone definition here, which I hope others will then make their own: sustainability in fashion and textiles fosters ecological integrity, social quality and human flourishing through products, action, relationships and practices of use.

A vision to enact this is proposed in Fletcher and Tham’s (2019) *Earth Logic*, which calls for a fundamental paradigm shift in the fashion system in which the Earth’s planetary boundaries are put first. In other words, instead of looking at how the fashion industry can incrementally improve, we need to change how fashion is conceived of through a radical de-centring of fashion and re-centring Earth and ensure that the fashion system operates within the planetary boundaries. To date, the field of sustainable fashion research has primarily focused on manufacturing practices in supply chains (Fletcher, 2014; Islam et al., 2021; Karaosman et al., 2017; Mora et al., 2014; Seuring & Müller, 2008), such as production processes, logistics, materials and design interventions, as well as consumers’ use and purchasing behaviour (Garcia et al., 2019; Neumann et al., 2020; Stringer et al., 2020; Tey et al., 2018) and the approaches taken by retailers (Payne, 2014; Yang, Song & Tong, 2017). Various studies on the environmental impact of textiles and fashion across the value chain have been conducted¹⁶; however, there is scant information on many textile and fashion

¹⁶ For example, Palacios-Mateo, van der Meer & Seide (2021) undertook a qualitative environmental analysis on the life cycle of polyester clothing (from fibre, production, use and end-of-life phase) and identified key points for environmental sustainability such as phasing out the use of fossil fuels, switching to recycled alternatives, reducing water and chemical use, and improving microfibre recovery and garment recollection rates.

products (Muthu, 2015; Palacios-Mateo, van der Meer & Seide, 2021), and the emphasis has largely been on resource efficiency (Fletcher, 2016). While there are numerous definitions and approaches around sustainability in the fashion industry, there is no universal definition of what sustainability means (Kozlowski et al., 2015). This indicates a need to bridge understandings between the various actors and develop more unified meanings around how sustainability is valued within fashion.

Although the term ‘sustainable fashion’ is fraught with ambiguity, fashion firms are increasingly focused on demonstrating social and environmental sustainability in their supply chains. Retailers signal their sustainability commitment through connecting corporate social responsibility (CSR) to their core business values and reference international standards and sustainability initiatives such as a code of ethics / code of conduct for suppliers (Rinaldi & Testa, 2014). Sustainability initiatives are incredibly useful for retailers seeking to address poor environmental and social standards in their supply chains, as they usually consist of multiple suppliers; in turn, these initiatives act as a form of sustainability governance and compliance (Jastram & Schneider, 2015; Lund-Thomsen et al., 2021). However, sustainability initiatives tend to serve the retailer, rather than suppliers downstream (Riisgaard et al., 2020). Added to this, retailers tend to rely on certifications and product labelling when communicating sustainability to consumers (Henninger, 2015; Thomas, 2008; Morris et al., 2021; Mukendi et al., 2020). While sustainability initiatives offer retailers and consumers information on certain practices, “no label caters for the full spectrum of needs for sustainability information” (Turunen & Halme, 2021, p. 3) or effectively guides consumers in their decision making (Morris et al., 2021; Bick et al., 2018), especially as consumers have limited understanding and knowledge around sustainability (Blazquez et al., 2020; Harris et al., 2015; Henninger et al., 2016; Evans & Peirson-Smith, 2018). Sustainability-related communication is an emerging field of study (Longo et al., 2019; Luo et al., 2021), and recent research has highlighted the need to improve fashion and sustainability communication, as well as understand how sustainability messages are received and perceived by consumers (Han et al., 2017; Li & Leonas, in press). This work has demonstrated, for example, that if a retailer provides too much sustainability information, it can complicate matters and confuse consumers, which impedes their ability to act (Longo et al., 2019). Entwining brand story with sustainability actions has emerged as a strategy for retailers to engage

consumers (Hepburn, 2012; Payne, 2014). Interestingly, storytelling has been an effective strategy to communicate complex and multidimensional terms and issues to non-experts within science (Dahlstrom, 2014) but this is yet to be explored within the context of explaining the complexities around fashion and sustainability. Communicating sustainability through labels has been widely explored, as well as the consumer attitude-behaviour gap whereby sustainability concerns do not convert into more sustainable purchasing behaviours (Joergens, 2006; Stringer et al., 2020). Interestingly, Carrington (2010, p. 141) describes consumers as actors who “do not always walk their talk”. In terms of consumers’ willingness to pay for sustainable value, previous research has found that many factors influence consumer purchasing decisions, including target market, style, colour, price, as well as sustainability attributes (Entwistle, 2009; Niinimäki, 2010; Ottman, 2011; Visser et al., 2015; Yan et al., 2019; Radhakrishnan, 2017; Niinimäki, 2010; Carrigan & Attalla, 2001; Ha-Brookshire & Norum, 2011). While consumer behaviour is an important dimension of sustainable fashion, it is just part of the story. This thesis is focused on actors that are materially connected to the value chain, from farm to store to disposal, and their perception of sustainability.

Another part of the rationale for focusing on the value chain is because research has found that while there is a plethora of sustainability initiatives and terms, there is a lack of consistency, coordination, standardisation and credibility around claims (Derkx, 2013; Kozlowski et al., 2015; Yang, Song & Tong, 2017). In 2019 the UN Alliance for Sustainable Fashion was formed to coordinate sustainability initiatives¹⁷ and establish a comprehensive approach to addressing social and environmental sustainability issues (United Nations Environment Programme, 2019). Cross-industry collaborations, such as the SAC, have emerged in an effort to increase collaboration around resource efficiency and reduce environmental impacts within supply chains. However, Fletcher (2016, p. 22) points out that despite these efforts, consumption has increased and “things have got worse, not better” because “continuous expansion of use of materials is fundamentally at odds with the finite nature of the resource base”.

¹⁷ Members include Connect4Climate, International Labour Organization, Ethical Fashion Initiative, UN Development Programme, UN Economic Commission for Europe, UN Global Compact, UN Office for Partnerships, UN Environmental Programme and UN Climate Change (United Nations Environment Programme, 2019).

In other words, measurements and labels on their own cannot drive sustainable consumption. Instead, working from a whole of chain perspective to identify sustainability understandings and practices is another way to move sustainability forward.

However, Fletcher (2010, 2016) argues that the root cause of fashion's unsustainability is the speed and reliance on changing styles, as well as the production of newness, which as historian Elizabeth Wilson (1985) explains, 'speaks capitalism'. The valorisation of newness in fashion led researcher Sandy Black to put forward the notion of 'the fashion paradox', which is "the economic importance of the fashion industry set against its inherent obsolescence and waste through constant change" (Black & Eckert, 2010, p. 813). The key problem with sustainability in the fashion industry is the rate of production, consumption and disposal (Niinimäki et al., 2020). For example, the global production of apparel doubled between 2000 and 2015 to over 100 billion units (Ellen MacArthur Foundation, 2017) and an estimated 92 million tonnes of waste is produced each year (Global Fashion Agenda and Boston Consulting Group, 2017; Niinimäki et al., 2020). Adding to this, the Ellen MacArthur Foundation (2017, pp. 19, 24) found that there is a "massive underutilisation" of clothing and the average use of a garment before disposal has declined by 36% compared to two decades ago. In other words, more clothing is being made but it is being worn less and disposed of more frequently.

One proposed solution that has dominated sustainability rhetoric is 'circularity' (Global Fashion Agenda and Boston Consulting Group, 2017). The circular economy is a method of continuing the use of resources for longer, rather than the current 'take-make-waste' linear model (Geissdoerfer et al., 2017). However, research has found that reducing the "material flow" of clothing and slowing the pace of consumption, as well as extending clothing lifetimes, would result in the biggest environmental and social gains (Allwood et al., 2006, pp. 3-4; Cobbing & Vicaire, 2017, pp. 6-8; Niinimäki et al., 2020; Waste & Resources Action Programme, 2012, pp. 15, 22). The Ellen MacArthur Foundation (2017, pp. 19, 24), which advocates for a shift towards 'a new circular textiles economy', also supports the view that increasing clothing utilisation is the "most direct lever to capture value and design out waste and pollution in the textiles system". Both Clark (2008) and Fletcher (2010) propose slow fashion as an antidote to this, which is rooted in the work of Daly (1992) which explored a

revised steady state socio-economic system. Slow fashion emphasises quality rather than speed, and includes characteristics such as localised and transparent production. However, this is not as straightforward when changing aesthetics are considered, and other questions need to be contemplated, such as: What would sustainable fashion look like? What materials would it be made out of? How much would it cost? Who would make it? Where would it be made? Why would consumers buy it? Who is responsible? Fletcher (2011, p. 170) proposes that instead, a broader system-approach is required:

It sees garments as a mosaic of interconnected flows of materials, labour and potential satisfiers of needs and not simply as isolated resources, processes or sources of one-off environmental, social and cultural impact in production.

With this in mind, there is a need to take an integrated view of the problem and the value of sustainability from an entire system perspective, rather than focusing on the impact at discrete stages of the fashion supply chain. Black and Eckert's (2010) research explains this is largely because there is no one correct answer toward sustainability. Rather, a variety of approaches and solutions are needed across the garment life cycle. There is also a need to consider the wider factors at play and engage with all stakeholders including value chain members and consumers. Noting that the fashion industry operates within the constraints of a capitalist system, there is a need to understand that considerations of sustainability may rest on Milne, Kearins and Walton's (2006) spectrum from weak to strong.

This section has established the key issues surrounding the complexity of the term sustainability across the various stages of the global supply chain, as well as the lack of consensus around sustainability definitions. Further research is required to define sustainable fashion more specifically, and how sustainability is valued across different actors in a connected chain has yet to be a focus of research. It is important to establish shared understandings and definitions, such as what is expected, perceived and missing. Sustainability issues within the fashion industry are largely associated with global value chains. Therefore, to further inform this study's central point of focus on the fashion industry, this chapter moves on to understanding the dynamics of the production and manufacturing of textile and fashion products. Value chains are

dynamic, market-driven systems that present a range of research challenges; therefore, frameworks to engage value chains need to be explored.

2.2 UNDERSTANDING VALUE CHAINS

Investigating the scholarly discourse around sustainability issues connected to fashion production has provided an important background to this study. There is a further need to look at a framework to understand the complex relationships between actors within the value chain. As this study is focused on understanding the Australian cotton value chain, this section is chiefly concerned with understanding how a chain can be defined as an object of study. The globalisation of the fashion industry means that value chains are global in nature. Globalisation is a social, cultural, political and economic phenomenon that has occurred since free trade began (Arnold, 2009), and refers to the ‘speeding up’ of information, products and technology to the global level, as well as the establishment of multinational corporations, enabled through free market policies of government (Ledezma, 2017). According to Uebda et al. (2009) globalisation brought two key changes – the need for specialisation in manufacturing and the internationalisation of business value creation activities to survive.

Over the past 30 years, a swathe of theoretical approaches to understanding how global value chains operate within industries have emerged (Gereffi & Lee, 2012; Sturgeon, 2009). This is largely due to the changes in the global economy, trade policies, information technology and transportation which has allowed multinational companies in developed countries to seek opportunities in less developed economies for offshore manufacturing and resources (Gereffi & Fernandez-Stark, 2016; Gereffi & Lee, 2012; Sturgeon, 2009). The growing phenomenon of fragmented global production was marked by new linkages, relationships and uneven power distribution, which led to many different theories in business studies, development studies and sociology around how they should be studied (Horner & Nadvi, 2018)¹⁸. The main

¹⁸ The main, yet different, “generational approach[es]” (Bair, 2005, p. 163), include: World-systems theory developed by Wallerstein in the 1970s; Value chain was proposed by David and Goldberg (1957) and then further developed by Michael Porter (1985); Supply chain management by Keith Oliver in 1982; GCC developed from world-systems theory (Bair, 2009; Hopkins & Wallerstein, 1986); GVC developed from GCC through collaborative work by Gereffi, Humphrey and Sturgeon (Bair, 2009); Supply Chain Management (SCM) (Laseter & Oliver, 2003; Mentzer et al., 2011); the

concepts include Value Chain, Global Commodity Chain (GCC), GVC and Global Production Networks (GPN).

According to Sturgeon (2000, p. 6) the key difference between a *chain* and a *network* is based on the scale of analysis and linkages between actors that form discrete chains (micro-scale) or the networked linkages between economic actors (macro-scale):

I propose the term value chain be used to denote a particular, product-based thread of activity that, at a given moment in time, runs through a larger constellation of activities and dynamic configurations embodied in a production network. A value chain can be thought of as a sub-set of a production network, a simplified snapshot taken within the much more complex and dynamic set of activities encompassed by the network. To suggest that a value chain is a more static and limited conceptual tool than a production network is not [to] diminish its usefulness. It is important to have a tool that will allow the distillation of the essential steps taken to get a particular product to market. Within such a snapshot the concrete activities of the key players can be made extremely clear. But it is also important to have a larger, related concept that captures [the] dynamic and exceedingly complex nature of productive activity.

Bair (2009) raises important considerations when looking at these frameworks, particularly that distinctions are open to dispute and readers should arrive at their own assessment specific to the theoretical or analytical issue they are addressing. In this project, the term value chain, rather than network, will be used to investigate the connected nature of production. Additionally, there is another key distinction between supply chain and value chain in the literature. By and large, a value chain¹⁹ looks at the activity of making a product or service along a ‘connected’ chain, whereas a supply chain is used to describe the larger system of production and manufacturing (Cortada, 2011). Value chains are often described as ‘global’ value chains because they are

French *filière* concept that grew from agro-food studies (Raikes et al., 2000); Global Production Networks (GPN) emerged independent of GCC and GVC through the work of Ernst and Kim (2002; Henderson et al., 2002), and since developed into GPN 1.0 (Coe et al., 2004; Levy, 2008) and 2.0 (Yeung & Coe, 2015). All approaches, which are often used interchangeably, share an interest in understanding how global industries are organised and relationships between different actors involved in the production of goods and services. Structurally, some of these approaches are similar – they look at the process of globalisation and consumer markets – but each approach looks at different factors, target audiences and research purposes.

¹⁹ Bonney et al. (2009, pp. 1, 5) add that value chains may be called a “value stream” to include the flow of specific products and specific product families (whereby there are minor differences such as end use market/s) which widens understandings of the chain on an industry basis.

international in scope; however, there are clear distinctions between the value chain, GCC and GVC approaches.

Fundamentally, the value chain concept deals with firm-level strategy and not with broader economic development, whereas GCC/GVC offers a framework to focus on the role of firms in shaping value chains and governing the flow of products. To give more definition to these terms, the value chain is a business management concept that looks at how firms fit into the global economy – here, the analysis is focused on how the firm can improve its competitiveness in the marketplace (Porter, 1985)²⁰. The VCA approach has been adopted in the private sector by individual businesses to understand consumer value (Soosay et al., 2012) through mapping material, and information flows, as well as relationships (Bonney et al., 2009; Howieson et al., 2016, p. 354; Soosay et al., 2012) (see Table 1 for further information).

²⁰ VCA is also focused on customer research across the chain. The VCA approach involves mapping internal/external actors, analysing what value adding relates to the competitive position of the firm. VCA examines relationships between the actors and within organisations as well as which activities add economic value to a product to achieve competitive advantage (Bair, 2009). Here the performance of these chains depends on the individual practices of businesses, as well as the dynamics of the chain (i.e. information sharing, relationship), and how well the chain meets consumer preferences.

Table 1: Value Chain Analysis concepts and their descriptions

Value Chain Analysis Concept	Description
Material flow	Material flow refers to the main activities at each stage along the chain, and involves describing the processes the product goes through. For example, in a lentils VCA researchers identified first stage inputs and main activities including seeds, fertiliser, chemicals, machinery, labour and finance (Ariyawardana & Collins, 2013). Another aspect of VCA is identifying whether activities are value adding, necessary but non-value adding and waste (Ariyawardana & Collins, 2013; Bonney et al., 2009). The purpose of material flow is to assess supply and demand coordination (i.e. shortfalls and oversupply; reducing lead times), and opportunities to add-value and maximise productivity, as well as eliminate or minimise wasteful activities (Bonney et al., 2009).
Information flow	Material flow is also interconnected with information flow, and is used for forecasting and understanding consumer preferences, evaluating the data and information generated and utilised at each stage, as well as gauging the robustness of relationships to improve production planning and flow along the chain. Responsiveness of the flow is assess on a scale of strong, partial or weak, as well whether information exchanges are two-way, one-way or uni-directional.
Relationships	Relationships between segments are a defining characteristic of value chains, as compared to supply chains. According to Howieson, Lawley and Hastings (2016, p. 354), “relationship flow describes the way chain members relate to each other”. One way to assess relationships, which has been followed by Soosay et al. (2012) and Howieson et al. (2013), is to ask value chain members whether interactions are strong, basic or weak.

Porter (1985) does acknowledge that a firm's value chain is entrenched within a wider system of value chains, but does not seek to understand current industry practice and why it exists; the value chain simply tries to maximise the current situation. The introduction of the GCC approach added the notion of chain governance to understand how entire chains are coordinated to be 'strategically linked'²¹ to be competitive and add economic value. The GVC approach grew out of GCC and focused more on understanding governance structures, arguing that commodity chains are either buyer-driven or producer-driven, and has since evolved into five types of relationship between firms and their suppliers: hierarchical, captive, relational, modular, and market (Gereffi et al., 2005; Sturgeon, 2009). The GVC governance concept helps conceptualise how value is distributed and by which actors along the chain (Humphrey & Schmitz, 2002). GVC studies have used the 'value chain' as an organisational structure to examine international industry sectors through understanding the global context (the input-output structure of GVC, geographical scope and governance structure) and local context (upgrading²², local institutional context and industry stakeholders) (Bair, 2009; Gereffi & Fernandez-Stark, 2016). The GCC/GVC approach has been widely accepted in public and private sectors²³ as a development tool linking producers with markets²⁴ (Gereffi & Fernandez-Stark, 2016; Sausman et al., 2015).

²¹ Bair (2005) says GCC can be a methodology to map the global-local nexus to understand how chains can be analysed and inform a developmental approach for policies that can enable firms to improve their position in the chain.

²² There are three types of upgrading/outcomes: economic upgrading to more complex, higher value services through the process, product, functional or inter-sectorial. Examples of process and product upgrading in fashion include Cut Make Trim (CMT), Original Equipment Manufacturing (OEM), Original Design Manufacturing (ODM) and Original Brand Manufacturing (OBM) (Gereffi, 1999); social upgrading which has concentrated on workers (Barrientos et al., 2011); and environmental upgrading which avoids or reduces damage (De Marchi et al., 2019).

²³ The GVC framework has been adopted by international development organisations, such as the World Bank (Cattaneo et al., 2010) and the International Labour Organization (Gereffi, 2006).

²⁴ It should be noted that early GVC methodology focused on economic and competitiveness issues, while recent GVC research has focused on shifts of global industries and how chains 'upgrade' in specific countries and explore the topic such as labour regulation, workforce development, sustainability and gender (Gereffi & Fernandez-Stark, 2016). Bair (2011) adds that the GVC framework is particularly concerned with development and the role firms play in international trade and production. To date, there has only been one GVC undertaking on organic cotton in India (Singh, 2006), finding that the importers, exporters and the retailers drove the chain and farmers and the labourer are the weakest links, with opportunities for market access for small producers.

GPN evolved as a critique²⁵ of GCC/GVC as being too firm-centric and overlooking the complex network structures of economic activities, such as the uneven development of the labour market, wages and production practices (Bair, 2009, p. 4). Here, the GPN is more broadly concerned with the interrelationships between firms as “networks embedded within networks” (Coe et al., 2008, p. 277) which are non-linear, multidimensional interconnections, across national geographies:

GCCs/GVCs are essentially linear structures, whereas GPNs strive to go beyond such linearity to incorporate all kinds of network configuration. Second, GCCs/GVCs focus narrowly on the governance of inter-firm transactions while GPNs attempt to encompass all relevant sets of actors and relationships (Coe et al., 2008, p. 272).

In other words, the major difference between GVC and GPN is that GPN is “deliberately broader” in analysis (Coe, 2011, p. 390)²⁶. Bair (2009) argues, as Sturgeon (2000, p. 6) alluded to earlier, that GVC and GPN provide unique contributions in understanding global industries, and can be used in a complementary fashion to understand the micro and macro context of the value chain. As this study is focused on following a single fibre as it is turned into a product, a value chain, as per Sturgeon’s point, is conceptually neater, yet it can be acknowledged that the value chain sits within a constellation of production networks. This study will now consider the unique aspects of textile and fashion value chains within global value chain theory.

2.2.1 Characteristics of fashion value chains

The previous section established the phenomena of global value chains, where production is split into different stages and activities across different countries. The global fashion chain is made up of five main segments: raw material, yarns and fabrics, garment manufacturers, trade channels, and retailers (Gereffi & Appelbaum, 1994).

²⁵ Although, Yeung and Coe (2015) explain that GPN is not a rebuttal of GVC or GCC research, but instead build on and reframe conceptual perspectives around production networks.

²⁶ Another criticism of GVC is the simplistic focus on ‘lead firms’ and treating firms as ‘black boxes’, neglecting what goes on inside the firm (Coe et al., 2008).

The ending of the Multi-Fibre Agreement (MFA)²⁷, phased out in 2005 with the World Trade Organization (WTO) agreements on textile and fashion production, enabled Western markets to move garment manufacturing offshore (Appadurai, 1996; Cattaneo et al., 2010). Tariff concessions were expected to increase the development of countries involved in the fashion value chain process, however developing countries such as Sri Lanka had to compete with China and India which had scalable, low-cost manufacturing (Arachchilage et al., 2016). The liberalisation of economies from the 1980s had a profound effect on the Australian fashion industry, which led to “the importation of low-cost apparel” (Craik, 2015, p. 58) and the “relentless decline in local production” (Weller, 2007, p. 47), and ultimately transformed the Australian fashion industry into a global value chain. The biggest outcome of globalisation has been the increase in inexpensive apparel production and fast fashion, which quickly became a consumer expectation (Ledezma, 2017). Furthermore, social and environmental issues in fashion have emerged in part from the global nature of the industry’s supply chain structure (Karaosman et al., 2017). Current research has found that the outsourcing of production processes and purchasing from suppliers has been as an obstacle for sustainability efforts as fashion’s supply chains are global, complex, opaque and hard to control (Karaosman et al., 2017; Mihm, 2011). In this way, the collapse of economic and trade barriers was a tipping point that accelerated the globalisation of the fashion industry and its attendant sustainability challenges (Weller, 2007).

Turning now to chain governance and dynamics, fashion value chains are often described as being buyer-driven (Gereffi & Appelbaum, 1994). Gereffi and Appelbaum (1994) define buyer-driven commodity chains as those which do not manufacture products; rather, large brands and retailers design and market products that are often made through decentralised, low-cost production networks. This means that retailers, chiefly in Western countries, are the dominant leaders in the fashion value chain, focused on higher-value functions such as distribution, design and marketing, and have a demand-pull relationship with suppliers (Gereffi & Fernandez-Stark, 2016). A key characteristic of fashion supply chains is that many retailers and

²⁷ The Multi-Fibre Agreement (MFA) protected the domestic market of major developed markets by imposing tariffs and quotas on the volumes of textile and apparel imported products from developing countries (Cattaneo et al., 2010).

brands engage in global sourcing and do not own their own production facilities. It is significant to note the close relationship retailers have with garment manufacturers compared to the other supply chain tiers due to their direct sourcing relationship. Depending on the business, some retailers may be fully vertically integrated (e.g. Zara) and have product developers who design a product that is sold (and have more control over the design process), while other retailers may fully outsource to vendors (e.g. H&M) or buy already designed product and on-sell to customers (and in turn, have little control over the design process) (Mihm, 2011) (see Figure 3)²⁸. The degree to which the business specifies the product also indicates how much control they may have over the raw material choices.

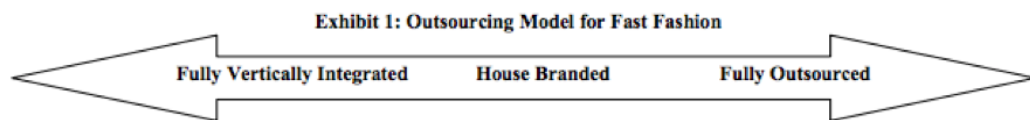


Figure 3: Apparel sourcing decisions (Mihm, 2011, p. 56)

There is also a growing body of research around the increasing power of manufacturing firms in Asia, which points to a need to redefine governance within GVCs as polycentric or multi-polar (i.e. global, regional and domestic), while also acknowledging the rising power of economies in China, India and Brazil (Horner & Nadvi, 2018)²⁹. For example, recent studies by Azmeh and Nadvi (2014) and Shin (2019) challenge the notion of buyer-driven fashion chains in which production is always low cost. Azmeh and Nadvi (2014, p. 708) looked at ‘new’ multinational apparel and fashion manufacturers who have improved their position in the value chain

²⁸ Mihm’s (2011) research found that sourcing decisions made by apparel retailers fall on a spectrum of these practices, with some strategies occurring at the same time within the same company with a number of suppliers. This suggests the retailers’ relationships with suppliers vary from company to company, and the nature of companies’ sourcing strategies can be convoluted and messy.

²⁹ Appelbaum (2008, p. 71) suggests a new era driven by both giant retailers and “giant transnational contractors”. Although never static, and scale-dependent, Cox, Ireland, Lonsdale, Sanderson and Watson (2002), propose four types of supplier-power structures: buyer dominance, supplier dominance, buyer-supplier interdependence, and buyer-supplier independence. Humphrey (2020) argues that suppliers’ role has rapidly evolved in the first two decades of the 21st century and GVC governance theory provides a “limited perspective” on suppliers’ determinism, functionalism and agency.

and “upgrade from simple ‘cut-make-trim’ to ‘full package’ production and internationalise their operations, becoming multinational firms in their own right”. In this way, value chains can operate across horizontal and vertical linkages (Gereffi and Appelbaum, 1994; Gereffi and Memedovic, 2003). The design process is a key element in creating the immaterial value of the garment, however Payne (2021, p. 59) offers another perspective in that value chains are composed of many different decision makers, all of whom play a role in the ‘design’ of the garment:

There is often no single decision maker who can be ascribed as ‘the designer’. Rather, many actors contribute to the designed garment. When there is a single decision maker, this person is constrained by other factors, which may include the production norms and processes to which they have access.

In other words, the aesthetic and the design are one part of the attractiveness of the garment, but there are many actors involved in the design of the garment. Examples of ‘designing’ the garment at different stages include the blending of fibres to a certain specification when spinning yarn; or the product developer at a retailer describing the desired garment specification, colour and quality to an offshore garment manufacturer who then liaises with a textile manufacturer to source the correct requirements to fulfil the contract. Although within mass-market companies there are specific formal roles of ‘designer’ or ‘product developer’, this person is chiefly involved in determining the style and aesthetic of the garment, while other actors such as garment technicians, buyers, and sourcing teams make other design decisions (Ranathunga Arachchilage, Payne, & Buys, 2019). However, within small and medium-sized enterprises, all these roles may be undertaken by the one person. This study is interested in how actors make decisions around the ‘design’ of the garment and its sustainability across its life, starting with the type of fibre, yarn and textile, all the way through to the garment’s disposal. This study also acknowledges that actors hold various levels of power within the fashion value chain, and this section has established the defining elements of fashion value chains, including their types, flows and governance. The following section turns to a closer examination of value.

2.3 VALUE IN BUSINESS MODELS AND CHAINS

Given the centrality of the notion of value to this study, the aim of this section is to explore ideas around ‘value’ in the scholarly literature. The term ‘value’ has varied meanings in different academic disciplines (Rohan, 2000). Ueda et al. (2009) mapped the examinations of value (or axiology, meaning the study of value) in the West from its emergence in ancient Greece (4th and 3rd B.C.) to the early 2000s, finding that sustainable value can be conceptualised through economic, ecological, political, philosophical and socio-cultural lenses including psychological value (see Figure 4).

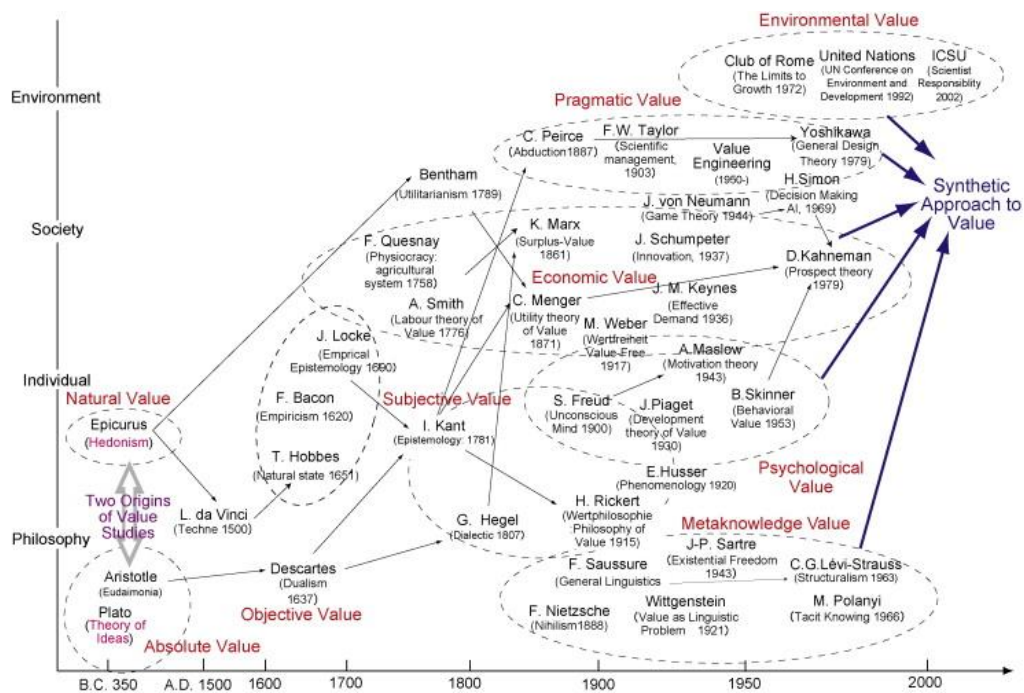


Figure 4: Genealogy of axiology (Ueda et al., 2009, p. 683)

Value can mean the “importance, the utility or merit of a good or service” (Oxford Dictionary, 2019, p. 643). Value can also be framed in economic terms such as the “worth of something” or that something is “worth the asking price” (Oxford Dictionary, 2019, p. 643). In sociology, value can refer to the systems of values different groups might hold or prioritise, which can have an influencing effect on institutional and societal behaviour (Parsons, 1935; Rohan, 2000; Rokeach, 1973). Other value types include ethical, moral and religious. Cultural values, for example,

can influence family values and gender roles. In philosophy, den Ouden (2012, pp. 81-82) explains that philosophers discuss value in terms of three interrelated parts:

On what sort of property or characteristic of something its 'having value' or 'being of value' is based; on whether having value is an objective or subjective matter, whether value resides in the object or is a matter of how we feel toward it; on trying to say what things have value, are valuable.

In the field of business, the term value has been used to describe how a business creates economic value in the form of revenue and profit. Classical economists and Marxian economists offer two different meanings around value: use value and exchange value. Karl Marx first discussed use value in *A Contribution to the Critique of Political Economy* (1859), where he explains how a customer/consumer determines whether the tangible features of a product and its use will satisfy a *need or want*. Later, Marx posits that not all use value is valuable; rather, value is realised when the product is transformed into a commodity through exchange value: "to become a commodity a product must be transferred to another, whom it will serve as a use value, by means of an exchange" (Marx, 1867, p. 30). Exchange value is defined as "the amount paid by the buyer to the seller for the use value" (Bowman & Ambrosini, 2000, p. 15). Within business literature two streams have emerged, business models and value chains, both of which conceptualise value in economic terms based on what consumers value.

The term business model is not new. The term can be traced back to an academic paper by Bellman et al. (1957), and Osterwalder (2004) was a key author in conceptualising the business model into an ontology. Generally speaking, a business model is the strategy for creating and capturing economic and consumer value through products and services (Fielt, 2013; Osterwalder & Pigneur, 2010). The primary purpose of the business model is to generate revenue and profits. The most cited business model framework consists of three parts: value proposition, value creation and delivery, and value captured (see Figure 5).

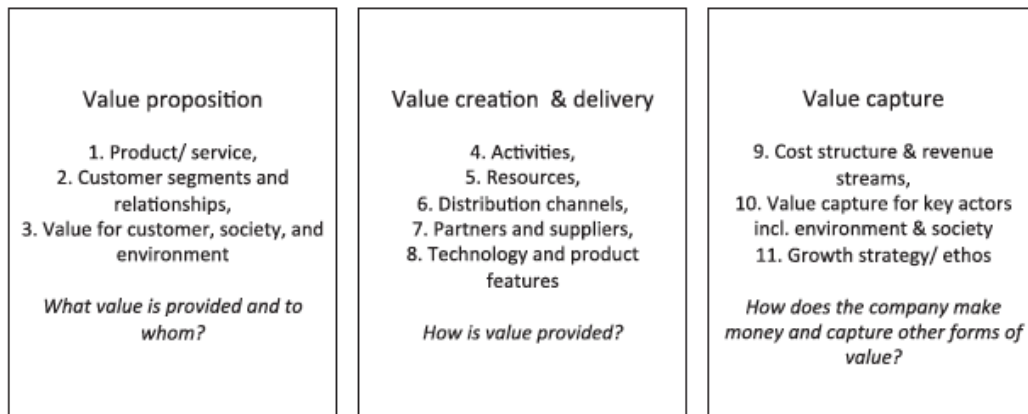


Figure 5: Conceptual Sustainable Business Model Framework (Bocken et al., 2015, p. 71; adapted from Richardson 2008, Osterwalder and Pigneur 2005, Bocken et al., 2014 and Short et al., 2014)

Here, value proposition is the commercialised value in the product or service, created through the transformation of raw materials into a product or service which satisfies customer needs. Value capture refers to how products or services are monetised and sold to customers (Teece, 2010). Value delivery involves the alignment of materials and activities required to deliver and execute the value proposition (Bocken et al., 2015). In seeking to align value creation and delivery, business models are ‘embedded’ within the value chain, and these linkages give rise to different value chains. To explain how value is created along a chain, Porter (1985) coined the concept of a value chain³⁰, which is defined as a series of activities which transform a raw material to a finished product along a connected chain. Similar to the business model notion of value, the value within value chain literature is defined in monetary terms as “the amount a buyer is willing to pay for an industry’s product” (Porter, 1985, p. 9). In the context of value chains, Bowman and Ambrosini (2000) explain that while labour and other activities and inputs may be the source of value creation, value capture occurs when the value exchange is realised (see Figure 6).

³⁰ Value chain, in Porter’s (1985) original definition, describes how an individual firm creates value.

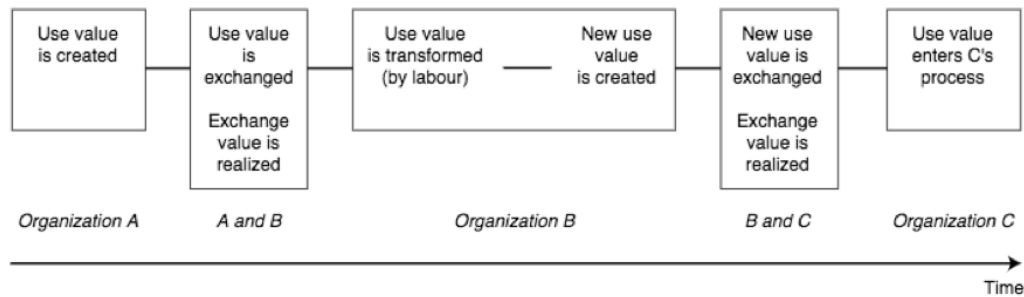


Figure 6: The process of value creation (Bowman & Ambrosini, 2000, p. 8)

Here, each actor along the chain has a different use and exchange value, while at the same time they are technically, materially and practically related. For example, to produce a simple 100% cotton t-shirt, cotton is required and therefore the use value of cotton is established. However, the specific type of production or output of cotton (i.e. provenance of cotton) might influence its exchange value. Bowman and Ambrosini (2000, p. 9) further explain that bargaining power between buyers and sellers also determines the amount of profit or surplus realised. Therefore, use value and exchange value are important to consider as they raise questions around how value is created, captured and passed along value chains.

The fashion industry is comprised of businesses within value chains – from raw material to production through to retailers and consumers. As explained earlier, fashion value chains are buyer-driven, and retailers have a demand-pull relationship with suppliers. The term value in fashion is imbued with economic as well as social and cultural meaning. Culturally, fashion can be described as a phenomenon of continually changing clothing styles (Entwistle, 2009). Craik (2009) explains that purchasing the latest clothing styles is a way to communicate a person’s social value, identity or status, and because of this, fashion is infused with consumerism and consumer culture. A consequence of this is the regular changing of fashions, as new garment styles and designs replace what seems outmoded. Add to this, the fashion industry consists of different market levels that give rise to different value chains. For example, ‘value brands’ is a term used in *The State of Fashion 2019 Report* (McKinsey and Business of Fashion, 2019a) to explain firms that manufacture and/or sell fast, disposable and cheap clothing at a lower price, and where consumers receive ‘value for their money’; whereas luxury fashion sets itself “out of reach of mass

consumption” (Berry, 1994, p. 32) and cultivates its brand value around heritage and craftsmanship. In this way, fashion satisfies a basic human need to be clothed for coverage and warmth, but at the same time, it is a symbolic good.

Entwistle (2009) further expands this notion, explaining that fashion has material and immaterial elements. Following Entwistle (2009), it is possible to frame garments as having material and immaterial value. Material value refers to the tangible elements that make apparel; these include haptic qualities such as the look and feel of the fabric, the garment’s design, functionality and craftsmanship, as well as its cost and rarity. Immaterial value refers to the ‘symbolic’ meaning of clothes; this includes the brand’s image, aesthetic, lifestyle or heritage. Immaterial value is usually communicated through marketing such as photographs, advertisements and brand stories. Entwistle (2009) argues that fashion is an aesthetic marketplace and shifting aesthetic and cultural values account for a garment’s market value. In Crewe’s (2017) book, *Geographies of Fashion*, value is similarly discussed through the notion of material and immaterial value, but also includes the spaces and places in which value is created. For example, value is created through production modes (e.g. artisanal versus mass production), specific sites of production (i.e. luxury goods made in Europe compared to lower cost, mass-manufacturing in South Asia), and through displays and exhibitions in places of fashion consumption (such as retail). Crewe (2017) adds that material value can be created through functional durability and timeless design which may, in turn, increase the number of times a garment is worn. This transforms the economics and value of clothing by changing consumption practices (i.e. buying fewer, better quality garments). Value also emerges through consumers’ relationships and personal connections to clothing, which is called material culture or emotional durability (Chapman, 2012; Crewe, 2017). Fostering positive relationships with clothing has become a sustainability strategy for slowing down consumption and holding onto and caring for garments for longer (Chapman, 2012; Crewe, 2017; Niinimäki & Koskinen, 2011). The term ‘value’ in fashion is therefore multifaceted, and all facets play a role in creating economic value, which in turn determines the value chain structure and retailers’ relationships with their suppliers.

Returning to conceptualisations of value within business model and value chain literature, one of the criticisms is that value is mostly conceptualised as businesses remaining financially viable. In other words, although the consumer is the focus of

value definitions, the receivers of this ‘value’ are those who own the means of production. Furthermore, value is strongly permeated with financial meanings within business and chain literature and does not consider how value flows to workers, communities and the living world (e.g. through increasing wealth for society, through poverty reduction, or through promoting biodiversity). Likewise, changes to how fashion is produced and consumed are needed to address sustainability issues, which requires changing how fashion is valued (Ellen MacArthur Foundation, 2017). Some researchers in the business model and value chain literature, such as Bocken et al. (2013) and Fearn et al. (2009), point out the importance of considering societal value, as well as addressing needs and challenges within society, which has led to two notions: sustainable value and shared value.

2.3.1 Shared and sustainable value

In the context of sustainability, a more inclusive view of value that considers social, economic and environmental dimensions is required. Mehera (2017, 2019) found that a variety of terms that focused on aligning sustainability with business strategies emerged in the early 2000s, and that two main streams of literature have arisen: “sustainable value (Hart & Milstein, 2003) and shared value (Porter & Kramer, 2011)” (Mehera, 2019, p. 22). The terms can be “clustered” together in the “same domain”, but it is important to acknowledge their origins in the literature as they are “strategically different” from one another (Mehera, 2019, p. 3). Starting with sustainable value, according to Cardoni, Kiseleva and Taticchi (2020), Hart and Milstein’s (2003) definition is the most used. Hart and Milstein (2003) define sustainable value as the need for businesses and industries to create societal and environmental value, as well as economic value for their stakeholders and the wider community. Interestingly, Hart (1997) critiqued the notion that sustainability would bring ‘costs’ to the business and instead proposed that companies could continue to make profit while taking action to reduce environmental impact. To effectively add ‘sustainable value’ to a business, Hart and Milstein (2003) developed the Sustainable Value Framework, which connected sustainability challenges with shareholder value. They introduced a four-dimensional model that considers four drivers of sustainability (clean technology, sustainability vision, pollution prevention and product stewardship) and four business strategies and practices to create shareholder benefits (innovation,

growth trajectory, costs and risk reduction, and reputation and legitimacy) (Hart & Milstein, 2003). In other words, Hart and Milstein (2003) encourage businesses to innovate and consider sustainability as a way to discover new market opportunities. This value creation process reflects the win-win ‘sweet-spot’ notion of good for business (revenue) and good for society (social benefits) (Savitz & Weber, 2007). However, tying environmental and social ‘wins’ to economic outcomes is a very limited view of sustainable value as it seeks to sustain the business first.

Yang, Rana and Evans (2018, p. 274) take the sustainable value definition further and define it as the “well-being, improvement, continuity and preservation of the individual (human life), company, society and environment, in such a way that satisfies the needs of the present without compromising inter-generational equity”. Similar to the TBL, Yang, Rana and Evans (2018) developed a sustainable value framework which assists in ‘naming’ sustainability aspects (see Figure 7). However, presenting sustainability as three circles in balance does not reflect the ‘real world’ dynamics around these aspects, such as how and where they interrelate, conflict or are ranked (i.e. economic value).

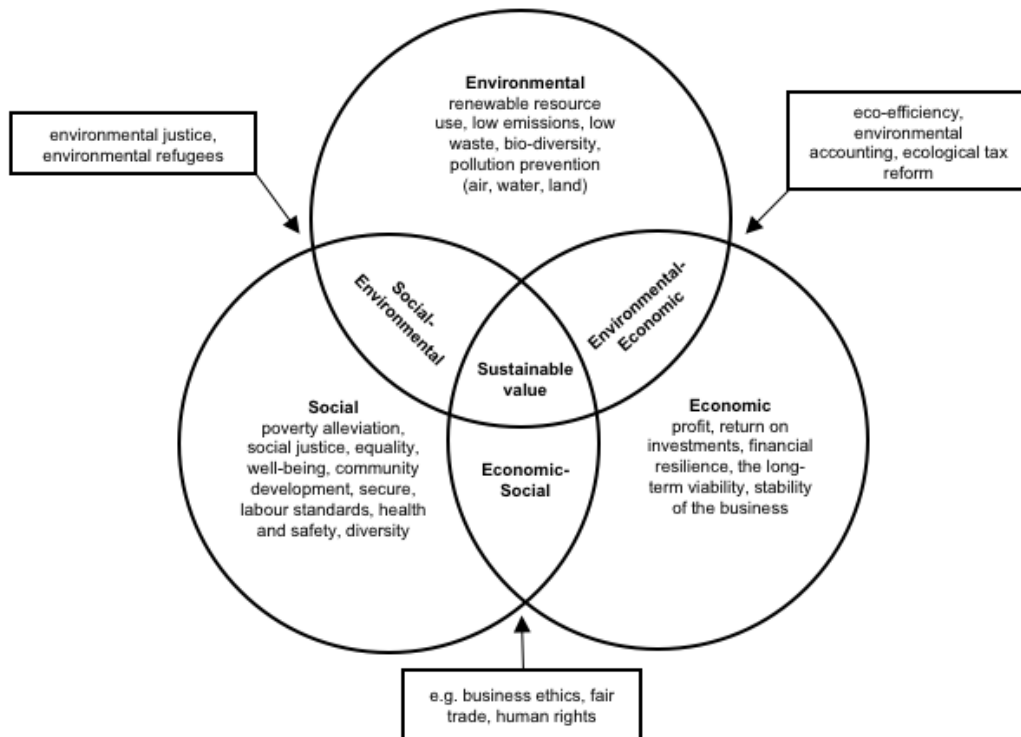


Figure 7: Sustainable value framework (Yang, Rana and Evans, 2018, p. 276)

Literature around sustainable value within business models is emerging (Lüdeke-Freund & Dembek, 2017), and there is a lack of empirical data to understand how these theories can be applied in practice (Schaltegger et al., 2012; Stubbs & Cocklin, 2008). For example, Bocken et al. (2014) developed eight sustainable business model archetypes which largely address ways to improve resource use (e.g. one archetype proposes maximising material and energy efficiency), but does not focus on the logic of how these changes can be implemented.

Turning now to the concept of shared value, Porter and Kramer (2011) postulated that value could have a ‘shared’ benefit to both the chain and society:

Policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates (Porter & Kramer, 2011, p. 6).

In contrast to Hart and Milstein’s (2003) sustainable value model, Porter and Kramer (2011, p. 7) contend that shared value “resets the boundaries of capitalism” and

promotes ‘conscious’ capitalism, which considers value from a socio-economic perspective. Interestingly, Mehera (2017, 2019) notes that the shared value framework emerged following the global financial crisis (2008–2009). As Pal and Sandberg (2017, p. 2) describe, shared value “spills over the boundaries of the firms” and creates “multiple benefits” both internally for the firm, as well as externally. Porter and Kramer (2011) propose a three-level shared value model: reconceiving products and markets, redefining productivity in the value chain, and enabling local cluster development. Here, value moves beyond understanding consumer value and includes values of the wider society (such as needs and challenges), as well as perspectives from external organisations such as government and non-government organisations, and assessing power dynamics of ‘value distribution’ along the chain³¹ (Porter & Kramer, 2011). Interestingly, Elkington’s (1998) ‘3P model’ also references shared value, noting that ‘types’ of economic, environmental and social partnerships between companies, their supply chains, NGOs, government agencies and consumers are needed to ensure effective, long-term value creation (Elkington, 1998). In other words, sustainability requires collaboration amongst various stakeholders, both within and outside the value chain, including farmers, government and civil society.

Criticisms of shared value state that shareholder value (profit) ignores conflicts between social and economic interests, and over-emphasises the firm’s ability in solving complex problems (Beschoner, 2013; Crane et al., 2014). Mehera (2017) found that there is inconsistency in who should benefit (i.e. corporations, multiple stakeholders, the entire chain) and the importance of each group (e.g. are outsiders equal or should society benefit before profit?). For example, Porter and Kramer (2011) explain that Fairtrade, a certification system designed to increase producers’ income in developing countries, is not a good example of shared value because it merely redistributes money, and therefore just makes better capitalists. Rather, a Fairtrade model of shared value would look at improving farming techniques and strengthening relationships between suppliers, as well as improving efficiency, yields and product quality (Porter & Kramer, 2011). Furthermore, although integrating the interests of

³¹ For example, Porter and Kramer (2011) explain that shared value is created through: 1) reconceiving products and markets (e.g. food companies focusing on nutrition rather than taste), 2) redefining productivity in the value chain (e.g. reducing shipping distance, in turn, reduces energy use), and 3) building supportive industry clusters (e.g. localising procurement through related businesses, trade organisations, standards, universities, fair and open markets).

multiple stakeholders is considered a radical change which reconceptualises value in theory, its practical application is less understood.

Both Cardoni, Kiseleva and Taticchi (2020) and Mehera (2017) identified that sustainable value and shared value are popular buzzwords that present positive business activities, rather than concepts that are explored in-depth. In other words, their application into the ‘real world’ is underdeveloped as studies so far have been explorative, and there is a lack of empirical studies on sustainable value (Cardoni et al., 2020). This dearth of research on the application of sustainable value and shared value presents a gap in the literature. Moreover, there is limited research on sustainable value within the Australian context (Dembek et al., 2016; Mehera, 2017). This study seeks to contribute to scholarship around sustainable value through empirically grounded critical research via the Australian cotton value chain. When looking at various aspects of sustainable value, this study will draw on the conceptions of sustainable value developed by Yang, Rana and Evans (2018). The concept of sustainable value relates to shared value given that value is shared with all stakeholders both within and outside the value chain, such as the wider community. The next section looks at models and tools to analyse sustainable value.

2.3.2 Sustainable value methods and tools for analysis

The literature determined that the term value attracts different meanings in different contexts (Cardoni et al., 2020; Evans et al., 2017), and that numerous methods and tools have been developed to understand sustainable value. Literature around value adding sustainability into the fashion supply chain is an emerging field of research enquiry, and current research is not yet mature (Shen et al., 2017). For example, Yang, Han and Lee (2017) developed and tested mechanisms to co-create sustainable value between luxury fashion brands, customers and multiple stakeholders across four dimensions, including information flow, main partners, material flow and cost/benefit. Here, sustainable value is determined through the benefit and cost relative to the environment and society. However, this framework was tested on secondary sources, such as news releases and reports, rather than empirical data. This demonstrates a need

for in-depth empirical research, as well as the need to develop a framework to collect empirical data on sustainable value³².

These methods and tools include Sustainable Value Chain Analysis (SVCA), Cambridge Value Mapping Tool (CVMT), Sustainable Value Analysis Tool (SVAT) and Triple Layer Business Model Canvas (TLBMC). A brief description and evaluation of these tools has been provided in Appendix A. Although all these tools hinge on creating sustainable value for stakeholders and products, the focus has been on changing value propositions, reconceiving products and markets, redefining productivity, and resource efficiency. A framework to explore the social construction of shared and sustainable value has not been connected to these tools. As this study aims to undertake a holistic examination of sustainability perspectives and issues arising across the Australian cotton value chain context, both SVCA and CVMT were identified as partially useful frameworks to achieve this. This section will assess the strengths and weaknesses of both methods, and arrive at an integrated framework to be used in this study.

SVCA grew from VCA (mentioned earlier in Section 2.2), which is a method used to assess the ‘economics’ of the chain with the goal of aligning consumer value and chain efficiency. As established earlier, value is determined by the consumer, and VCA ‘walks the chain’ and assesses the strengths and weaknesses of the flow of information and materials, and how relationships within the chain support this (Howieson et al., 2013)³³. VCA has been extended to SVCA. Fearne et al. (2009) drew on Porter and Kramer’s (2011) notion of shared value to encompass environmental and social aspects as a means of achieving competitive advantage via sustainability, or

³² This argument was also made in Mellick et al. (2021) were the tailored tool for this study and some preliminary findings were presented.

³³ VCA has been undertaken on the textile industry (Danskin et al., 2005; Rieple & Singh, 2010) and has been “endorsed” as a strategic process and method for agri-food chains to “create further value” (Howieson et al., 2016, p. 361). Other industries that have undertaken VCA include beef (Francis et al., 2008), organic cotton in India (Rieple & Singh, 2010), spices (Meaton et al., 2015), Australian barramundi (Howieson et al., 2013) and Australian seafood (Howieson, Hastings and Lawley, 2016) to name a few, however it is important to note that VCA studies can differ in their approaches. For example, the VCA on Australian barramundi (Howieson et al., 2013) and organic cotton in India (Rieple & Singh, 2010) have a chiefly economic focus and consider efficiencies in the chain to improve resource alignment. A sweet potato study in Ethiopia (Emana & Nigussie, 2011) undertook a Global Value Chain Analysis (GVCA) to examine governance along the chain, focusing on the power relationships between multinational companies and opportunities in developing-country chains. GVCA theory has also been applied to an industry-wide analysis of Mediterranean oranges (Sausman et al., 2015).

else the firm could be open to public or government scrutiny³⁴. The most comprehensive SVCA has been conducted on Oxford Landing, an Australian wine value chain³⁵. Fearne et al. (2009) and Soosay et al. (2012) modified the methodology and combined Life Cycle Analysis³⁶ (LCA) with VCA methods to align consumer preferences, environmental management and resource allocation. The LCA process was used to identify activities within a boundary³⁷ (from inputs, growers, Oxford Landing winery, Yalumba Angaston, Tesco to consumers) that created the greatest emissions³⁸. Activities were categorised according to whether they were value adding, necessary but non-value adding, and/or wasteful (see Figure 8).

³⁴ Fearne et al. (2012) propose three ways VCA could include 'sustainable' dimensions by drawing on Porter and Kramer's (2011) concept of 'shared value creation' in which value is created for both the value chain and wider society. These include: 1) extending the boundary of the analysis outside the supplier-customer-consumer and taking more of a systems approach to include multiple firms, which may extend the boundary to include end of life; 2) Scope of value extended from consumer value into other types of value created by the chain; 3) Examine chains in line with Gereffi's (1994) notion of governance, looking at relationships within and along the chain and potential for collaboration, innovation and competitiveness (Fearne et al., 2012).

³⁵ SVCA studies have been undertaken by Bonney et al. (2009) on the agri-food study, and Fearne et al. (2009) and Soosay, Fearne and Dent (2012) on the Oxford Landing Wine chain analysis. It should be noted here that Fearne et al. (2009) and Soosay, Fearne and Dent (2012) are referring to the same study on Oxford Landing Wine but published in different formats.

³⁶ Life Cycle Assessment (LCA) measures environmental impacts as energy consumption, water and chemical use, in the product life cycle within the 'cradle to grave' system boundary (Kozlowski et al., 2015; Smith & Barker, 1995; Soosay et al., 2012).

³⁷ There are no defined rules when it comes to defining the boundary in VCA/SVCA studies. It is also important to note that there are many different approaches to which steps/stages are included in an LCA, making it hard to draw similarities and comparisons between studies. Overall VCA/SVCA studies have engaged between five and seven 'primary' stages of the chain, and the main differences occur in what is considered the beginning of the chain and the end. For example, some studies start with input suppliers or producers/farmers (Bonney et al., 2009; Sausman et al., 2015) and some include the end point of consumption (retailing) (Francis et al., 2008; Meaton et al., 2015; Rieple & Singh, 2010) or engage with consumers to identify value (Bonney et al., 2009; Fearne et al., 2009; Sausman et al., 2015). What is significant to note here is that VCA/SVCA stop at consumers or retailers and do not include the disposal step.

³⁸ Soosay, Fearne and Dent (2012) used quantitative data for their sustainable value analysis on GHG emissions based on existing quantitative data collected elsewhere, although Bonney et al. (2009) say that both quantitative and qualitative would suffice.

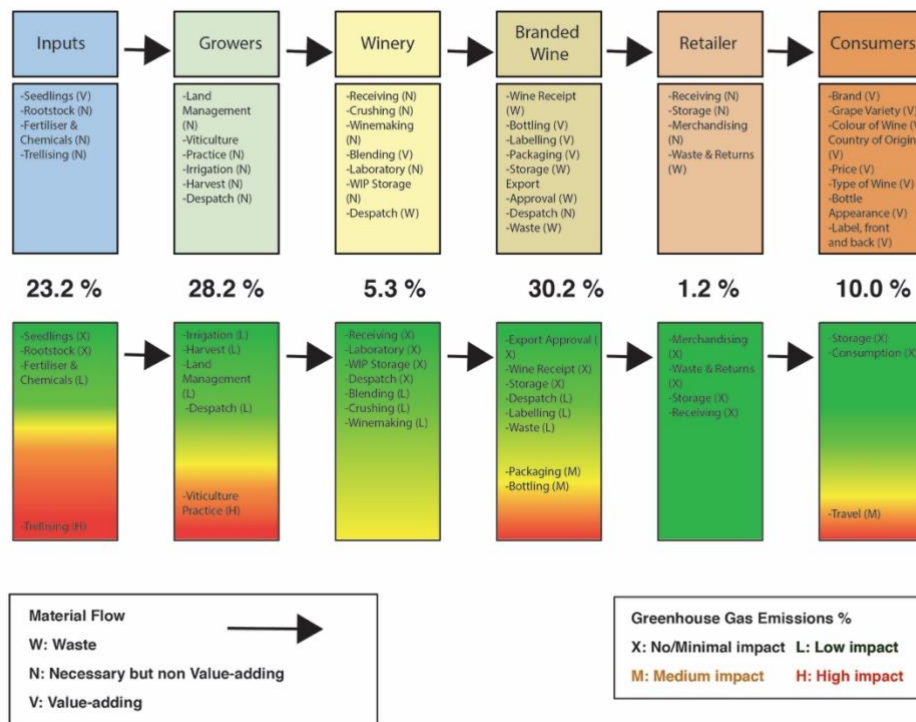


Figure 8: Adapted from Soosay et al. (2012, p. 73) Oxford Landing Wine study where activities across each stage were mapped to greenhouse gas emissions impact

Even with the incorporation of the term sustainable, SVCA places great importance on consumer insight, as value is still defined in terms of a consumer’s “willingness to pay and frequency of purchase” (Bonney et al., 2009, p. 1). In this model, the customer is the arbiter of value. Accordingly, Fearne et al. (2009) and Soosay et al. (2012) surveyed consumers in the United Kingdom (their biggest market) about Oxford Landing’s wine and how highly they rated product sustainability. They found that very few participants valued sustainability as an attribute at the time. This finding indicated that consumers were unwilling to pay a premium for sustainable products, therefore any investment in sustainable production would have to come from other sources (e.g. government). Fearne et al. (2009, pp. 8-9) explain that identifying what sustainable value is (in this case reducing carbon emissions) and who values it (i.e. government or consumers) is important because it uncovers motivating factors and potential funding streams for implementing sustainability practices along the chain. This perspective is an incremental approach to including sustainability into the value chain, achieved by

looking at what might be commercially viable to support and invest in³⁹. However, only looking at what consumers value is too narrow when it comes to understanding sustainable value. Additionally, SVCA emphasis on aligning operational processes to consumer value focuses too closely on metrics that aim to increase economic value or reduce inputs. There is an argument to be made that uncovering these processes will be of little value to the Australian cotton industry. First, because it might only uncover information that is known already, especially in the local Australian industry context. Second, design is also an element in fashion value chains that contributes to the material and immaterial value of products; however, design is not typically included in value chain analyses⁴⁰. Third, and as identified earlier, fashion value chains are buyer-driven, and because of their nature, downstream segments need to respond to market demand, meaning they have little control or power over operations at different stages. Therefore, scrutinising which activities add value or are wasteful along the chain will not aid the Australian cotton industry in creating sustainable value because it has little control over other segments. Instead, the framework for this study must identify where sustainable value is generated at each point along the chain, the interactions and relationships between stakeholders, and, from there, any opportunities for collaboration between value chain members to create sustainable value along the chain.

Although sustainability is an underlying notion in SVCA, the approach is shackled to business outcomes as consumer value and profit maximisation for the organisation remain the priority. This presents a tension between competing demands as environmental and social concerns are not seen as having intrinsic value, but as a way for firms to benefit financially. Further, consumer value only presents one perspective around ‘who will pay’ for sustainability in the value chain. It does not take into account the perspective of value chain members, and as a result, presents a limited understanding of how sustainability is valued. This also limits the potential to find meaningful shared connections between stakeholders beyond finding economic

³⁹ This argument was also made in Mellick et al. (2021) where the tailored tool for this study and some preliminary findings were presented.

⁴⁰ It must be noted that in Soosay et al.’s (2012) SVCA, brand name was tested as a consumer value attribute (and was ranked ninth in the consumer survey) and the design of the label was mentioned as part of the information flow in the Oxford Landing supply chain, but the focus was on whether the label best communicated how to pair the wine with food.

savings, and omits necessary requirements needed for sustainability, such as behaviour change. This leaves little room for radical shifts as sustainability must fit into measurable and controllable business management activities which effectively seek to *sustain* the business. As a consequence, sustainable value within the SVCA is laden with tensions, as the approach operates under the lens of prioritising economic imperatives, and does not provide a useful framework for collecting value chain member perspectives around sustainable value. However, ‘walking’ the chain provides a useful boundary and method to study value chains.

The Cambridge Value Mapping Tool (CVMT) was developed by Bocken, Short, Rana and Evans (2013) to assist firms in developing value propositions for industrial sustainability. They noted that while there have been many strides towards incorporating sustainability into businesses, previous research had focused on one dimension of sustainability (such as LCA and eco-design product design), remained within the ‘business as usual’ paradigm, was conceptual, lacked widespread adoption, or relied on expert guidance. Instead, they argue, business models need to rethink their sustainable value proposition in terms of use value (how consumers use or value the product, e.g. durability), how economic value is captured through transaction actors (i.e. economic or exchange value, market access), as well as benefits and costs to the environment and society. The tool was designed as a qualitative approach to stimulating idea generation from a ‘systems-perceptive’. Bocken et al. (2013) made distinctions between different forms of value, which included identifying captured and uncaptured (missed/destroyed/wasted) value, as well as opportunities (see Table 2).

Table 2: Value mapping concepts and their descriptions adapted from Bocken et al. (2013)

Value Mapping Concepts	Description
Value Captured	Activities that generate a return which could either be finance related, such as profit, or non-finance related, such as efficient processes that lead to a reduction of inputs or strong relationships.
Value Uncaptured (Destroyed or Missed)	Value could be missed in activities that do not generate a return, such as inefficient processes. Value could be destroyed through wasteful activities, such as pollution and excessive inventory.
Value Opportunities	Activities that could create new value, such as finding value in waste streams or collaboration to solve problems.

Suggested stakeholders include customers, investors, suppliers, the community and the environment, which can be grouped into value categories for simplification (transaction, use, societal and environmental value), as well as expanded to include specific stakeholders (see Figure 9) (Bocken et al., 2013). It is significant to note here that the tool considers sustainable value from a broad perspective, including society and the environment as stakeholder categories and recipients of value in their own right (which aligns with the notion of shared value), along with ‘actors’ who generate transaction (economic) value and members outside of the chain, such as government and the public.

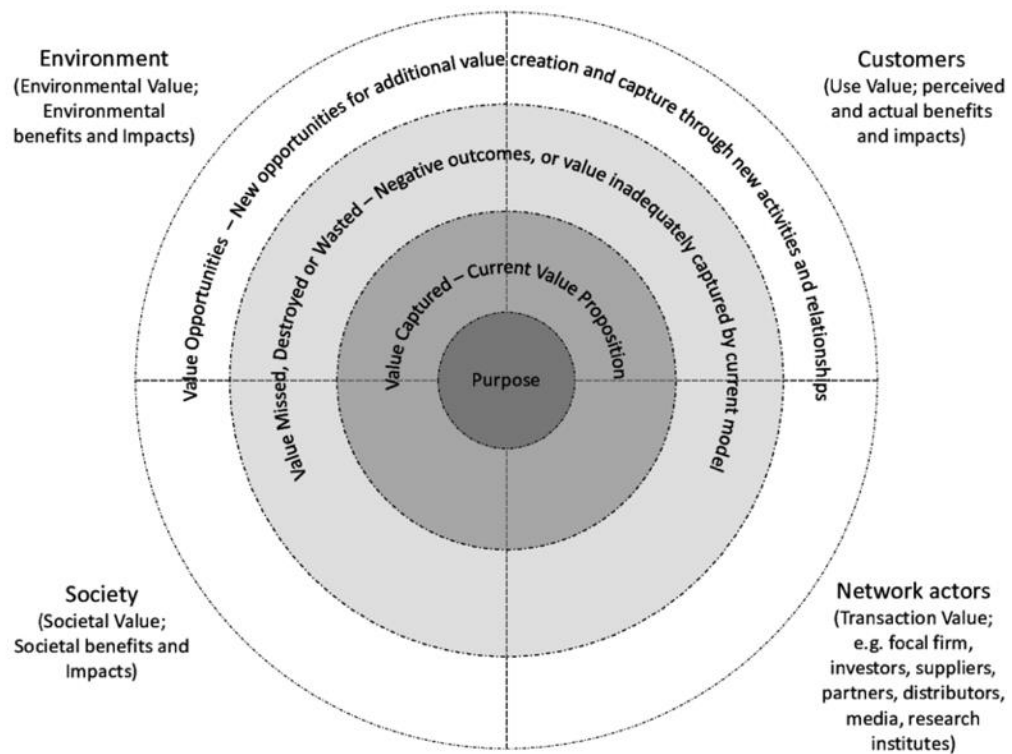


Figure 9: Simplified Value Mapping Tool (Bocken et al., 2013, p. 12)

The tool was tested in 13 workshops which included participants from a wide variety of industries, including apparel, footwear, food, agriculture and automotive, and organisations, such as start-ups, large corporations, public sector and non-government organisations. Bocken et al. (2015) identified a range of uses and successes, for example refining entrepreneur/start-up business ideas, identifying new products/services for existing businesses, eliminating waste in product design, and considering the life cycle of a product and its associated environmental and social impacts (see Table 3 below).

Table 3: Value mapping illustrative examples from Bocken et al. (2015, pp. 80-81)

Stakeholder	Value created	Value destroyed	Value missed	New value opportunities
Customers	Use utility, functionality, health benefit, wellbeing, prestige, feel good	Detrimental health/safety impacts, over-priced products/services, compromised use (poor functionality, quality), premature replacement requirement (over-	Poorly served markets/customer segments, failure to provide full range of desired functionality/utility/performance, failure to understand full benefits of product/service,	New markets, segments, new product/service features/offerings/functionality (building on existing assets, or new diversification),

Stakeholder	Value created	Value destroyed	Value missed	New value opportunities
		selling, short fashion cycles), unfair exclusion from benefits	failure to make full use of product/ service (idle assets)	greater product longevity and durability, lower cost
Employees	Employment, wealth distribution, livelihood security, meaning and purpose, learning and development	Underpaid, job stagnation and diminution of skills, stress and mental health disorder through overwork and mistreatment, accidents and dangerous working conditions, lay-offs	Underutilised/ unused skills or working time, lack of development opportunities, poor incentives, poor management guidance, inadequate tools (e.g. IT), few internship opportunities	New job creation, training and development, promotion/ pay increase, new opportunities to apply skills/creativity, meaningful work, job rotation, enhanced health/ safety, incentive scheme, employee ownership
Society	Poverty alleviation, community development, social justice, health and wellbeing, secure and meaningful employment for all	Job lay-offs, failure to contribute to taxation, breach of ethics, detrimental impact on health/ wellbeing and debt, distortion of democratic political system through lobbying, exclusion of societal segments from access to products/services, abuse of monopoly position	Underdeveloped stagnating communities, high youth unemployment, mass migration, decaying infrastructure and urban centres, forced early retirement, failure to adequately cater to all groups in society (ageing population, ethnic minorities, disabled etc.)	Extend product/service to broader segments of society, community investment and development initiatives, apprenticeship and investment in education, research, and training programs, support to give people work experience. Lobbying for legislation to support introduction of societally beneficial products/services
Environment	Resource use within regeneration rates; emissions and waste levels within metabolism limits; biodiversity protection	Toxic emissions and waste to landfill, consumption of non-renewable resources, depletion of biodiversity, depletion of resource bases	Waste to landfill that could be reused/recycled, premature end-of-life of product, losses in value chain (e.g. food losses)	Switch to renewable materials and processes, reduce waste, improve efficiency and productivity, end of pipe capture, green chemistry, closed loop reuse of waste (industrial symbiosis, remanufacture, reuse, recycle), net positive contributions to biodiversity, etc.
Shareholders/ investors	Profit, ROI, growth, financial resilience, long-term viability	Economic loss, premature right off or degradation of assets, stranded assets, penalties and fines	Failing to capture value from delivering customer or public value, underinvestment in growth/development opportunities	Seek new revenue generation mechanisms, reduce costs, seek higher value-added opportunities (higher

Stakeholder	Value created	Value destroyed	Value missed	New value opportunities
				profitability), diversification, reduce exposure to potential penalties, reduce waste to landfill taxes, strategic investment in technology, R&D, resources and assets
Suppliers/ partners	Profit, ROI, growth, market access, development, long-term beneficial relationships, relationship stability and predictability, and long-term viability	Economic loss, underpaid, late payment, loss of contract or renege supply agreements, overly oppressive contractual arrangements or management practices that compromise relationships and constrict business performance	Failing to utilise full assets and capabilities, unpredictable demands for goods/services provision, underpayment for services/goods provided, failing to engage with new technologies and capabilities in the industry/other industries	Extend relationships, seek further opportunities to create shared value, forge new relationships to access new capabilities, technologies, markets, etc. Open innovation approaches to encourage broader collaborative networks outside traditional industry boundaries (e.g. NGOs)

While VCA prioritises economic value, the CVMT framework/approach does leave it open to exploring economic value together with environmental and societal value more broadly. However, there are shortcomings around the CVMT. First, CVMT is embedded within the business model literature, which is foregrounded by creating, capturing and delivering economic value. Additionally, the CVMT does not guide companies on which sustainability approach to integrate into their business, nor does it consider the potential challenges around which approach a company should take (Comin et al., 2020). Instead, the tool focuses on ideation, and does not consider implementation (Geissdoerfer et al., 2016). The other shortcoming is that empirical research into the CVMT is limited, especially around interaction with stakeholders on the process. For example, what happens when actors have widely divergent goals around economic, social or environmental value? Relatedly, the CVMT does not offer a framework to understand relationships and power dynamics between stakeholders along the value chain, which would present a blind spot for this study. For example, how stakeholders reconcile tensions around the creation and capture of sustainable value, how they interact and what they value, remains to be explored. Drawing on GVC governance theory to understand power relationships would assist with this.

Finally, the tool does not offer a framework to systematically identify key stakeholders, therefore a stakeholder analysis would need to be conducted. A value chain approach would assist in setting the boundary and identifying participants.

The CVMT is aimed at creating sustainable value propositions which consider all relevant stakeholders, but also provides a starting point for identifying and mapping the different value perceptions each stakeholder has. Asking participants about how sustainable value is created along the chain is important, as their knowledge of the industry could give insights that might reimagine the value chain and open up avenues for sustainability that the industry could explore beyond reducing inputs⁴¹. The CVMT model is the most appropriate technique for data collection as it can be used to identify where sustainable value is created, who it benefits both in and beyond the chain, and opportunities to create more value in the future. Beyond the chain may mean wider society, the local community and the environment. The VCA will be used to map the material and information flow to understand the entire production process, as well as to identify relationships between key actors and their role within the chain. This will reveal the structures, relationships, leverage points and drivers for change, and GVC will be drawn upon for analysing the role of global players and their governance structure, as well as power dynamics. In order to investigate sustainable value, this study takes a two-tiered approach that involves ‘walking’ the chain (following the VCA method) and mapping perspectives (using the CVMT) around sustainable value to capture the nuances. The combination of these approaches will create a powerful and comprehensive tool to support the understanding of sustainable value, and has the potential to create authentic impact for this research topic.

2.4 CONCLUSION

This review has considered existing understandings around sustainability, finding there is no single definition or solution. While there is lots of activity around sustainability within the fashion industry, current research lacks empirical data around how sustainability is valued within the context of fashion’s value chain. The discussion

⁴¹ This argument was also made in Mellick et al. (2021) were the tailored tool for this study and some preliminary findings were presented.

above identified that an integrated approach was required in order to explore understandings around sustainability within value chains. The requirements for this study include value chain mapping, multi-stakeholder engagement and a deepened view of the TBL which considers various forms of sustainable value. This is because at the heart of sustainability is a change in mindset, a move away from referring to monetary profit, to considering the environment and society as valuable. The SVCA and CVMT are two tools that can be used to analyse sustainability in value chains; however, on close examination, there were challenges in applying these tools in textile and fashion value chains. In addressing these challenges, the discussion formulated an approach which combines the VCA method and CVMT to collect data and stimulate ideas and perspectives around sustainable value. The following Methodology chapter departs from this point, and outlines the research design and methods of this study.

Chapter 3: Methodology

This chapter outlines the methodology employed to achieve the study's aims and objectives of exploring Australian cotton value chain members' perceptions of sustainable value, how it is created, and opportunities for future value creation. Crucial to this study are the voices of value chain members across the Australian cotton value chain. This chapter begins by discussing the rationale behind using a qualitative interpretive phenomenology approach, the theoretical lenses informing the study, and then details the research methods including selection of participants, data collection, and data analysis. The chapter concludes with the ethical considerations and limitations of the research.

3.1 METHODOLOGY AND RESEARCH DESIGN

3.1.1 Research questions

The central aims of this research are to analyse how the Australian cotton industry can understand where value is created and identify opportunities to create sustainable value along its supply chain. Therefore, the overarching research question of this thesis is: How is sustainable value understood, created and captured by the Australian cotton industry and its value chain stakeholders? The Literature Review (Chapter 2) identified that sustainability has broad definitions. However, the application and practice of sustainability in fashion differs based on the needs of different players in the supply chain. Due to the notion that the value of sustainability is defined from the perspective of individual experiences and circumstances, this research addresses the lack of definition around sustainable value in fashion value chains. To answer the central aim, a method to identify and understand how value chain members conceptualise sustainable value was required. To arrive at a relevant framework, I undertook a literature review which involved reading, synthesising, and drawing together existing knowledge across disciplines including sustainability, value chains, fashion supply chains and value more broadly (see Chapter 2). A range of sub-

questions was used to guide the development of the framework and data collection of interviews:

1. Who are the most important stakeholders, what are their relationships with others along the value chain, and how do they define sustainable value?
2. Where in the Australian cotton value chain is sustainable value created, captured and uncaptured?
3. What are the opportunities and barriers for sustainable value creation?

This project will extend scholarly understandings around the dynamics of sustainability in value chains, as well as enrich the scholarship around shared and sustainable value through empirically grounded critical research. The practical contributions of this project will be the identification of barriers as to why sustainable value can and cannot be created or captured, as well as recommendations for the Australian cotton industry to create sustainable value in their value chain.

3.1.2 Methodological context

Turning now to questions of ontological, epistemological and methodological approaches, Mason (2002) and Lincoln and Guba (1985) describe ontology as conceptualising reality and how it can be studied; epistemology as the nature of knowledge itself and what can be known; and methodology as the lens to focus the research and find out what can be known. The central aim of the research is in “understanding” value chain perspectives (Robson, 2011, p. 24) and a qualitative approach to gain a “depth of meaning” (Leavy, 2017, p. 124) was undertaken in this project. Phenomenology is a qualitative research approach concerned with understanding, examining and making meaning of people’s lived experience in the world. The word ‘phenomenon’ comes from Greece and means ‘to flare up, to show itself, to appear’ (Moustakas, 1994, p. 26). Phenomenology is the study of ‘phenomena’, which is defined as the “appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in

our experience” (Stanford Encyclopedia of Philosophy, 2020, p. 1). This study is concerned with a particular phenomenon – how Australian cotton’s sustainable value is perceived and transferred along the fashion value chain. Sustainable value is a phenomenon within the context of a fashion value chain because actors located at different stages and activities will have varied experiences or perceptions of Australian cotton’s sustainability. The phenomenological method of inquiry first appeared in the writings of William Brentano in the late 19th century and was further developed by Edmund Husserl (1859–1938) and Martin Heidegger (1889–1976) (Moran, 2005; Wojnar & Swanson, 2007). Phenomenology research has evolved into two schools or approaches: describing experiences (based on Husserl’s (1970) philosophy) or interpreting experiences (based on Heidegger’s (1962) philosophy) (Lopez & Willis, 2004; Wojnar & Swanson, 2007). The key ontological and epistemological differences between these phenomenological approaches lie in the role of the researcher:

Husserl focused more on the epistemological question of the relationship between the knower and the object of study, Heidegger moved to the ontological question of the nature of reality and ‘Being’ in the world (Lavery, 2003, pp. 26-27).

Husserl’s phenomenology ontological perspective assumes a positivist approach and focuses on separating the researcher and the object of study (Denzin & Lincoln, 2011; Lavery, 2003). The descriptive approach aims to ‘reveal’ how the experience that is being studied presents itself by focusing on a detailed description of the characteristics of lived experiences (Giorgi, 1985; Giorgi, 2008; Giorgi, 2009; Husserl, 1970; Matua & Van Der Wal, 2015; Moustakas, 1994; Plakhotnik, 2016; Tuohy et al., 2013). Here researchers do not ascribe meaning to the experience and instead methodologically ‘bracket’ their prior knowledge about the phenomenon (also referred to as transcendental phenomenological reduction) in an effort to bring attention to the structure of the phenomenon itself (Giorgi & Giorgi, 2003; Giorgi et al., 2017; Lopez & Willis, 2004; Tufford & Newman, 2012). For example, in a descriptive approach, the researcher would ask the participant to describe a phenomenon and then use those descriptions to find some commonalities in the experiences (Plakhotnik, 2016). In contrast, Heidegger “saw bracketing as impossible” (Lavery, 2003, p. 27) and supported the interpretivist ontological perspective that there are multiple and relative realities. The interpretative approach seeks to ‘explore’ another world and describe,

understand, interpret and determine the meaning of people's experience of a particular phenomenon (Heidegger, 1962; Manen, 1997; Matua & Van Der Wal, 2015; Smith et al., 2009; Tuohy et al., 2013). Here participants and researchers are co-creators of interpretation as researchers use their prior knowledge of the phenomenon to guide the research, interpret the findings and embed meaning (Denzin & Lincoln, 2011; Heidegger, 1962; Humble & Cross, 2010; Lopez & Willis, 2004; Sloan & Bowe, 2014). For example, in an interpretative approach, the researcher would ask the participant to describe a situation when the phenomenon was experienced and ask additional questions about interactions and relations, and then try to interpret the responses (Plakhotnik, 2016; Smith, 1987). Hans-Georg Gadamer developed a procedure for understanding the experience called hermeneutic phenomenology, which is an interpretive process focused on 'understanding' the world as experienced by individuals and groups (Laverty, 2003). There have been many critiques of the phenomenological approach, especially around its emphasis on subjectivity and relativism, as well as difficulty in analysis and interpretation of data (Kelder et al., 2005; Mingers, 1992; Pringle et al., 2011). However, the central tenet of social constructionism does not take the stance that 'real' knowledge does not exist; rather, it acknowledges that knowledge is culturally and historically situated and shaped through relationships and human interactions. In this way, social constructionism theory is a useful approach for this project as it does not prioritise or privilege one view, but rather acknowledges that multiple realities can be present at one time. As such, social constructionism facilitates the collection and analysis of a wide range of perspectives around issues that would be relevant to this project (such as social, economic and environmental concerns).

Noting that this study on Australian cotton and sustainable value draws upon human perspectives and experiences at different points in the value chain, this project is informed by a relativistic ontology as multiple realities will be presented in the data, and in turn, it will be hard to find an objective or single 'truth' (Denzin & Lincoln, 2011). Connected to this is the epistemological stance of social constructionism which allows for the exploration of multiple perspectives, while at the same time acknowledging that knowledge is created and validated in groups and constructed between people (Guba & Lincoln, 1994). Robson (2011, p. 24) further explains that:

Social properties are constructed through interactions between people, rather than having a separate existence. Meaning does not exist in its own right; it is constructed by human beings as they interact and engage in interpretation... the task of the researcher is to understand the social constructions of meaning and knowledge.

In other words, the constructionist approach lies in understanding how truth and meaning emerge between subjects. In this study, the experiences under investigation are Australian cotton value chain members' observations of sustainable value in the production and consumption of Australian cotton. Noting my experience working in Australian cotton and sustainability research (as mentioned in Chapter 1), as well as my fashion education, I take on an interpretivist hermeneutic phenomenology approach. This is appropriate for studying context-specific, interrelated, complex processes such as fashion value chains, as the researcher plays a key role in exploring the meanings behind them.

Turning now to research methodologies, qualitative research is a major strategy for phenomenology studies (Creswell, 2003), with hermeneutic phenomenology focusing on interpreting the meaning of experience on individual and social levels (Laverty, 2003). Participants selected have a lived experience of the phenomenon and a willingness to discuss the experience in detail (Polkinghorne, 1989). Here participants are “purposive actors” who present multiple realities which are informed by their own “underlining ideas, meanings and motivations” (Robson, 2011, p. 17). Creswell and Creswell (2018, p. 182) explain that “learning the meaning that the participants hold” is a key characteristic of qualitative research as it relies on participant perspectives of the situation being studied. The number of participants may vary but the data should reach a clear understanding of the experience to the ‘point of saturation’ (Sandelowski, 1986). Smith and Osborn (2008) recommend using semi-structured interviews for data collection in phenomenology studies, which allows for flexibility and the ability to produce rich insights from participants’ perceptions. Robson (2011, p. 24) further explains that qualitative research methods usually involve interviews and observations to collect participant perspectives, and Creswell and Creswell (2018, p. 8) add that open-ended questions give participants the space to share their views and experiences. Laverty (2003) also affirms this approach, stating that data collection should involve open-ended questions with a discussion led mainly by the participant, not the researcher. Patton (1987, p. 196) adds that interviews assist

in unearthing ‘unobservable’ information: “the purpose of interviewing is to find out what is in and on someone else’s mind. We interview people to find out from them those things we can’t observe”. Further supporting this approach, the Literature Review (Chapter 2) highlighted that interviews with value chain members played a crucial part in data collection and analysis in other studies.

Another layer in the hermeneutic phenomenology approach to data collection and analysis is one of “co-creation between the researcher and participant” where “participants are invited into an ongoing conversation, but [the approach] does not provide a set methodology” (Koch, 1995, p. 835). In other words, there is not a fixed set of practices as interpretations towards the understanding of the experience occur between the participants, the researcher and the context (Laverty, 2003). In turn, hermeneutic phenomenology research methodologies engage with participants, as well as the researcher. Here the researcher reflects on their assumptions and biases which may be included as data around the topic (Laverty, 2003). In terms of reliability and validity, meaning is tentative and always changing, but as Koch (1995) states, the multiple rounds of interpretation and discussion allow patterns to emerge and the process is seen as critical in itself.

Using qualitative methods to gather perceptions of sustainable value from across the Australian cotton value chain will inherently offer multiple perspectives that cannot be captured through quantitative methods. It should be noted that VCA uses both “qualitative and quantitative approaches”, however, there are “no strict rules as to how it should be conducted” (Zamora, 2016, p. 119). Therefore, this is a qualitative study which draws on interpretive phenomenology. It is the role of the researcher to unpack the socially constructed reality of what is being studied. Therefore, uncovering knowledge and meaning around sustainable value through interviews with stakeholders in the Australian cotton value chain was an appropriate strategy in this study.

3.1.3 Theoretical framework

The premise of this study is to understand the combined activities of firms in taking raw materials and turning them into products, as well as managing those products at the end of their life, and within this, dynamics of sustainable value. The

Literature Review (Chapter 2) concluded that an integrated framework for the investigation of how sustainability is valued in fashion value chains does not exist. Therefore, an integrated theoretical framework was developed through the Literature Review for this purpose; specifically, to guide the analysis of value chains and sustainable value.

The chief theoretical framework was to look at how whole chains work together, rather than looking at stages of the chain in isolation, and take a ‘holistic account’ of the Australian cotton value chain. A ‘holistic account’ is a methodological approach, which as explained by Creswell and Creswell (2018, p. 182), views the problem as a whole rather than as a collection of parts, and involves reporting on “multiple perspectives” to develop and identify the “complex picture of the problem”. Related to taking a ‘holistic account’ is work undertaken by systems theorist Donella Meadows in *Thinking in Systems* (2008, p. 170), where she explains “before you disturb the system in any way, watch how it behaves...”. As a fashion value chain consists of a variety of stages, linked together from fibre producer to supplier to retailer to consumer, all of these activities and actors need be taken into account when examining sustainability. Furthermore, the sustainable value of a product does not end after a consumer has purchased it; the product is only as sustainable as its entire life cycle. As Fletcher (2011, p. 171) explains, “sustainability problems [are] interconnected issues extending beyond the boundaries of individual companies or even industries”. Consequently, when considering sustainability interventions, it is not desirable to transfer the impact elsewhere in the value chain. Therefore, a framework to understand fashion supply chains is required in order to capture the way the Australian cotton value chain operates in “the real world” and consider how multiple factors interact in different ways, rather than in a linear fashion (Creswell & Creswell, 2018, p. 182; Robson, 2011).

The Literature Review (Chapter 2) found that ‘chains’ and ‘networks’ are the two overarching approaches to understanding global industries. Sturgeon (2000, p. 6) simply explains, the value ‘chain’ is a “particular, product-based thread of activity” that occurs within production ‘networks’ which are “a larger constellation of activities and dynamic configurations”. This project takes a value chain approach to understand how sustainability is valued along connected Australian cotton value chains which operate within a large production network.

Leaving aside the implications around sustainable value within these frameworks (as this will be addressed in greater detail below), the VCA/SVCA focuses on how the firm can achieve competitive advantage (Fearne et al., 2012), whereas GCC/GVC takes a wider analysis to understand the structures, relationships, leverage points and drivers of change to see where the firms fit into the bigger picture. With the need to take a ‘holistic account’ in mind, my methodological approach is to first observe, map and analyse the system (Australian cotton value chains). However, noting that GVC treats stages as ‘black boxes’ (Coe et al., 2008), this study follows a VCA approach and ‘walks’ discrete Australian cotton value chains to understand how sustainability is valued within stages and transmitted through connected chains. In terms of understanding the governance structure of Australian cotton value chains, this study will draw on Gereffi and Appelbaum’s (1994) notion that fashion is a buyer-driven consumer goods industry, and Sturgeon’s (2009) notion of modularity whereby lead firms are the gatekeepers that ‘coordinate’ production and manufacturing in terms of when, where, how and by whom. In summary, this study draws on VCA and GVC as a framework to study and understand Australian cotton and the wider context of sustainable value within global fashion value chains.

Turning now to considering how sustainability is valued, created and distributed in value chains, a theoretical framework to understand sustainability and value is required. When it comes to sustainability, most actors can agree that environmental and social sustainability issues must be addressed, however, when it comes to the meaning of sustainability, definitions remain contested (Henninger et al., 2016). Perhaps most fundamentally, this project draws on Elkington’s (1998) TBL notion of sustainability, which offers a broad perspective on interlinking revenue creation (economic) with natural (environmental) and societal (social) care. In the Literature Review (Chapter 2), two key concepts arose towards understanding sustainability in value chains: sustainable value and shared value. The most frequently cited definition of sustainable value is by Hart and Milstein (2003, p. 56) which states: “strategies and practices that contribute to a more sustainable world while simultaneously driving shareholder value”. Where businesses were previously considered to be black boxes, attention had now turned to how they create (and co-create) sustainable value (Mehera, 2017). Yang, Rana and Evans (2018) conceptualised sustainable value to include

environmental, economic and social value (as well as their respective points of intersection) (see Figure 10).

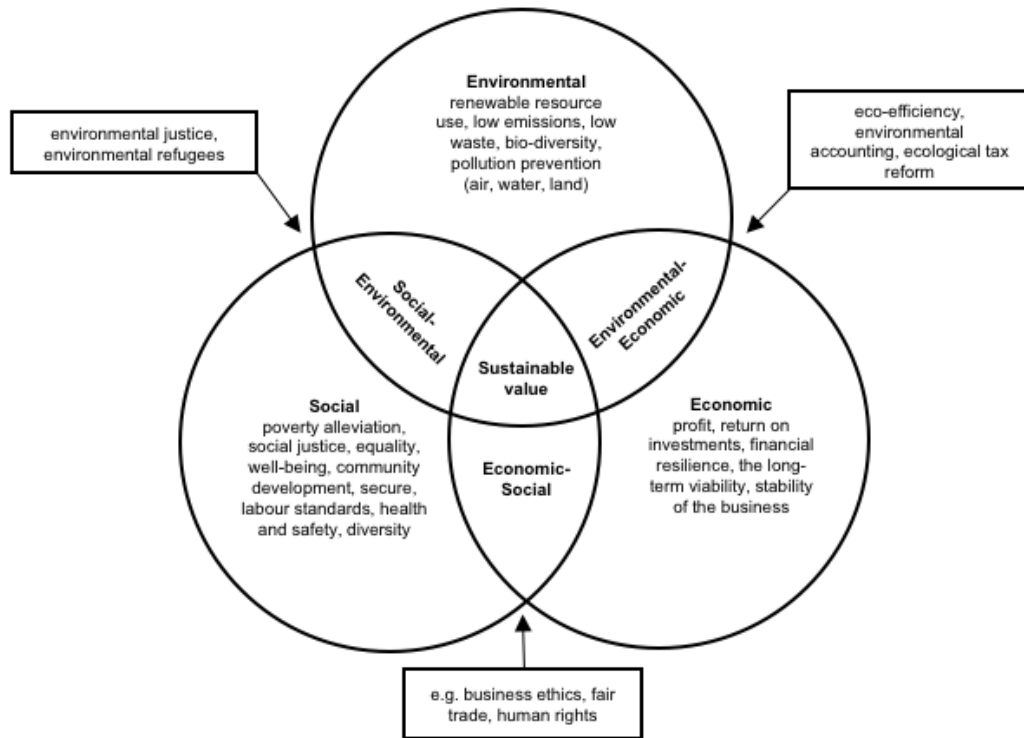


Figure 10: Sustainable value framework (Yang, Rana and Evans, 2018, p. 276)

Porter and Kramer (2011) coined the term ‘shared value’ as a framework which links business activities to economic, social and environmental benefits in society. In other words, they propose two value receivers: business and society. This study takes a holistic view of value that includes delivering economic, social and environmental value creation (Bocken et al., 2015). Drawing on these lenses, I define sustainable value as the need for businesses and industries to create societal and environmental value *as well as* economic value for their stakeholders, shareholders and the wider community (Elkington, 1998; Fearn et al., 2012; Hart & Milstein, 2003).

However, these sustainability terms are not perfect. For instance, TBL is only one view of sustainability, framed in business terms, and has been criticised for sustaining the unsustainable (Blühdorn, 2017; Sridhar & Jones, 2013). Other ideas, such as deep ecology, propose an earth-centred worldview that sees nature as more

than a resource to be exploited; instead, all living beings have equal and intrinsic value (Naess & Sessions, 1986; Rothenberg, 2012). Deep ecology grew from the environmentalism movement in the 1960s, and literature such as *The Limits to Growth* (1972), with the purpose of challenging dominant industrial and consumer society, and addressing “environmental concerns at a deep level” and restoring balance (Anderson & Guyas, 2012, p. 229). However, TBL is the most commonly used conceptual framework in sustainability reporting (e.g. Global Reporting Initiative and BCorp) and is most likely to be implemented (Kozlowski et al., 2015). Added to this, Cardoni, Kiseleva and Taticchi (2020) and Mehera (2017) identified that the application of the terms sustainable value and shared value so far has been explorative, and “there is a lack of empirical studies” on sustainable and shared value in the ‘real world’ (Cardoni et al., 2020, p. 11). For example, in a review of shared value, Dembek, Singh and Bhakoo (2016, 239) found there was “no universal” measurement and that there was inconsistency in who should benefit (e.g. corporations, multiple stakeholders, all stakeholders, the entire chain) and the importance of each group (i.e. are outsiders equal or should society benefit before profit?). Overall, Dembek, Singh and Bhakoo (2016) argue that under the neo-classical view of economics, the role of a firm in society should be to create and maximise profits for its stakeholders, and current notions of shared value show a limited relationship between society and business beyond economic benefits of the organisation. Integrating these points, this study draws on both sustainable and shared value notions through using the CVMT to construct a framework to identify sustainable value categories, and then asking how value chain members value sustainability and to whom it is valuable to. Chapter 4 undertakes a contextual analysis and identifies key Australian cotton stakeholders and sustainable value aspects in relation to the CVMT sustainable value categories: transaction, use, societal and environmental value.

Also informing this methodology is sustainable fashion scholarship. The Literature Review (Chapter 2) highlighted that fashion operates in a globalised, capitalist system characterised by continual aesthetic change and in turn, ‘planned obsolescence’. There is no universal approach or definition around what sustainable fashion means (Evans & Peirson-Smith, 2018; Henninger et al., 2016; Kozlowski et al., 2015; Thomas, 2020), and current efforts towards ‘sustainable fashion’ have not addressed the issue of overconsumption (Niinimäki et al., 2020), but rather take an

incremental approach to sustainability through signing up to initiatives to improve social and environmental impacts within the chain. It is here that we see the systemic constraints of ‘sustainable fashion’ as being fundamentally ineffective in addressing environmental and social sustainability problems in a capitalist system.

In summary, an integrated theoretical framework that explores the complexities and nuances of sustainability and its meaning within the context of globalised fashion supply chains is critical. Firstly, an appropriate methodological approach is required to gain a ‘holistic account’ of sustainable value in Australian cotton value chains. The VCA lens will be used to observe, map and analyse existing activities, processes and relationships of the Australian cotton value chain, as well as the GVC lens of governance to understand how the chain operates. When it comes to value, this project takes an incremental approach to sustainability, drawing on the notion of the triple bottom line (Elkington, 1998), sustainable value (Hart & Milstein, 2003) and shared value (Porter & Kramer, 2011). The CVMT tool will be used to ask value chain members to identify sustainable value (based on the categories: transaction, use, social and environmental) and where it is captured, uncaptured and the potential for further value creation, noting that value can be in the product, value chain or beyond the chain. When it comes to defining how sustainable value is captured, this study will keep in mind that value capture in a business model is defined (noting that we live in a capitalist society which takes a neo-classical view on business) based on earning revenue (Richardson, 2008), whereas Bocken et al. (2015) and Yang, Vladimirova & Evans’s (2017) definition considers any environmental and social improvement to be a value in itself. When it comes to the beneficiaries of shared value (and their weight) it is not straightforward as there is no universal approach to measuring how shared value is captured and for whom (Dembek et al., 2016). This was something to keep in mind during data collection and analysis, and in reflecting on how Australian cotton value chain members perceive the value of sustainability.

3.2 DATA COLLECTION METHODS

A key part of this research project was reviewing literature around VCA, SVCA and other tools and methods that capture sustainable value as applied in other disciplines to develop a tailored method to capture perspectives around sustainable

value in the Australian cotton value chain (see Chapter 2). Weighing up the findings from literature and past studies, this study follows the VCA method of ‘walking the chain’ of an Australian cotton product, noting that this is most feasible for the collection of qualitative data through interviews with members of the geographically dispersed global cotton value chain. There are no defined rules around the boundary for a VCA study; however, most studies have included five to seven ‘primary’ stages of the chain, and the main differences lie in what is considered to be the beginning of the chain and the end⁴². This study follows the main segments in the chain, including: cotton farm, ginning, marketing, yarn manufacturing, textile manufacturing, garment manufacturing, retailing, and end of life (disposal) pathways after use. Notably, this study will draw on retailers’ understanding of their consumers; but rather than assuming that the retailer knows the consumer, this study will focus on understanding how retailers construct what/how their consumers think and feel. Previous VCA/SVCA followed a single product chain (Fearne et al., 2009; Soosay et al., 2012) or compared and contrasted more than two product value chains (Francis et al., 2008; Howieson et al., 2013; Rieple & Singh, 2010; Sausman et al., 2015). This study will analyse two Australian cotton value chains so that comparisons and fine distinctions can be drawn. Following Howieson et al.’s (2016) VCA method of ‘mapping the chain’, I also undertook a contextual review (Chapter 4) based on publicly available information and data from previous CRDC projects, QUT1701 and QUT1705 (as discussed in Chapter 1). I engaged in a consultation process with CRDC and cotton industry stakeholders, such as Cotton Australia (CA), to define sustainable value and determine the best way to approach participants. I attended several conferences and networking events between March and May 2019, where I gained a contextual understanding of key sustainability issues facing stakeholders along the cotton value chain, as well as feedback from Australian cotton stakeholders on the tailored tool. This information was used as background for defining sustainable value for the Australian cotton industry and its stakeholders, and for discussing opportunities with participants.

⁴² For example, some studies start with input suppliers or producers/farmers (Bonney et al., 2009; Sausman et al., 2015) and some end at the point of consumption (retailing) (Francis et al., 2008; Meaton et al., 2015; Rieple & Singh, 2010) or engage with consumers to identify value (Bonney et al., 2009; Fearne et al., 2009; Sausman et al., 2015). What is significant to note here is that VCA/SVCA stop at consumers or retailers and do not include the use and disposal step.

I interviewed participants using the simplified version of the CVMT as a visual prompt to guide the interview. The CVMT categories were tailored to Australian cotton stakeholders and aspects, which was developed through a stakeholder analysis in Chapter 4. The term ‘stakeholder’ refers to actors within the Australian cotton value chain, as well as actors who have a shared value outside the chain, such as government and the public. The term ‘aspect’ covers the various aspects of cotton and its production, which could refer to particular practices, features, attributes, details or characteristics of cotton and/or sustainability. The tool takes a broad perspective on sustainable value, allows for discussion and idea generation, is easy to understand and simple in design, as well as adaptable for different contexts. The tailored CVMT captured participants’ perspectives around sustainable value broadly, specifically how it is created and missed, as well as opportunities and barriers for future value creation, and for which stakeholders it is valuable to. The interview questions were guided by Yang, Vladimirova & Evans (2017), which also drew upon Bocken’s et al. (2015) work. Discussing types of value (transaction, use, societal and environmental) with participants allowed them to define what sustainable value means to them and their business. Additionally, mapping the various aspects of sustainable value to stakeholders revealed their interactions and exchanges with other value chain members. I also asked participants about their role in the value chain, what sustainability meant to them and the average gate price collected at their stage. Collecting gate prices at each stage of the chain follows Rieple and Singh’s (2010) VCA study on organic cotton. Although Rieple and Singh (2010) do not define gate price as a term, it generally refers to the price at the factory gate, the value of goods when they leave the factory, or the price that goods are purchased at. Collecting data on gate prices will assist in identifying if participants receive a premium on cotton that is considered ‘sustainable’ (i.e. myBMP/BCI or Australian cotton). Bocken et al. (2013) estimated that interviews/workshops in which multiple people were present lasted between 2 and 3 hours. Interviews for this study were conducted with one participant at a time (where possible), face-to-face or via teleconferencing, audio-recorded and ran for approximately 60 minutes. Interviews were transcribed and then sent back to participants for approval.

Questions for participants included:

1. What is your role in the cotton value chain? How does this stage add value?
2. What does sustainability mean in relation to your business?
3. What is the average gate price for cotton at this stage? (i.e. \$/bale, metre, kilogram, garment) (optional)

Informed by Yang, Vladimirova & Evans (2017) and Bocken et al. (2015), the following questions were discussed in relation to the tailored CVMT:

4. What types of sustainable value does Australian cotton add to the fashion supply chain?
5. Where is value not being captured for Australian cotton?
6. What are the opportunities for Australian cotton in creating sustainable value along the chain?
7. What are the greatest sustainability challenges or barriers for future value creation?
8. Is there anyone that you interact with along the Australian cotton value chain that should be included in the study?

3.3 PARTICIPANTS

Typically, phenomenological studies seek out participants who have a lived experience of the phenomenon being studied – in this case, people who were materially connected in the Australian cotton value chain and had experienced the transference of Australian cotton's sustainable value. Following Soosay, Fearne and Dent's (2012) SVCA research methodology which focused on a single product (Oxford Landing wine), this study engaged with participants who were members of a connected cotton value chain. Therefore, research participants were selected based on their position in the chain, starting from a single grower, to cotton marketing and ginning firm/s, progressing to offshore agent and spinning mill, textile and garment manufacturer,

through to an Australian retailer. This method is feasible because the physical tracking of Australian cotton through the value chain has already been undertaken by retailers such as Country Road, Kmart, Target and the EDITION label (Cotton Australia, 2017a; Sutton, 2018; Wesfarmers, n.d.). The aim was to interview participants along each section of a connected value chain, using purposive snowballing sampling techniques to identify which players to interview along the chain (Tongco, 2007). The size and scale of Soosay, Fearn and Dent's (2012) SVCA study with 57 participants and Howieson et al.'s (2013) VCA data pool of 13 participants informed the sample size for this study, as well as Rieple and Singh's (2010) organic cotton VCA study which followed multiple value chains and drew comparisons around value creation.

As mentioned in Section 3.2, two Australian cotton value chains were analysed in this study. The two chains were chosen due to their different sizes and scale (niche and mass-market), as well as their ability to trace Australian cotton through the chain. I was also fortunate to gain access to participants firstly through common networks, and then through connection via emails. In total, I conducted semi-structured interviews with 21 participants across two value chains (niche and mass-market). Initially, I approached 24 participants via email in order to seek their participation in the study – two declined, one was unreachable, and 21 agreed for me to interview them. In the niche value chain (ACVC 1), 11 participants were interviewed in April to May 2019 and March to September 2020 (see Table 4 below). The participants included two cotton growers, a ginner, a spinner, a converter, a dyer, three niche garment manufacturers and retailers, a second-hand clothing retailer / charity and a designer that uses off-cuts. The knitter was unable to participate at the time of data collection. In the mass-market value chain (ACVC 2), 10 participants were interviewed between February and September 2020 (see Table 5 below). The participants included a cotton grower, a trader, a ginner, a verification provider, an agent, a garment manufacturer, a mass-market retailer and a rental retailer. I was not able to be connected to the spinner, and the second-hand clothing retailer was unable to participate at the time of data collection.

Table 4: Summary of ACVC 1 participants

No. of participants	Participant Code	Stage	Interview Duration
1	GR01	Cotton Grower	4 hours
2	GR02	Cotton Grower	
3	GI01	Cotton Ginner / Warehouse	1 hour
4	SP01	Spinner	2 hours
5	TE01	Converter	3 hours
Declined		Knitter	N/A
6	TE02	Dyer	1 hour
7	RE01	Niche Garment Manufacturer and Retailer	1 hour
8	RE02	Niche Garment Manufacturer and Retailer	1 hour
9	RE03	Niche Garment Manufacturer and Retailer	1 hour
10	EN01	Second-hand Clothing Retailer / Charity	1.5 hours
11	EN02	Designer using waste	1 hour

Table 5: Summary of ACVC 2 participants

No. of participants	Code	Stage	Interview Duration	
1	GR03	Cotton Trader	1 hour 20 mins	
2	GR04	Cotton Grower / Farm Manager	1 hour 20 mins	
3	GI02	Cotton Ginner / Warehouse	1 hour	
4	TR01	Verification Provider	2 hours	
5	AG01	Agent	7 mins	
Unable to connect		Spinner	N/A	
6	GM01	Garment Manufacturer	8 mins	
7	RE04	Mass-market Retailer – Sustainable Product Specialist	1 hour	50 mins
8	RE05	Mass-market Retailer – Knitwear Product Development Manager		30 mins
9	RE06	Mass-market Retailer – Ethical Sourcing Specialist		
10	RE07	Rental Retailer	1 hour 30 mins	
Declined		Second-hand Clothing Retailer	N/A	

In terms of gaining access to the participants, it was important that I could guarantee the individuals and companies confidentiality. Ethical considerations are explored in greater depth in Section 3.5. Before I commenced the interview, I gave a brief background and context of the study. This helped participants to understand the context in which the questions were asked and avoided ambiguity in the interviews (Jones, 2004, p. 259). It was a condition of ethical clearance from the QUT Human Research Ethics Committee (approval number 1900000034) that the companies and participants who participated in the study remain confidential. In the data records and in the thesis, participants are referred to by their code names (e.g. GR01) and retailers are referred to as ‘mass-market retailer’ or ‘niche garment manufacturer and retailer’. In the interview transcripts, these code names are used instead of the actual company and participant names.

The interview questions were developed alongside the tailored tool after an extensive review of the scholarly literature. The interview questions were exploratory in nature, designed to be open-ended, as detailed above. The use of the same interview

questions with each participant enabled a degree of replication within the study of each value chain (Yin, 2009), as participants' responses to particular questions could be compared and contrasted. However, the interviews ran for different lengths of time due to the participants' individual time commitments and willingness to divulge information and thoughts about the questions – some within 60 minutes, some as long as 4 hours.

3.4 DATA ANALYSIS

Noting that the approach for this research is interpretive phenomenology, the chief analytical strategy was to prioritise participants' experiences and explore how participants were making sense of their experiences. As Cronin and Lowes (2016) explain, the interpretative process is dualistic, as on the one hand the participants are making sense of their lived experience, and on the other hand the researcher is interpreting and making meaning around how the participant makes sense of their experience. Data analysis should look at what is said but also what is said in between the lines (Kvale, 1994). To achieve this, Smith and Osborne (2008) recommend identifying themes that emerge from interview transcripts, which can then be used as a framework that connects to the next participant's data, and then the next participant's data, and so on. Following this, Smith and Osborne (2008) suggest looking for connections between themes and developing clusters. In alignment with Berg (2001, p. 240) and Smith and Osborne (2008), the analytic activities of the interview data were undertaken in the following steps:

1. Data was collected through semi-structured interviews using the tailored tool and made into transcripts.
2. Following Pat Bazeley (2007), I reflected upon participants' statements, during the process of transcribing the interviews, in journal entries within NVivo.
3. After the interview was transcribed, identifiable data (participants, companies and brand names, etc.) was assigned with code names to protect the confidentiality of participants and companies.

4. Participants were sent coded transcripts for approval – any information that appeared commercial in confidence was brought to participants' attention for their decision to remove.
5. Transcripts were separated into their respective value chain and loaded into NVivo. Codes were analytically developed, initially using the interview questions as a guide. Using a deductive thematic approach, the data was manually coded and sorted into value categories (transaction, use, societal and environmental value) and value types (value captured, uncaptured, opportunities and challenges) (Gioia et al., 2013; Lapadat, 2010; Leavy, 2017).
6. The participants' responses were summarised into tables: definitions of sustainable value, value captured, value uncaptured, value opportunities, value challenges, relationships and power. The data was compiled in a similar fashion to Bocken et al.'s (2015) value mapping table (see Table 3 above). Table 6 below illustrates an example of emergent insights specific to the grower's business model and where transaction value is captured (further details can be found in Chapter 4).
7. Data was then coded based on naturally occurring themes and concepts through an open-coding process on the basis of participants' experiences in, and knowledge and expertise of, Australian cotton and fashion value chains. Following Smith and Osborne's (2008) suggestion, a table of themes and clusters was created from participants' responses.
8. Using an inductive approach, themes across the data were then analysed to identify similarities or differences, and isolate meaningful patterns and themes, which were then transformed into insights (Gioia et al., 2013; Lapadat, 2010; Leavy, 2017).
9. Identified patterns were considered in the light of researcher expertise and a final table of superordinate themes was established.
10. Themes were then developed into a narrative and presented as findings in order to derive conclusions and implications for practice and theory.

Table 6: Data analysis illustrative example

Value Chain	Participant	Value Category	Value Captured
ACVC 1	GR01, GR02	Transaction Value	Selling yarn directly to garment manufacturers reduces the risk of the farmer being trade exposed to the daily price of cotton and exchange rate in the commodity market.

As described above, themes were identified through an iterative process and emerged through multiple drafts of findings across each value chain. Taking an inductive approach in step eight was essential to understanding participants experience, as sustainable value can be interpreted in many ways within the context of the fashion value chain. An inductive approach is appropriate for this study’s relativistic ontology and epistemological stance as it acknowledges the meaning that individual participants hold, while also acknowledging that multiple views of an experience or an issue can emerge. In addition to this, interview data and themes were triangulated with information from other sources, such as academic and grey literature, to effectively increase the credibility of findings (Emerson et al., 1995; Merriam, 2002). This was achieved through Chapter 4 (Cotton in Context) which drew on secondary data and reports from aligned CDRC projects QUT1701 and QUT1705 (as discussed in Chapter 1). Chapter 4 is themed around the stages of the value chain, and explores the key activities and information around sustainability and cotton, which assisted in testing and confirming themes from the interview data. Analysing insights from interviews enabled me to build ‘thick descriptions’ around where sustainable value is captured and uncaptured, as well as where value opportunities and challenges in the Australian cotton value chain may lie (Harrison, 2013). Namely, the experiences of participants revealed texture, richness and nuance beyond information publicly available on the fashion value chain. The final stage of the analysis involved a cross-analysis of the value chains. Here I could compare and contrast the views of individual actors in connected value chains in regards to both their position and view on sustainability. Again, this process was iterative and involved writing, re-writing and re-examining the findings to identify similarities, differences and insights across both value chains.

3.5 ETHICAL CONSIDERATIONS AND LIMITATIONS

As a researcher within QUT, research must be conducted under the QUT Code of Conduct. I received ethical clearance from the QUT Human Research Ethics Committee (approval number 1900000034) in January 2019. The research activities included qualitative data collection from semi-structured interviews conducted with participants connected to ACVC 1 and ACVC 2. Semi-structured interviews were recognised as requiring a low risk ethical clearance, with one adaptation made to accommodate written responses for two participants who could not be interviewed. During the ethics application process, I submitted my first contact emails to prospective participants, as well as a list of semi-structured interview questions and the tailored CVMT. These materials and procedures can be found in Appendix B. Following Robson's (2011, p. 209) good practice, participants and companies were made confidential through code names so participants could speak candidly and avoid revealing commercially sensitive information. Interviews were auto-transcribed using the software Wreally, and then manually edited by the researcher. Other procedures for ethical clearance were strictly adhered to, such as data storage.

In order to develop the context of the Australian cotton industry and value chain (see Chapter 4), other data relating to the industry was gathered from grey literature, websites and publications, as well as reports from QUT1701 (Payne, Mellick, Simpson, et al., 2017) and QUT1705 (Payne, Mellick, & Peterson, 2017). To ensure the confidentiality of participants and companies, any publicly available data relating to a participant and/or their company was discussed using the company's real name and cannot be linked to the data gathered from interviews.

Limitations of the study are based on the method of data collection. Specifically, a qualitative methodology, along with the effect of the researchers' presence on the data collection process, could influence the data in two ways. First, the research is dependent on the individual skills, biases and experience of the researcher. This was managed by approaching the research design through relevant literature, conceptual frameworks and triangulation with other sources, which in turn, minimised these limitations. Second, participants' responses may align with company policies or have a "courtesy bias", which John Browne (2005, p. 125) describes as instances when the participant tells the researcher what they think the researcher wants to hear. This was addressed at the beginning of the interview where the researcher outlined the research

objectives so that the interviewee understood the purpose of the study. Participants were anonymised so they had a greater chance to speak candidly. While there is no guarantee that participants could depoliticise their experience, the interpretive ontological position accommodates this by acknowledging that multiple realities can co-exist. Finally, the study was conducted over three years, and the value chain structure and dynamics presented in the results for the Australian cotton industry may not represent the current situation.

The nature of the study may limit the generalisability of the findings. To address this issue, two Australian cotton value chains (niche and mass-market) were followed so that comparisons and fine distinctions about value creation could be drawn, as done in the organic cotton study (Rieple & Singh, 2010). By studying two value chains, I could dig deep and explore sustainability more thoroughly; however, multiple cases would have built a stronger base for theory building. Another limitation was that the volume of data collected through interviews made analysis and interpretation time consuming. Therefore, represented in this study are issues, themes and insights where there was consensus amongst participants. Strictly adhering to analysis procedures, identification of themes and insights, and triangulation of insights with other data sources, ensured accurate accounts of key insights from both chains. Relatedly, another possible limitation lies in the reliability of data replication due to varying interview lengths. The process of triangulating interview data with other data sources and the scholarly literature largely mitigated this limitation.

Finally, the time-driven nature of the global fashion industry alongside the time-intensive semi-structured interviews and transcript approval processes proved, in some cases, a deterrent to participating in the study. Therefore, where relevant, voices that could not be represented in the study are noted, and information from QUT1701 (Payne, Mellick, Simpson, et al., 2017) and QUT1705 (Payne, Mellick, & Peterson, 2017) reports are included to build the case.

3.6 CONCLUSION

This chapter has outlined the research paradigm, design rationale and process of analysis for this study. The qualitative interpretive phenomenology approach is an appropriate strategy to map a large and complex system such as an Australian cotton

value chain, as well as to collect and analyse value chain members' perceptions of sustainability and its value. This approach takes an interpretive ontological position that acknowledges that there are multiple realities. The study also takes a social constructionism epistemological stance and acknowledges that knowledge and meanings are constructed and understood between people. The chief methodological approach is hermeneutic phenomenology, which focuses on interpreting people's experience of a phenomenon using qualitative research techniques. Specifically, the key to this methodological approach is primary data gathered through in-depth interviews with participants who are connected along an Australian cotton value chain and who have experienced the phenomenon of sustainable value. Particularly, two Australian cotton value chains were examined, and convergence of these in-depth interviews ensured the trustworthiness and validity of the findings. The following chapter will turn to the site of the study and examine Australian cotton value chains.

Chapter 4: Cotton in Context

With a view to understand the industry's sustainable value and investigate opportunities for improving Australian cotton value chains, the Literature Review (Chapter 2) and Methodology (Chapter 3) set up a framework that integrates a value mapping and value chain approach. This chapter has two purposes. As the Australian cotton value chain is the site for the exploration of sustainable value, the first purpose of this chapter is to establish the wider context of the value chain dynamics in which Australian cotton is traded and valued. This chapter will present what is known about sustainability and cotton, including in relation to contentious issues such as genetically modified organism (GMO) and non-genetically modified cotton, credible claims, quantifying impacts and traceability. The stages of the Australian cotton value chain will then be mapped, with reference to themes of material and information flows, as well as relationships and value chain governance. These stages include farming, ginning, classing, marketing, spinning, textiles and garment manufacturing, retailing, waste and circularity. This chapter draws on two main data sources: publicly available information including IBIS World reports, industry reports, news articles, and retailer and certification websites, and findings/reports from QUT1701 and QUT1705. Establishing this context will assist in the discussion and analysis of value chain dynamics and sustainable value for ACVC 1 and ACVC 2. The second purpose of this chapter is to undertake a stakeholder analysis and identify the key Australian cotton stakeholders and sustainable value aspects in relation to the CVMT sustainable value categories: transaction, use, societal and environmental value. These factors will be used in the adapted CVMT to interview participants. Please note a journal article based on this tailored tool was published in 2021 (Mellick et al., 2021).

4.1 DEFINITIONS OF COTTON PRODUCTION

Cotton production is the first stage of the global cotton value chain, which includes the following phases: growing cotton, ginning (separating the cotton fibre from the seed and cleaning it), blending cotton from different regions or with man-made fibres (MMF) and spinning into yarn, textile manufacturing, garment

manufacturing, and retailing (Cotton Australia, 2020b). Cotton is the most used natural fibre globally. The industry plays an important role in the livelihoods of people around the globe, employing approximately 250 million people across 75 countries (International Cotton Advisory Committee and Food and Agriculture Organization, 2015). The main cotton producers are India, China and the United States (Statista, 2020a) (see Figure 11).

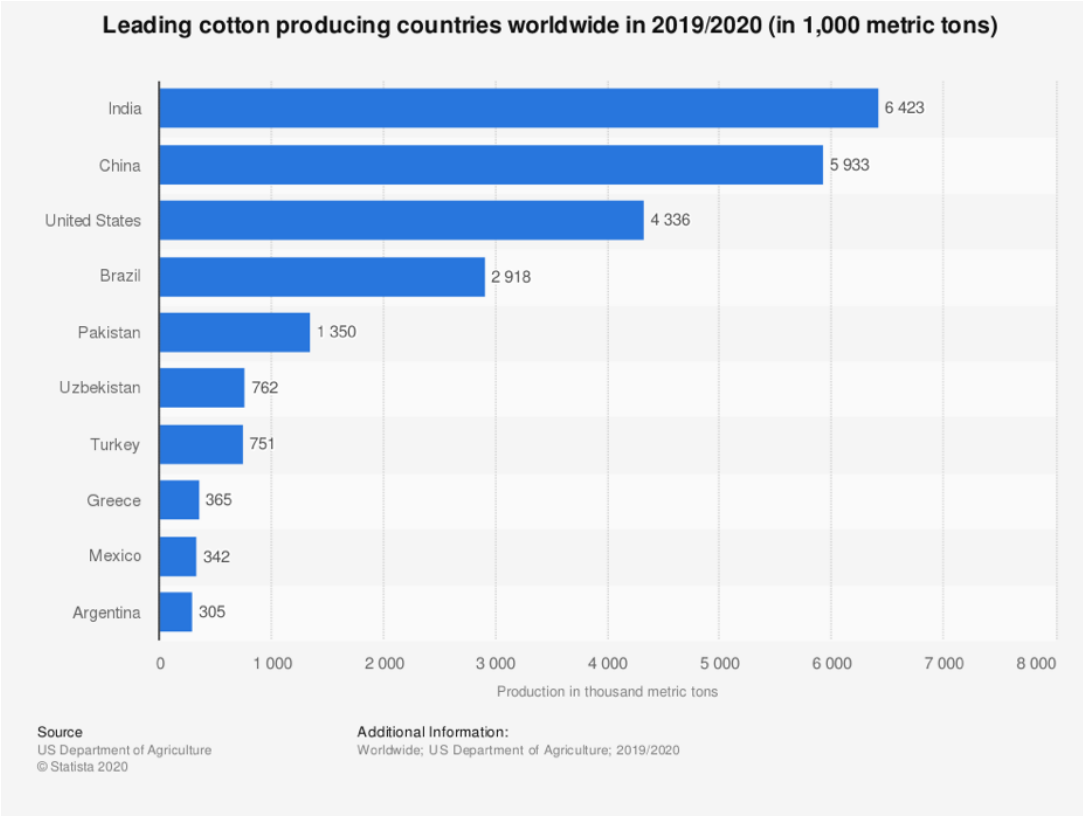


Figure 11: Global cotton production 2019/2020 (Statista, 2020a)

Globally, there are three broad categories of cotton cultivation: organic, conventional and ‘more sustainable’. Organic cotton production typically refers to cotton grown with untreated natural seeds (e.g. without pesticides and not genetically modified), without the use of synthetic fertilisers and pesticides (natural fertilisers and pesticides are permitted), and is formally certified by the International Federation of Organic Agriculture Movements (IFOAM) (GOTS, 2017; Rieple & Singh, 2010; Textile Exchange, 2020b). Organic cotton is estimated to account for less than 1% of total cotton production (Textile Exchange, 2021), which means that the available quantity of organic cotton is very limited. Typically, organic cotton produces smaller

yields⁴³ and is more suited to niche agricultural production (Dissanayake & Perera, 2016); however, organic production can bring a premium for subsistence farmers of around 10 to 20% (Altenbuchner et al., 2016; Eyhorn et al., 2007; Glin et al., 2012; Rieple & Singh, 2010). Most of the cotton grown around the world is grown ‘conventionally’. Typically, conventional cotton refers to cotton grown with the assistance of GMO seed and/or synthetic agrichemicals (including fertilisers, herbicides, insecticides, defoliants) (Shah et al., 2018; Wegier et al., 2016). The word ‘conventional’ is often used as an undesirable, pejorative term (World Wildlife Fund, 2021); however, according to the Pesticide Action Network UK (2017, p. 13), “there is no formal definition of conventional cotton”. ‘More sustainable’ cotton is a term used to refer to programs such as organic cotton, Fairtrade cotton, Cotton Made in Africa (CmiA) and Better Cotton (BCI)^{44,45} (Payne, Mellick, Simpson, et al., 2017; Payne, Mellick, & Peterson, 2017; Prince of Wales’s International Sustainability Unit, 2017; Textile Exchange, 2021). Following these definitions, Australian cotton would fall under the term conventional cotton as growers use GMO seeds and agrichemicals. This is largely because it would be uneconomic to use low yielding farming practices and seed varieties. In the case that Australian cotton is grown under myBMP/BCI, the cotton would fall outside the conventional cotton definition and under the ‘more sustainable’ bracket. However, it is important to note that there are ambiguities around these definitions, as well as challenges around the use of this terminology. For example, the value of GMO is polarised as there are concerns around multinational company control and monopoly over seeds (Fletcher, 2014; Fletcher & Grose, 2012). There is also a general distrust of GMO technology and a vague sense that natural is

⁴³ Pawar (2007 in Rieple and Singh 2010) estimated that transitioning from conventional to organic methods can result in a yield decrease of between 10 and 20% and in some cases 50% for the first two to three years. Fletcher and Grose (2012, p. 23) estimated a much higher figure, stating “organic yields can be as small as 60% of those of conventionally grown cotton” which can mean “significant financial losses for the farmer, especially if the market does not support the necessary increase in price”.

⁴⁴ In late 2021, the Better Cotton Initiative went through a brand name change to Better Cotton (Cotton Australia, 2021c). As the name change occurred after data was collected for this project, this study will refer to the program as Better Cotton Initiative (BCI). In terms of referencing, this study will use the brand name (Better Cotton Initiative or Better Cotton) based on which brand name the information was captured under at the time.

⁴⁵ For example, Textile Exchange (2021, p. 10) separates conventional cotton from cotton produced under the following programs: Responsible Brazilian Cotton (ABRAPA), BASF e3, BCI, Cleaner Cotton, CmiA, Fairtrade, Fairtrade Organic, Field to Market, International Sustainability and Carbon Certification (ISCC), myBMP, Organic, Responsible Environment Enhanced Livelihoods Cotton (REEL) Cotton, Regenerative Organic Certified (ROC), Transitional Cotton, Trust US Cotton Protocol (USCTP).

better. Particularly, there is concern that introducing GMO gene variants (such as the Bt toxin) into the environment could cause unknown consequences and build resistance to that strain (i.e. ‘super’ weeds and pests) (Fletcher, 2014; Fletcher & Grose, 2012). Yet there are practices, such as Integrated Pest Management (IPM), which are recognised to manage pests and weed resistance through combining biological methods and biotechnology (with GMO seeds) (Cotton Australia, 2021b; Fletcher, 2014; Fletcher & Grose, 2012). Furthermore, as discussed earlier with the case of Australian cotton, innovations with GMO seeds (along with IPM) have boosted productivity (i.e. higher yields with lower water and land use) and controlled pests that eat the cotton fibre (such as bollworms), while at the same time, reduced the rate of pesticide application. All of these factors also have an impact on fibre quality, which in turn affects a farmer’s income. It is also important to keep in mind that it is hard to distinguish between organic, conventional and ‘more sustainable’ cotton in the final product, and certifications/labelling play a key role in the identification of cotton types (Eyupoglu, 2019). Understanding all these factors is important as concerns and debates around cotton production are rife across the industry. They will be discussed in more detail below.

Relatedly, understanding cotton quality (which is largely connected to fibre length) is significant because this determines price, quality and end markets for cotton. The most common are *Gossypium hirsutum* (90% market share) and *Gossypium barbadense* (5% market share) (see Appendix C for a full list of cotton types)⁴⁶. *G. hirsutum* is characterised as a shorter fibre staple which is suitable for common products such as towels, sheets and shirts (OECD, 2008), whereas *G. barbadense* is characterised by its longer length which means it can be made into luxurious, high quality fabrics that command a premium price. Cotton is a commodity crop, which means that it is traded and sold globally, usually in large volumes based on quality. Once sold, cotton enters into the supply chain, which is opaque, heterogeneous, complex and global. With processing stages between production and consumption relatively long and comprising of numerous actors, tracing materials through the supply chain is difficult. The actors beyond the farm gate and their roles will be

⁴⁶ There are 52 species of cotton in the *Gossypium* family, but four species are commercially farmed (*hirsutum*, *barbadense*, *aboreum*, and *herbaceum*).

discussed in more detail in Section 4.2, including ginning, classing, marketing, spinning, textile and garment manufacturing, retailers and waste networks.

4.1.1 Cotton and sustainability issues

Turning now to sustainability issues, cotton production is scrutinised by retailers, non-government organisations and consumers on issues such as water management, fertiliser and pesticide use, as well as use of forced and child labour (International Cotton Advisory Committee and Food and Agriculture Organization, 2015; Payne, Mellick, & Peterson, 2017; Radhakrishnan, 2017). The following section outlines environmental and social concerns that are well established in the grey literature (International Cotton Advisory Committee and Food and Agriculture Organization, 2015; Pesticide Action Network UK et al., 2020). Starting with environmental issues, growers use pesticides and insecticides to control crop-destroying pests such as bollworms and silverleaf whitefly. There are concerns that pesticide use is hazardous to the ecosystem and biodiversity, and poses a threat to cotton labourers health (Rani et al., 2021). Cotton also has a reputation as a water intensive crop⁴⁷. Cotton can be farmed using irrigated, semi-irrigated or non-irrigated/rain-fed, and in particular, water extracted for flood irrigation has raised questions around efficiency. Related to this are concerns around water quality, such as pesticide run-off into groundwater, and water scarcity within the context of water availability. Added to this, water is a basic need (De Visser et al., 2003) and there is immense consumer sensitivity towards water use and pesticide use in cotton production (Radhakrishnan, 2017). Other issues are related to fertiliser use contributing to greenhouse gas (GHG) emissions, as well as pollution, soil erosion and degradation (Radhakrishnan, 2017).

Turning now to labour issues, cotton production is characterised by diverse labour practices and standards across the world. In the United States, Brazil and Australia, cotton production is “highly mechanised”, with technology used to monitor farm conditions (such as moisture) and mechanical harvesters used to pick the cotton; whereas in India, Pakistan and Africa, farmers typically have small farm holdings and cotton is usually hand-picked (International Cotton Advisory Committee and Food and

⁴⁷ It must be noted that this is highly debated (Preuss, 2021; Salfino, 2020) and Cotton Australia released a statement refuting this claim (Australian Cotton, 2021b).

Agriculture Organization, 2015, p. 6). The key issues of concern around labour practices include labour rights and standards, health and safety, equity and collective bargaining (International Cotton Advisory Committee and Food and Agriculture Organization, 2015). Since 2010, governments have placed more scrutiny and onus on businesses around forced labour and slavery in supply chains (e.g. Modern Slavery legislation in Australia (2019), the UK (2015) and the US (2010)). News in 2020 exposed that one in five cotton textile and garment products sold globally are connected to the forced labour of Uyghurs in China (Business & Human Rights Resource Centre, 2020; Chua, 2021a; Friedman & Paton, 2021; Kelly, 2020; Williams, 2020).

In addition to social and environmental concerns are the farm economics associated with cotton production⁴⁸. Chiefly, the price of cotton is determined by an uncertain and volatile global marketplace, which is due to a range of factors such as market forces and government subsidies. Additionally, the cost of inputs such as seeds and fertilisers have led to high levels of farmer debt. Finally, cotton production is dependent on nature, and activities depend on resources such as water, land and climatic conditions. These elements highly influence cotton yield and quality, especially when they are limited or if unpredictable weather occurs (i.e. hail, storms, etc.). This section has identified the key sustainability issues within cotton production. While sustainability issues continue beyond fibre production, this project is focusing on the *sustainable value* of Australian cotton. The following section will now unpack the key areas of debate around cotton and sustainability.

4.1.2 Debate on cotton and sustainability

It is widely agreed that cotton production needs to be sustainable to ensure the future viability of the industry. As cotton is farmed in over 70 countries, all with differing on-farm and trading practices, these characteristics make it difficult to adopt an integrated approach to understanding sustainability across fashion supply chains. In recent years, there has been an emergence of initiatives to promote sustainable cotton production to downstream supply chain actors. As discussed earlier, there is consensus

⁴⁸ It must be noted that social and environmental concerns, as well as issues with farm economics, apply to agriculture generally, and are not exclusive to cotton production.

that ‘more sustainable’ cotton can be defined as cotton sourced from BCI (which Australian cotton is benchmarked to), organic⁴⁹, Fairtrade and recycled, with cotton outside of these programs defined as ‘conventional’ cotton (Payne, Mellick, & Peterson, 2017; Pesticide Action Network UK et al., 2017; Textile Exchange, 2021) (see Appendix D for details about the programs). However, there are points of contention and gaps in knowledge around definitions of sustainable cotton. These include quantifying environmental impact, organic versus GMO seed, as well as chain of custody approaches.

Starting with quantifying impact, the fibre scoring tool, the Higg Material Sustainability Index (also known as the Higg MSI) by the Sustainable Apparel Coalition⁵⁰ is widely used by fashion companies to benchmark their sustainability ratings (Radhakrishnan, 2014). The Higg MSI scores a material’s impacts⁵¹ through a life cycle approach from the production of raw fibres through to textile production, garment assembly and production. However, the Higg MSI has been criticised as being too simplistic or relying on studies that cannot be generalised⁵² (Kassatly, 2019; Laitala et al., 2018; Watson & Wiedemann, 2019). This raises clear issues, especially when the Global Fashion Agenda’s *Pulse of Fashion Report* (2018, pp. 72, 76) presents data from the Higg MSI which clearly identifies natural fibres as the least sustainable fibre, and recommends increasing “the use of recycled polyester, mainly to replace cotton” (Laitala et al., 2018, p. 17) (see Figure 12).

⁴⁹ Organic cotton programs include Global Organic Textile Standard (GOTS) and Organic Cotton Standard (OCS).

⁵⁰ The Sustainable Apparel Coalition was founded in 2010, and currently represents a third of the global apparel and footwear produced (including brands, retailers, and manufacturers) (Radhakrishnan, 2014).

⁵¹ The Higg MSI combines scores for five impact categories: global warming (GHG emissions), eutrophication (nutrients in water run-off), water scarcity (water use), abiotic resource depletion (resource overuse), and chemistry (which is human toxicity) (Laitala et al., 2018).

⁵² The data from the tool is largely based on Nike’s Considered Index (donated to them in 2012) (Radhakrishnan, 2014) and the Higg MSI’s validity has come into question due to either generalisations based on fibre from only one factory or the datasets not being available to review.



Figure 12: Sustainable Apparel Coalition's Material Sustainability Index cradle to gate environmental impact by material from Global Fashion Agenda and Boston Consulting Group (2018, p. 42)

In addition to the immense concern around environmental impacts and use of inputs, labour is another key dimension of cotton production that needs to be considered (BCI, 2018; McClay, 2019). However, LCAs do not consider the social impact of farmers or regions (for example, whether farmers are going to lose money, whether it is dangerous work, or whether income security is enhanced). Furthermore, the Higg MSI does not include impacts around the use phase, which previous research has found to be the most impactful (Laitala & Boks, 2012; Laitala et al., 2018), especially as the washing of synthetic (e.g. polyester) clothing has been linked to microplastic pollution in the environment which causes contamination in food, water and air, and poses health risks to marine and human life, as well as ecosystems (De Falco, Di Pace, Cocca & Avella, 2019; Rahman, Sarkar, Yadav, Achari & Slobodnik, 2021; Chatterjee & Sharma 2019; Prata, da Costa, Lopes, Andrady, Duarte, & Rocha-Santos, 2021). The Higg MSI is not a comprehensive assessment of environmental impact, making comparison and 'ranking' problematic. As discussed in the Literature Review (Chapter 2), there is a dearth of LCA information on fibres and textiles. It is important to note here that Cotton Incorporated (2017) conducted an LCA on cotton fibre and fabric, however, impacts are measured per 1,000 kg of fibre/garment, which is difficult to translate into

per garment terms. It must also be noted that cotton identity programs do not require information sharing around input use, but in late 2021 BCI (2021a) announced that it will use Life Cycle Inventories (LCI)⁵³ to collect and publish quantitative data around production impacts. However, this information was not available at the time of data collection. This does indicate that quantifying and measuring cotton's environmental impacts will be an eternal hot topic in this field. Nevertheless, this section has pointed to some of the current limitations around tools and measurements, as well as gaps in knowledge around cotton's sustainability.

The second point of contention is around credible claims about the different types of cotton production. One widely published figure from the World Wildlife Fund (WWF) (2013) is that a cotton t-shirt takes up to 2700 litres (L) of water to produce⁵⁴. However, WWF has not made the study behind the figure publicly available. Another figure, from the Textile Exchange (2014) report, claims that organic cotton uses 91% less blue water consumption than conventional cotton⁵⁵. However, the report has been heavily scrutinised, especially for being misleading about organic cotton's water use because rainwater (which the cotton would have substantially relied upon to grow) was not included in the calculation (Kassatly, 2019). What we can see here are incomparable claims based on limited information and research⁵⁶ about the inputs used across all cotton production programs. Bates argues that "at the present time there is no data to substantiate claims that at a global level, one type of cotton is more sustainable than another" (Kassatly, 2019, p. 13). Problems arise when retailers use these studies to make sourcing decisions and claims around materials' sustainability impacts and present these statistics as representative of the whole of organic cotton or conventional cotton without understanding the methodology of the study and their

⁵³ LCI is the data collection portion of LCA and is a more straightforward approach compared to LCAs multi-step, life cycle impact.

⁵⁴ WWF's figure has been quoted by sustainability ratings publication, Good on You (Good on You, 2017), consultancy McKinsey & Company (Granskog et al., 2020), as well as fashion retailers C&A (C&A, 2018), Kathmandu (Kathmandu, 2021) and A.BCH (A.BCH, 2021).

⁵⁵ Textile Exchange's figure has been widely quoted from Vogue (Chan, 2019), as well as global fashion retailers Kowtow (2021), C&A (2018), Nudie Jeans (2021), H&M (2021) and Inditex (2021b) to name a few.

⁵⁶ At this stage, one study of cotton grown in India has found that compared to conventional cotton, organic cotton uses 28% less water and Better Cotton Initiative uses 39% less water (Shah et al., 2018). Water use calculations based on 1 kg of seed cotton: Conventional Cotton 541.06 L, Organic Cotton 391.80 L and Better Cotton Initiative 331.61 L (Shah et al., 2018).

limitations⁵⁷. In fact, this highlights a deeper issue around the root cause of misconceptions around cotton growing practices (especially around water use) and demonstrates the consequences of these gaps in knowledge (for example, labelling cotton as a thirsty crop and high user of water). At the time of writing, a report published by the Transformers Foundation (2021) debunked commonly shared myths about cotton, such as that a single t-shirt requires 20,000 L of water to make. A related purpose of the report was to ‘teach’ consumers, civil society and non-profits, media, brands and industry the best practices around using sustainability claims, and proposes a ranking system for claims. The ranking from high to low is as follows: peer reviewed articles (Gold), robust methodology (Green), primary resource but questionable methodology (Yellow), contested or unreliable data (Orange) and unverified, unknown or obsolete data (Red) (Transformers Foundation, 2021). For example, the claim of 20,000 L of water used to produce a single t-shirt was ranked as Red because the original source of the data could not be located (Transformers Foundation, 2021). The report also discourages use of globalised statistics due to their lack of context, and makes six calls to action for the industry, which include establishing a global fact-checking system, co-investing in filling data gaps, and making data open-source and publicly available (Transformers Foundation, 2021). Although it is too early to see the impact of this report on the industry, the report has been lauded for shedding light and attention on mistruths which have perpetuated and undermined cotton’s value as a sustainable fibre. This report is also timely as credible claims are becoming more important due to increasing regulatory scrutiny⁵⁸ and enforcement of significant penalties⁵⁹, especially in cases of misleading environmental claims.

⁵⁷ This problem is not unique to cotton but more of a symptom of the complexity of the value chain. For example, Kent (2019) highlighted that there is incomplete data surrounding sustainability impacts due to the industry’s opacity, which means that fashion retailers are often relying on misinformation when setting sustainability targets, which hampers the pursuit of effective change.

⁵⁸ The Australian Competition and Consumer Commission (ACCC), an Australian consumer and competition protection watchdog, states that premium and credence claims are required to be “honest, accurate and able to be substantiated [...] clearly explain[ed], in simple language, the significance of the benefit to the environment” (Australian Competition and Consumer Commission, 2021a). In May 2021, *Apparel Insider* reported that the UK’s Competition and Markets Authority was developing new guidelines for greenwashing (due to be finalised in September 2021) (Mathews, 2021b). The guidelines will call on brands to use clear marking language, make fair and meaningful comparisons, not omit information, substantiate claims and to consider the full product life cycle (Mathews, 2021b). This is expected to have potential ramifications for the marketing of ‘more sustainable cotton’ (such as BCI), which could be classified as too vague (Mathews, 2021b).

⁵⁹ For example, Volkswagen AG was ordered to pay \$125 million in penalties for misrepresentation of diesel fuel emissions.

As misinformation around cotton is widespread, perceptions around cotton and sustainability are equally important to consider. For example, previous research has shown that there is a strong perception amongst consumers that non-GMO or organic cotton is better in terms of quality and for the environment when compared to GMO cotton (Bucklow et al., 2017; Ellis et al., 2012; Ha-Brookshire & Norum, 2011; Hustvedt & Dickson, 2009; Lin, 2009; Radhakrishnan, 2017). One assumption is that because organic cotton is grown without pesticides it is ideal for sensitive skin (Eyupoglu, 2019; Gopalakrishnan, 2007; Lin, 2009; Radhakrishnan, 2017). However, by the time conventional cotton is harvested and processed into a yarn, textile and then a garment, there is no trace of pesticides, insecticides and herbicides on the final product. Furthermore, the same dyes and finishes are often used on both organic and conventional cotton (Cotton Australia, 2021i). As mentioned earlier, other concerns include the control of GMO seeds by powerful multinationals, and the impact GMO seeds have in farming systems not appropriately set up to manage resistance (Fletcher, 2014; Fletcher & Grose, 2012). However, organic production sometimes requires more labour and land, and yields are usually half those of conventional cotton, so it does raise questions around whether organic cotton uses land productively (International Cotton Advisory Committee, 2018). As highlighted earlier, comparable data that quantifies the impact of the different types of cotton production is lacking (Kassatly, 2020a). Nevertheless, there is a need to understand perceptions around sustainability, especially when it comes to different cotton production practices.

A final point of contention is the role of different ‘chain of custody’ models and their ability to effectively capture and transfer sustainable value along the chain. ‘Chain of custody’ models have been designed to create transparency and trust around the circulation of materials and their properties (e.g. origin, production practices) in value chains (Ellen MacArthur Foundation, 2020). Identity preservation, segregation and mass balance (Ellen MacArthur Foundation, 2020) are the three most common practices in fashion value chains, which will now be discussed in more detail.

Mass balance is one chain of custody approach to tracing the amount of material content through complex value chains. For example, BCI’s mass balance system⁶⁰

⁶⁰ In BCI’s chain of custody process, cotton is physically segregated from farm to gin (until baled) and then Better Cotton Credit Units (BCCUs or BCI credits) are tracked administratively (Payne, Mellick

means that BCI cotton is not in the final product, but rather works within the system of how cotton is currently traded and produced, as a scalable strategy to create more demand, build critical mass, and in turn impact. Added to this, BCI's mass balance system is less expensive than physical traceability, hence its appeal to mass-market retailers. However, mass balance lacks market differentiation of cotton based on origin, which has raised questions around its ability to capture sustainable value. For example, problems have arisen where BCI has been linked to forced labour (Glover, 2021a; Sutherland, 2021)⁶¹ and BCI's marketing of sustainability credentials has been criticised for being misleading, lacking accountability and transparency around the production of cotton (Glover, 2019). These weaknesses are important for retailers to note, especially considering that government policy and regulation is playing a key role in traceability and supply chain governance. For example, the United Kingdom, United States and Australia⁶² have Modern Slavery Acts which require companies to ensure that there is no risk of forced labour, slavery or human trafficking in their supply chains. The second model, identity preservation, physically tracks the product from its origins along the supply chain (Ellen MacArthur Foundation, 2020). Traceability technology, such as Oritain, FibreTrace, Applied DNA and the Trust US Cotton

and Peterson, 2017). This process is called 'mass balance administration', and BCI cotton was anticipated to grow to 30% market share by 2020 (Better Cotton Initiative, 2017, p. 3) but reached 23% in the 2019-20 season (Better Cotton, 2021a, p. 3).

⁶¹ BCI has been embroiled in controversy following reports that emerged around 2018 which accused China's Xinjiang region of forced labour from Uyghurs and other Muslim groups for cotton picking. Australian retailers Jeanswest, Dangerfield, Ikea and H&M were revealed to have been sourcing cotton from the region, while Cotton On and Target Australia were linked to Xinjiang-based subcontractors (McNeill et al., 2019). In 2020, BCI said it would suspend its licensing of farms in Xinjiang, but in 2021 BCI removed this statement. It has been suggested this was in response to backlash from China, which called on consumers to boycott brands over disavowing Xinjiang cotton, including H&M, Nike and Burberry (Helfenbein, 2021a; Johns, 2021). This pressuring of foreign companies and organisations to stay silent is significant, as the Coalition to End Forced Labour said BCI's silence put the credibility of the programs and its members at risk (Mathews, 2021a). China has since suggested it will launch its own version of the BCI initiative (Chua, 2021b). In 2020, BCI announced plans to offer full traceability model citing legislative requirement (such as the Modern Slavery Acts) and geopolitical issues (such as the Xinjiang region of China).

⁶² The Australian Modern Slavery Act requires brands to publicly report on risks of forced labour, slavery or human trafficking in their supply chains. However, it has been argued that the Australian policy is a 'weak' mechanism as the government is not required to list the entities which are required to report and there are limited consequences for entities which do not meet the reporting requirements or responses to cases of exploitation (Vijayarasa, 2019).

Protocol⁶³ has allowed retailers to make credible claims about the origin of fibres. It is a burgeoning area; however, physical traceability is expensive.

The final model, segregation, involves the physical segregation of products⁶⁴ (Ellen MacArthur Foundation, 2020). Organic cotton, particularly GOTS, uses physical segregation to ensure that it is not mixed with GMO cotton. However, in 2019 it was found that India was selling fake organic cotton certificates to brands, which undermined the rigour of the program (Abdulla, 2020; Fibre2Fashion News Desk, 2020). Another instance of fraudulent cotton occurred in 2016 when Indian spinning company, Welspun, was caught mislabelling Egyptian cotton (a premium type of cotton of the *G. barbadense* variety due to its Extra-Long Staple) and selling an inferior product to Walmart, Target, and Bed Bath and Beyond (Moodie, 2016). Welspun suffered significant financial and reputational costs as a result, and in 2018 they partnered with Oritain to develop WEL-TRAK to scientifically prove product traceability (Oritain, 2021; Stempel, 2019). Being able to verify claims made around cotton is important not only in being able to charge more, as in the case of organic and Extra-Long Staple cotton, but also in capturing sustainable value of raw material in fashion supply chains. While there are three main types of chain of custody approaches in fashion value chains, none are without challenges. The following section will explore the Australian cotton industry value chain structure and dynamics.

⁶³ The Trust US Cotton Protocol, in partnership with TextileGenesis, has taken traceability beyond origin claims to include quantifiable metrics such as land use, soil carbon, water management, soil loss, GHG emissions and energy efficiency (U.S. Cotton Trust Protocol, 2021). The program was launched in mid-2020 and the Trust Protocol has over 300 brands, retailers and mills, including Gap and Next (Ledger Insights, 2021). At the time of writing, it is not yet known if the program attracts a premium or delivers a premium to cotton growers based on sustainability metrics.

⁶⁴ Helfenbein (2021b) explains the types of evidence required by United States Customs to demonstrate that a shipment of men's Uniqlo cotton shirts were not produced with forced labour, which also illustrates the complexity around physically tracing cotton: "list of production steps and production record for the yarn, including records that identify the cotton and the cotton producer of the raw cotton. Transportation documents from cotton grower to yarn maker. Supporting documents that related to employees that picked the cotton, timecards or the like, wage payment receipts, and daily process reports that relate to the raw cotton sold to the yarn producer".

4.2 AUSTRALIAN COTTON INDUSTRY STRUCTURE AND VALUE CHAIN DYNAMICS

Following the VCA method, this section will map the Australian cotton value chain stages, and examine the material and information flows, as well as relationships (Bonney et al., 2009; Howieson et al., 2016, p. 354; Soosay et al., 2012). The main onshore Australian cotton actors⁶⁵ include growers, ginners, classers and merchants. It is critical to note that the Australian fashion manufacturing industry, from spinning through to garment manufacturing, has slowly been dismantled over the past 30 years due to the lowering of tariffs and quotas on imported clothing. Hence, cotton is sold to overseas markets to be further value added. This section will provide a high-level analysis of each stage of the Australian cotton value chain, starting from the onshore stages of cotton farming, ginning, classing and marketing, through to offshore manufacturing such as spinning, textile and garment production, followed by retailing and waste networks (Appendix E contains more detailed information).

Farming

The cotton value chain activities start with farming cotton. In Australia there are over 1500 growers across Queensland, New South Wales, Victoria and Western Australia (Cotton Australia, 2021g). Cotton production accounts for up to 60% of the agricultural output in the regions in which it is grown, with 3 million bales produced per year on average which contributes around \$1.8 billion⁶⁶ in exports each year (Cotton Australia, 2020a; Cotton Australia & Cotton Research and Development Corporation, 2019). Australian growers produce a high quality fibre from varieties of *G. hirsutum* (Upland cotton), which is grown on either a dryland (rainwater fed) or irrigated (additional water supply) farm. Innovations in cotton seed GMO technology allow Australian growers to produce both medium and longer staple varieties (Payne,

⁶⁵ Industry organisations include Cotton Australia (chief grower body), Cotton Research and Development Corporation (research arm), Australian Cotton Shippers Association. The public sector has some involvement as a regulatory mechanism (i.e. water licences) and the government matches grower research and development levy funds dollar-for-dollar (all growers pay a levy which equates to \$2.25 for every bale of cotton; or \$4.06 per tonne of exported seed cotton) which supports research that helps improve the industry's performance (Cotton Research and Development Corporation, 2021b).

⁶⁶ Average annual gross value of seed and lint production between 2014–2019 (Cotton Australia, 2020a).

Mellick, Simpson, et al., 2017). This means that in terms of fibre length, Australian cotton sits towards the top end of *G. hirsutum* (Upland) growths, but below *G. barbadense* varieties (Extra-Long Staple) (Payne, Mellick, Simpson, et al., 2017). As cotton is sold based on quality parameters, growers work to achieve a balance between achieving the highest quality fibre (in length, strength, micronaire and low contamination) while maximising yield. Roth (2010) explains that economic returns are a key factor for the success of agribusiness, and cotton has traditionally been the most profitable crop where it is grown (estimating \$500–\$1000 per hectare).

In addition to contributing economic value to the national economy, the Australian cotton industry has a history of assessing and reporting sustainability⁶⁷ (Cotton Australia, 2020a). In 1997, the industry established the myBMP program⁶⁸, a voluntary farm management system which benchmarks sustainability practices⁶⁹. The myBMP program has been benchmarked to BCI, and Australian cotton growers can participate in BCI once they have attained the full myBMP certification and paid their Cotton Australia levy fee⁷⁰ (Better Cotton Initiative, 2017; Better Cotton, 2021c; Cotton Australia, 2021h). In 2019, it was estimated that 66% of Australian cotton growers were registered for myBMP (Cotton Australia & Cotton Research and Development Corporation, 2019), and 48 Australian farmers were licenced for BCI cotton (Better Cotton, 2020, 2021b)⁷¹. The Australian cotton industry also produces a sustainability report every five years which outlines the industry's sustainability performance through environmental, social and economic indicators (Cotton Australia & Cotton Research and Development Corporation, 2019). As stated in the Introduction (Chapter 1), Australian cotton is highly land and resource efficient, as evidenced by innovations in cotton growing which have seen a reduction of pesticide use by 97%

⁶⁷ The Australian cotton industry was one of the first industries to benchmark environmental performance in 1991 (Cotton Australia, 2020a).

⁶⁸ BMP program was launched in 1997, reviewed in 2006–07 and turned into an online system in 2010 (myBMP, 2021)

⁶⁹ The myBMP program covers 10 key modules for growers including biosecurity, energy and input efficiency, fibre quality, human resources and work health and safety, integrated pest management, sustainable natural landscape, pesticide management, petrochemical storage and handling, soil health and water management (myBMP, 2021). There are ginning and classing modules as well.

⁷⁰ However, only 68 Australian farmers are currently BCI certified (Cotton Australia, 2021a).

⁷¹ It must be noted that Cotton Australia estimated a higher figure of around 68 growers as BCI licenced (Cotton Australia, 2021d).

and improved water usage by 48%, and yields three times the world average⁷² (Cotton Australia & Cotton Research and Development Corporation, 2019). Implicitly, sustainability is framed in terms of reducing outputs and increasing yields (i.e. doing more with less), which aligns to the competitive productivism paradigm (Lawrence et al., 2013). Understanding inputs and their use is possible due to the high level of traceability on-farm. Farmers typically ‘zone’ their farms during pre-planting, catalogue how much seed is planted, and keep track of water/irrigation timing and pesticide applications throughout the season. When cotton is picked, harvesters use Global Positioning System (GPS) tracking and generate a Radio Frequency Identification (RFID) tag based on its location. This tag is carried through the ginning, classing and merchant stages. With existing onshore traceability practices in place, coupled with burgeoning consumer interest and new technologies such as blockchain which digitise the supply chain, the Australian cotton industry is primed to meet the supply chain needs of onshore traceability and transparency.

The Australian cotton industry is a major social contributor to regional communities. In 2020, Cotton Australia released a report titled *Cotton with a Conscience* and found that the cotton industry consists of mainly family-run farms (90%) and a few large-scale corporate farms⁷³, and directly employs 12,500 people (across the value adding stages such as inputs, farming, ginning and marketing) (in a non-drought year) (Cotton Australia, 2020a). The cotton industry’s impact on the local rural economy is high, for example, 93% of business expenditure is spent in regional businesses, which aids employment and retention (Cotton Australia, 2020a). These figures are significant, as retailers are concerned about child labour and slave labour conditions, typically associated with cotton production in developing countries, as discussed above.

Nevertheless, there are two major headwinds that will affect the future of the industry. First, environmental systems and changes in climate impact farms; for example, weather events (drought, fire, hail, etc.) impact the availability of resources (i.e. water), and in turn the ability to produce cotton. In recent seasons the supply of

⁷² Research has also found that growing and manufacturing Australian cotton has significantly a lower carbon footprint compared to polyester (Day, 2009).

⁷³ For example, CS Agriculture Pty Ltd (Cubbie Station), which is 51% owned by a Chinese-led consortium by Shandong Ruyi, have a 2–3% market share (Youl, 2021).

Australian cotton has fluctuated significantly, with 600,000 bales in 2019/2020, 2.6–2.8 million bales in 2020/2021 (Cotton Australia, 2021j), and an estimated 3.9 million bales was anticipated in 2021/2022, which Biki (2021) estimated was “50 percent higher than the estimated MY [Model Year] 2020/21 result and 15 percent above the previous 10-year average”. Notably, the 2019/2020 season (which produced less than 600,000 bales), was the smallest crop since 1982/1983, largely due to reductions in water availability and increases in cost (Australian Bureau of Statistics, 2021). Second, consumers (end users of cotton) are more aware and have expectations around sustainability credentials (Cotton Research and Development Corporation, 2018). These two issues converged in the summer of 2018/19. The Murray-Darling Basin⁷⁴ (MDB) was in severe drought and there were several highly publicised fish kills in the MDB in early 2019, which stirred a public and political discussion that was quick to blame the cotton industry for taking too much water (Condon & Claughton, 2020; Middleton, 2019; Webster & McCosker, 2019). However, in practice, farmers do not ‘take’ water, but are allocated water licences based on the availability of water in the region. In some regions for the 2019 season there was no allocation for water, leading many cotton growers to plant alternative crops or to leave paddocks fallow (ABC News, 2019; Aravanis, 2017; Kilvert, 2019).

Concerns over water highlight that in addition to resource scarcity, public perceptions of the industry are just as important as where and how cotton is grown. This demonstrates that the industry needs to protect its social licence to operate (as established in the Literature Review) and prove it is responsible, sustainable and provides real benefits to its stakeholders and the wider community. Social licence to operate affects the industry’s access to resources such as water and land, pesticides and chemical use, as well as the use of GMO crops. The need for ‘socially licenced’ industries was identified in the work of Mayes’ (2015) GPN case study on Broken Hill Propriety Company Ltd (BHP) Billiton’s Ravensthorpe Nickel Operation (RNO) in Western Australia. Mayes (2015, p. S115) explains that extractive industries, such as mining and agriculture, are “place-bound” and gaining social licence to operate is important because companies need to ‘negotiate access’ to sites to enable production.

⁷⁴ The Murray-Darling Basin (MDB) is a major water source for 90% of Australian cotton growers, and is a complex river system catchment which stretches from Queensland, to New South Wales, the Australian Capital Territory, Victoria and South Australia.

Social licence is a hard term to define, but is usually associated with the values of the community where the industry is seeking access to, as well as the community's trust and perceptions of that industry (Andreoni et al., 2016). As Bice (2014, p. 76) notes in her Australian mining case study, it is a "metaphorical licence" that holds "intangible 'do-gooder' sentiments". Equally important, is the power that social licence to operate gives to an industry when the local communities and wider society feel good about that industry's presence. It should be noted that social licence to operate can be related to Porter and Kramer's (2006) notion of shared value, which considers 'value beyond the chain'. The Australian cotton industry is aware of these challenges, as well their changing nature, and has invested in this area (Andreoni et al., 2016; Condon & Claughton, 2020; Roth, 2011). The myBMP program is a key part of benchmarking Australian cotton farming practices. In addition to this, the industry has joined international programs, SAC, Cotton LEADS and the Better Cotton Initiative, and publishes a sustainability report which communicates to key stakeholders how farming practices are sustainable (Cotton Australia, 2021k; Cotton Australia & Cotton Research and Development Corporation, 2019; Cotton Research and Development Corporation, 2021c). Reporting and measuring sustainability is linked to value chain competitiveness which is a key strategic area for the Australian cotton industry, and this study contributes to this agenda.

Ginning

Ginning is the first value adding stage post-farm gate and involves separating the cottonseed and cotton plant matter, known as leaf or trash, from cotton lint. All parts of the cotton plant are utilised⁷⁵. Ginners and growers have a logistical relationship centred around managing fibre quality⁷⁶. The ginners' role is to gin the

⁷⁵ Although cotton lint makes up about 42% of the picked cotton weight, the focus is on selling cotton lint (contributes 85% of the total income) as this is more lucrative than seed (contributes 15% of total income) (Cotton Australia and Cotton Research and Development Corporation, 2014). Cotton lint is sold to spinners for further processing into yarn. Cotton seed is used to make oil or as stock feed. However, the only cotton crushing processor, Cargill, shut down operations in 2018 due to increases in seed costs and electricity (Grain Central, 2018). Cotton trash (waste left over from the ginning process such as short fibres and stalks) is either composted and made into fertiliser, burned to make energy, or can be used as a source for bioplastics (Waste Management Review, 2019; Haque, Remadevi, Wang, & Naebe, 2020).

⁷⁶ For example, ginners may ask growers questions about "the conditions of the season to understand what characteristics the gin is working with from that region" (Payne, Mellick, Simpson, et al., 2017, p. 17).

cotton (remove the seed and trash) with minimal influence on the overall quality parameters of the cotton crop so that the farmer can receive the highest possible price for their crop. In terms of societal value, gins employ seasonal staff but are a largely automated operation, which in turn reduces labour costs. Once the cotton is ginned, it is baled and containerised, then sent to ports for shipping. Gins may provide ginning services alone, or include marketing and shipping services as well. There is a moderate share of market concentration, as the top three companies hold approximately 50% of the market share, with the industry’s largest players being vertically integrated (cotton farming, ginning, warehousing, marketing and trading) (Youl, 2020) (see Table 7 below).

Table 7: Major Australian cotton ginning companies adapted from IBIS World (Youl, 2020)

Ginning Companies	Gins and locations	Ownership	Market share
Namoi Cotton	12 cotton gins across southern Queensland and New South Wales, as well as three warehousing and packing facilities	Cooperative ownership structure, controlled by Australian growers ⁷⁷	24.5%
LDC Enterprises Australia Pty Limited	Vertically integrated with marketing and transport activities based in Brisbane, Queensland	Louis Dreyfus Commodities ⁷⁸	21.5%
Auscott	Vertically integrated with four farms and gins, as well as cotton	Australian Food and Fibre ⁷⁹	6.5%

⁷⁷ There are some co-owned ventures such as Australian Food and Fibre and Sundown Pastoral. Of significance is the joint venture between LDC Enterprises Australia and Namoi Cotton which essentially pools both companies’ cotton for trade (Youl, 2020).

⁷⁸ Owned by a US company since 2010. Global commodity trader of oilseeds, rice, coffee, wheat, barley, sugar, juice, dairy and fertilisers across North America, Latin America, Europe, the Middle East, Africa and Asia (Youl, 2020).

⁷⁹ Founded in 1963 by US-based company J.G. Boswell Company and sold to Australian Food and Fibre in 2021 (Grain Central, 2021; Youl, 2020).

Ginning Companies	Gins and locations	Ownership	Market share
	classing, marketing and shipping services		
Olam Investments Australia Pty Ltd (also known as Queensland Cotton)	10 cotton gins across Queensland and New South Wales, as well as warehousing and marketing	Olam International ⁸⁰	3.6%
Southern Cotton Pty Ltd ⁸¹	One gin in the Murrumbidgee Valley in New South Wales	Australian-owned	1-2%

Classing

After the cotton is ginned and baled, samples from each bale are classed based on quality parameters. The classing quality parameters include colour, leaf, length, strength, micronaire and uniformity. Classing is not so much a value adding stage, but rather a service to determine the quality parameters (hence its ‘class’) of the cotton. Base cotton is a term used to describe the parameters before cotton is discounted. These parameters are: 31 colour, Level 3 trash, 3.5–4.9 micronaire, 1 1/8” / 36 fibre length (CottonInfo, n.d.). Classing is an important stage because the information generated about cotton quality determines how much growers are paid. There are three classing houses in Australia, the biggest being ProClass (see Table 8). As classers only require bale samples, they have a logistical relationship with gins and growers. The classer then gives the classing result to the ginner, the merchant and the grower⁸².

⁸⁰ Olam acquired Queensland Cotton in 2007 and is now the Australian branch of Singapore-based Olam International, which specialises in trading food (such as cocoa, coffee and cashews) and agricultural products (such as fertiliser, wood, wool and rubber) in over 70 countries (Youl, 2020).

⁸¹ Established in 2011. According to IBIS World (Youl, 2020), although a small player, the gin offers competitive advantage in its cost-saving technological systems, such as powering the gin through burning stalks and leaves left over from cotton processing.

⁸² Grower uses classing data to understand how the quality of the cotton has been influenced based on the inputs/location (e.g. how much water was used on-farm).

Table 8: Australian cotton classers adapted from Australian Competition and Consumer Commission (ACCC) (2021b)

Company	Location
Auscott Limited	Sydney
Australian Classing Services (wholly owned subsidiary of Namoi Cotton Limited (2021))	Wee Waa
ProClass Pty Ltd	Goondiwindi

Marketing

After the raw cotton is grown, ginned and classed onshore, it is then sold by merchants to spinning factories offshore. Australia produces a high quality, low-contaminant cotton fibre that is in demand. According to industry reports, Australia sells 99% of all cotton grown annually (USDA Foreign Agricultural Service, 2019). Australia produces around 3% of the world’s cotton, which on a global scale is a relatively small amount (Cotton Australia, 2017b; Payne, Mellick, Simpson, et al., 2017). Nevertheless, Australia is the world’s fourth largest exporter, after the United States and India (USDA Foreign Agricultural Service, 2019). As Australia is located in the Southern hemisphere, cotton growing and harvesting times alternate with the Northern hemisphere season, which provides the Australian cotton industry with a competitive advantage. Spinning mills that buy Australian cotton include China, Bangladesh, Vietnam, India, Indonesia, Turkey, Thailand, Korea and Pakistan (ABARES 2014 in Cotton Australia, 2016). Agents and merchants are intermediaries that trade cotton to mills. There are a number of channels through which Australian cotton reaches customers, all co-existing and working to serve the needs of their end users. The chief differences between these value chains lie in the way actors along a value chain are connected to one another, and how these chains create and capture value for their customers, consumers and other participants in the chain.

Cotton is mainly traded on forward markets, futures markets and on the spot market. The majority of Australian cotton is sold on the forward market⁸³. There is a small amount of physically segregated/traceable cotton sold directly to Australian

⁸³ In 2015, it was estimated that 40 to 60% of Australian cotton was sold through forward contracts, and 20 to 30% was sold on the spot market (Farmarco in ACCC 2015, 4). Australian cotton growers and merchants can forward-sell cotton up to four years in advance (CottonInfo, 2017).

retailers through Cotton Australia's 'Cotton to Market' program (which will be discussed in more detail in the Retailing section below). Over the past decade, cotton prices have averaged around \$529/bale, and ranged from \$300/bale to more than \$600/bale (Cotton Australia, 2021e). Cotton prices are affected by supply and demand factors, as well as the New York Futures, the Australian to United States Dollar currency and the difference between the cash and future price for cotton (the Basis) (Cotton Research and Development Corporation; CottonInfo, 2020). Another important consideration is that cotton dominates the natural fibres marketplace at around 23%; it also competes with wool and man-made regenerated cellulose from wood-based sources (Textile Exchange, 2020a). However, the competitiveness of synthetic man-made fibres (such as polyester) has decreased cotton's market share over time. The production of polyester is mainly concentrated in China and Korea, and is a particularly strong source of competition, especially in times of low crude oil prices (Youl, 2020).

There are strong information flows onshore between cotton growers, pre- and post-harvest contractors, ginner, classers and merchants to prepare and send the cotton to agents when requested. Merchants are gatekeepers of the buying and selling of cotton as they have specialised knowledge of overseas customers' requirements (spinners), as well as market demand, price and availability. The merchant usually tells the cotton farmer the price of cotton, but the farmer typically does not know where the merchant sells their cotton to (i.e. general geographic location), let alone the specific mill/factory. Likewise, cotton is bought and sold based on quality, and the RFID information (farm and field identification) is not shared with mills because growers own this data. It is essential to establish here that the trading of cotton between the merchants, agents and mills is based on the quality of the cotton. Australian cotton has captured a premium for its 'use' value (i.e. cotton quality in terms of colour, strength and low contamination), but it is not clear if Australian cotton has captured economic value for sustainable farming practices. Although myBMP has gained some market recognition, joining BCI has been one way that Australian farmers have gained global market access for sustainable cotton.

Spinning, Textile and Garment Manufacturing

For the purposes of this project, the manufacturing stages from yarn production, textile and garment manufacturing have been summarised together. These stages are highly specialised sub-processes, and companies either operate as a single-stage processor of yarn, or are vertically integrated with two stages (yarn and manufacturing) or three stages (yarn, textile, and garment manufacturing) (Payne, Mellick, Simpson, et al., 2017). As mentioned earlier, spinners offshore are the primary purchasers of Australian cotton and the next value adding stage of Australian cotton⁸⁴. While Australia has a reputation for producing high quality, consistent cotton, it must be noted that there has been immense research and attention on improving Australian cotton's fibre quality for the spinning market, and in turn, increasing the industry's export potential (Braunack, 2013; Chang & Nguyen, 2002; Long et al., 2013; Long et al., 2010; Gordon, van der Sluijs and Prins, 2004). The majority of the world's yarn, textile and garment manufacturing occurs in Asia, particularly China⁸⁵, Germany, Bangladesh, Vietnam and India (Payne, Mellick, Simpson, et al., 2017; Fibre2Fashion, 2019b). Once cotton lint is received by spinners/mills from merchants, bales are opened and sorted based on their quality. Cotton is then blended together to achieve desired parameters depending on the end product (e.g. long staple yarns are required for a fine white shirting fabric) and cleaned of any leaves and contaminants. The practice of blending fibres together means that traceability becomes complex. After the yarn has been spun, it is woven or knitted into fabric, which is then made into a product for end users. Subsequent manufacturing stages depend on the end product; however, these stages generally involve cutting and sewing together fabric. Apparel manufacturers are typically price takers, not price-setters, as these are largely set by retailers that buy the clothes, representing a classic buyer-driven value chain (Gereffi, 1994). The role of the retailer is dominant – they exercise considerable power over

⁸⁴ Weller (2007) and Snape, Gropp and Luttrell (1998) explain that because Australia lacked market power, it was not a party in the negotiations of the bilateral trade restrictions of the Multi-Fibre Arrangement (MFA).

⁸⁵ China is the largest apparel manufacturer and exporter, with approximate turnover around \$266.41 billion USD in 2019, and grew nearly 10% in 2020 to \$291.22 billion USD (despite the pandemic), which accounts for a little less than half of the global market (Fibre2Fashion, 2019b; Just Style, 2021b). China also produces natural (i.e. cotton, wool, linen, silk) and man-made (i.e. polyester) fibres and textiles, as well as textile dyeing, printing and finishing. Helian Group Co. Ltd is the largest vertically integrated textile and apparel manufacturer in China (around 1.5% market share) and was expected to produce around \$11.8 billion in revenue in 2020 (DellaCamera, 2021).

processes and production, and suppliers have to adjust their resources and activities to ensure they are aligned with the retailer's specification requirements.

Turning to the Australian context, manufacturing has slowly been declining. For example, approximately 38,800 people were employed in 2017–18, with the figure more recently estimated to be around 36,000 people (Australian Industry and Skills Committee, 2020; Cooper & Spence, 2019). According to IBIS World reports, retail generates the largest revenue at \$18.9 billion, while textile manufacturing generates \$315.3 million, knitting production generates \$90.6 million and fashion manufacturing generates \$1.8 billion in revenue (Dean, 2021a, 2021b, 2021c; Oo, 2021). Although Australian production is more expensive than offshore manufacturing, there is a trade off in terms of higher transportation costs and time, as well as carbon footprint. The COVID-19 pandemic exposed vulnerabilities within global supply chains (such as production and shipping delays), which renewed interest in re-shoring manufacturing capacity, leading to the Australian Government's Modern Manufacturing Strategy⁸⁶ (Department of Industry, 2021). Re-shoring (the opposite of offshoring) is the notion of exiting production in foreign countries and returning to manufacturing goods domestically. However, textiles and fashion production are not included as part of this plan. Furthermore, the Productivity Commission found that less than 2 percent of imports are vulnerable to international supply chain disruptions (Kehoe, 2021; Productivity Commission, 2021; Thompson, 2021). Right-shoring is another strategy that has been gaining traction. Right-shoring is defined as placing a business's components and processes in a mix of foreign countries or localities that provide the best combination of costs and efficiencies to effectively maintain or improve competitiveness (Joubioux & Vanpoucke, 2016). This is an important context, especially as research has shown that local and domestic production is important to consumers when considering sustainability, and 'locally made' has been found to positively influence consumers' willingness to pay (Niinimäki & Hassi, 2011; Tey et al., 2018; Veit et al., 2018).

⁸⁶ Six key areas were identified as priorities, these include: Resources Technology & Critical Minerals Processing; Food & Beverage; Medical products; Recycling & Clean Energy; Defence; and Space (Department of Industry, 2021).

Retailing

Retailing is the final value adding segment in the chain and retailers are the gatekeepers to consumers. Consumers inform retailers about their preferences through their buying and consumption habits. Retailers are powerful actors in the fashion value chain as they control the product specifications, information and financial flows, as well as capture a greater percentage of the final price (Gereffi, 1994). Added to this, the global fashion market is valued at 1.5 trillion US dollars⁸⁷ and has a high concentration of fast fashion companies, such as Inditex, H&M and Fast Retailing, which dominate the fashion industry (Shahbandeh, 2021)⁸⁸ (see Table 9).

Table 9: Sales of major fashion manufacturers and retailers in 2020 (Statista, 2020b)

Company	Ownership	Sales (USD Billions)
Inditex (Zara)	Spain	24.80
Hennes & Mauritz (H&M)	Sweden	22.48
Fast Retailing (Uniqlo)	Japan	18.91
Gap	USA	13.80
L Brands	USA	11.85
PvH (Calvin Klein, Tommy Hilfiger)	USA	7.13
Ralph Lauren	USA	6.16
Next	UK	4.94
American Eagle Outfitters	USA	3.76
Abercrombie & Fitch	USA	3.13
Esprit	Hong Kong	1.19

As explored in the Literature Review (Chapter 2), within the context of global value chain and fashion theory, the stages of production from raw material to the final

⁸⁷ Which is expected to grow by 150% to 2.25 trillion dollars by 2025, demonstrating an increase in clothing demand across the world; and in turn, means there will also be 50% more impact (Shahbandeh, 2021)

⁸⁸ McKinsey also found that fast fashion businesses ranked alongside luxury retailers, Moët Hennessy Louis Vuitton (LVMH) and Hermes, and the premium and mid-market brands are squeezed in the middle. As mentioned in the Introduction, McKinsey and Business of Fashion (2018, p. 11) found that “the top 20 companies in the industry account for 97 percent of economic profit”, which demonstrates the polarising nature of fashion fortunes, as well as the unequal playing field for fashion retailers.

product add ‘material’ value, while the ‘immaterial’ value occurs in the design and marketing of fashion, which is largely controlled by the retailer (Entwistle, 2009; Gereffi, 1994; Weller, 2008). Retailers typically do not provide information about the value chain to their customers – usually, the garment swing tag contains information about material composition, where the garment was made, as well as some care instructions (i.e. dry clean only, recommended iron temperature setting, etc.). Consumers have expressed concern about the social and environmental impacts of garments and have shifted their expectations around supply chain traceability and transparency, such as wanting to know more information about where the garment was made and where the material was sourced from. This has required retailers to work with the supply chain and the various tiers to peel back the layers of information about the garment (Fashion Revolution, 2019). As mentioned in the Literature Review, this can be difficult as the global supply chain is opaque and retailers usually only liaise with their garment manufacturing tiers and specify their requirements (i.e. colours, style, etc.). The manufacturers typically source the materials required (i.e. buttons, textiles, etc.) but would not typically disclose this information to the retailer. For example, cotton is only one of the fibres that retailers’ source and cotton fibre is usually blended to achieve the desired yarn specification. As discussed earlier, cotton identity programs including BCI (and in turn, myBMP), organic, Fairtrade and recycled cotton, have become a proxy for sustainability (Payne, Mellick, & Peterson, 2017; Pesticide Action Network UK et al., 2017).

Although cotton is a globally traded commodity and retailers can source cotton from different regions, there are several Australian retailers who have prioritised buying Australian cotton. These retailers include Country Road, Trenery, Rodd and Gunn, Politix, Target, Kmart, Sussan, Bonds, ELK the Label, and Nobody Denim (Australian Cotton, 2021c). In a presentation at the ABARES Outlook Conference in 2017, Rick Lambell (2017) from Kmart (a self-described “low price, low cost” retailer), said that Australian-grown cotton was a key part of their sustainable materials strategy, and also a new market opportunity. In a customer insight study, Kmart found that Australian cotton was “the most popular” when compared to recycled, Fairtrade and organic cotton (Lambell, 2017). Interestingly, the perception of better quality and supporting Australian jobs and industry were key attributes that appealed to customers. Kmart also commissioned a sustainability risk assessment and found that overall

Australian cotton was “doing a great job” and was in many ways “a world leader in sustainable development” (Lambell, 2017). It also was noted that myBMP was a good, simple standard for retailers to refer to. However, the industry’s use of water was identified as an area of “high risk”, and communication around “the good work the industry was doing” was noted as an area that could be improved (Lambell, 2017). For example, it was noted that the Australian cotton industry could give retailer’s information on how risk areas (i.e. water use) were being managed, and how the retailer could communicate this in a simple and effective way to consumers. Traceability, integrity of claims and storytelling were noted as key areas of future focus for the retailer. Additionally, the future sourcing of cotton would be from a “sustainably certified source” (Lambell, 2017), and BCI was considered to be a “widely adopted” sustainability standard. It is interesting to note that there is minimal public information around how Australian cotton is procured and ‘pulled’ through the value chain by Australian retailers. This dynamic will be explored in greater detail with ACVC 1 and 2 in Chapters 5 and 6.

As Australian retailers sourcing Australian cotton are a focus of this study, it is therefore important to briefly give more context to the Australian fashion retail marketplace. The Australian clothing retailing sector is estimated to be worth \$18.9 billion in revenue (Oo, 2021). According to IBIS World, the top four companies account for around 40% of this revenue, with the major players being Country Road and Mosaic Brands⁸⁹ (Barry, 2020) (see Table 10 below).

Table 10: Australian fashion retailers from IBIS World (Barry, 2020; Oo, 2021)

Company	Market Share in Australia (%)	Brand names	Ownership	Estimated 2020/2021 Revenue
Woolworths International (Australia) Pty Limited	5.1	Country Road, Trenery, Witchery, Politix	South African	\$844.8 million

⁸⁹ It is difficult to gauge the number of niche/independent businesses and other forms of apparel, such as uniforms.

Company	Market Share in Australia (%)	Brand names	Ownership	Estimated 2020/2021 Revenue
Mosaic Brands	5	Millers, Katies, Crossroads, Autograph, Beme, Rivers, Noni B, Rockmans, W.Lane	Australian	\$819.8 million
Premier Investments Limited	4–5	Just Jeans, Peter Alexander, Jacqui E, Jay Jays, Portmans, Dotti	Australian	N/A
Cotton On Clothing Pty Ltd	2–3	Cotton On, Supré, Cotton On Body, Cotton On Kids, Factorie	Australian	\$577.9 million

It is significant to point out here that the Australian fashion industry is ‘hollowed out’, with raw material production (such as cotton) and clothing retailing generating significant economic activity in Australia, while manufacturing is offshored (Payne & Ferrero-Regis, 2019). According to Weller’s (2007) research on Australian fashion, outsourcing production is the chief strategy that Australian fashion retailers employ, which falls on the right side of Mihm’s (2011) spectrum (fully outsourced). Added to this, it should be noted that within the context of fashion and sustainability, retailers in Europe and the United States have been on their ‘sustainability journey’ for almost a decade longer than Australian retailers⁹⁰. In turn, Australian retailers are potentially

⁹⁰ For example, in 1991 denim company Levi Strauss was the first apparel retailer and multi-national company to establish a global code of conduct called ‘Terms of Engagement’ which set out labour standards, health and safety requirements and environmental benchmarks (Levi Strauss & Co, 2021). In contrast, companies such as Nike received brand damage in the 1990s because of their connection to sweatshops. Other multinational retailers, such as Uniqlo, H&M, Zara and GAP, established sustainability initiatives, reports and codes of conduct in the early 2000s, which coincides with the publication of the Global Reporting Initiative, United Nations Global Compact and the United Nations Millennium Declaration in 2000 (Gap Inc., 2003; H&M Group, 2002; Inditex, 2021a; Uniqlo, 2021). It was more difficult to find the first sustainability reports for the four leading Australian retailers. For example, Country Road established Codes of Conduct in 2004 and 2010 (Country Road, 2017), Woolworths Holdings’ Good Business Journey started in 2009 (Woolworths Holdings Limited, 2009), and David Jones’s Good Business Journey started in 2015 (David Jones, 2021).

playing catch-up in terms of industry responses to sustainability, and perhaps even looking to Northern hemisphere retailers for leadership in the sustainability space.

Waste and Circularity

Textile waste is a growing issue, and there is an increasing focus and pressure on the fashion industry to apply circularity to garments. The Ellen MacArthur Foundation (2017) estimates that only 1% of clothing is being recycled, which means the value of the other 99% is yet to be unlocked. Further to this, landfill causes many problems including groundwater, soil and air pollution, toxic gas emissions such as methane and carbon dioxide, biodiversity impacts on habits, as well as health and safety issues such as fire, dust and pests (Danthurebandara et al., 2012; Yadav et al., 2019; Zhang et al., 2019). It is therefore imperative to briefly give context to the textile waste problem in Australia (mirrored in many developed countries). Attention has been on understanding the size of the problem and developing mechanisms to reduce the volume of textile waste to landfill. For example, in the 2018–19 financial year, the Australian Bureau of Statistics (2020) estimated around 800,000 tonnes of textile, leather, and rubber waste was discarded, with around 74%–85% sent to landfill in Australia. The waste hierarchy is a useful framework to understand the types of waste streams, which in priority order include prevention, preparing for reuse, recycling, recovery and disposal (European Commission, 2021b). Here, preventing waste is the preferred option at the top of the pyramid, and sending waste to landfill is the last resort (European Commission, 2021b) (see Figure 13).



Figure 13: Waste hierarchy from European Commission (2021b)

When a garment is at the end of its life, due to either physical use (i.e. damaged, ripped, no longer fitting) or its symbolic use (i.e. when the garment is still wearable but the style is ‘out’ of fashion), there are a few options for its disposal in Australia. Clothing can either be donated to charity, collected through retailer in-store collections, resold through peer-to-peer services/networks (i.e. Depop, Gumtree, Facebook Marketplace, eBay, clothing swaps), given to friends/family or placed in domestic rubbish bins which go straight to landfill. Landfill or exporting waste is the main disposal strategy for post-consumer textile waste in Australia⁹¹. Noting that prevention is the highest priority on the waste hierarchy, a chief method to keeping clothes in use for longer is the circular economy model. This approach strives to use materials for as long as possible to increase their lifetime and in turn, reduce waste. Charities are key actors in promoting the prevention of waste; they perform necessary collection and sorting activities in order to resell clothing, and in turn, capture various forms of social, economic and environmental value. There are various types of value captured at this stage. Firstly, charity shops create social benefits through raising money for local charity and services, opportunities for volunteering and employment, as well as social

⁹¹ Prior to 2017, Australia exported the majority of its waste to China, until the waste import policy went into effect in 2018, which restricted the import of 24 types of waste (such as plastics, textiles and paper). Following the ban, Australia shifted its waste to less developed countries, such as Malaysia, Vietnam and Indonesia (Walden & Renaldi, 2019).

integration and providing affordable goods (Osterley & Williams, 2018). Secondly, there is value in monetary terms in selling or reusing clothing and textile waste, although the financial value is opaque (Hansen, 2000). The majority of charities sell around 40 to 75% of their collected clothing – indicating the amount of donations surpasses demand (Hansen, 2000). Thirdly, second-hand clothing has also been conceptualised as a positive market-based solution to managing textile waste which appears to benefit the environment (diverting waste from landfill) and society (charitable donations to those in need) (Norris, 2012). New partnerships that capture value have emerged between charities and fashion retailers. For example, retailers are increasingly donating unsold stock to charities. Typically, charity retailers sort through donations from the public and retailers (either unsold goods or second-hand collected in store), which are then sorted into either sale (further sorted into high or low quality), unsaleable (soiled or ripped end up in landfill) or rags (usually cotton textiles). Low quality garments are sold to developing countries in the Global South at a low cost (Hansen, 2014; Katende-Magezi, 2017), and below is a map of the material flow of second-hand clothing (see Figure 14).

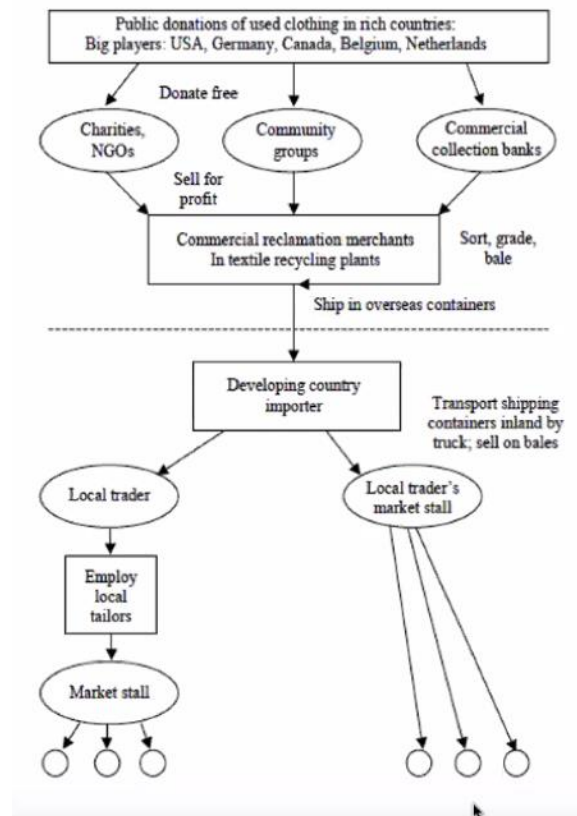


Figure 14: Diagram illustrating the material flow of second-hand clothing from Brooks (2013)

There has been a drive towards employing more circular consumption and production models in fashion such as rental, long-lasting design and free garment repairs; and notably, these have been practices employed by many of the retailing participants in this study. Research shows that reuse adds significant value to the environment. For example, the Waste and Resources Action Programme (WRAP) (2012) has estimated that adding an extra nine months of active use to a garments' life cycle could achieve a 20–30% reduction in carbon, waste and water footprints. Following the prioritisation of waste according to the hierarchy, we can see that the higher the reuse, the greater environmental value is added for society. While landfill is the chief strategy for Australian waste there is increasing investment and attention on waste strategies from government and industry. The cotton industry has an important role to play in the circular economy. Cotton can be recycled chemically or mechanically (Dissanayake & Weerasinghe, 2021; Johnson et al., 2020; Wojciechowska, 2021). Chemically, cotton scraps can be turned into a liquid pulp and be recycled into a fibre (i.e. Circulose/Renewcell and Refibria/Lenzing). Mechanically recycling cotton involves shredding fabrics, however, fibre is usually weaker and has

to be blended with virgin cotton fibre to make new products. Currently there is only a minuscule amount of textiles being recycled due to the challenges around fibre separation, dyes and coatings (Heikkilä et al., 2018). Cotton is also a biodegradable fibre, which means that it can break down at the end of its life (Cotton Incorporated, 2021). The Australian cotton industry has invested in projects that look at composting cotton textile waste back into the farm (Cotton Australia, 2021f; Glover, 2021b; Just Style, 2021a), and has called for more research into its potential (Cotton Research and Development Corporation, 2021a). However, blended fibres are a key challenge to recycling and composting textile waste. There are start-ups in this space looking to solve this problem. For example, Australian textile recycling start-up BlockTexx received funding in 2021 to build a plant in South East Queensland (Smee, 2021). The technology can separate blended fibres such as cotton and polyester. However, textile recycling technologies such as this are still emerging, and current solutions need to be scaled up to handle the large volume of textile waste. It must also be noted that one of the key criticisms around the circular economy is the ‘rebound effect’, whereby activities that reduce impacts also lead to increased production, which in turn reduces their overall benefits (Zink & Geyer, 2017). Given that the Australian cotton industry does not have control over the end uses of cotton (i.e. fabric composition), previous research has found that a whole of system approach is needed to advance the circular economy and requires collaborations along the value chain (Pal et al., 2019). For example, decisions from earlier stages, from raw materials through to garment manufacturing, influence the reusability of garments (Karell, 2018). Added to this, resource scarcity is a headwind that will affect the production of materials, such as cotton (Müller-Christ & Gandenberger, 2006). Therefore, noting the significance of textile waste and the move towards more circular approaches, there is a need to understand the role the Australian cotton industry can play in this space.

4.3 AUSTRALIAN COTTON STAKEHOLDER ANALYSIS

This chapter has presented the value chain dynamics of both the global and Australian cotton chains, as well as key stakeholders and sustainability issues. This section outlines the sustainable value categories and their key stakeholders and aspects for the tailored CVMT, which was used to interview participants (see Table 11 and

Figure 15). As discussed in Section 3.2, a ‘stakeholder’ refers to actors with an interest in or connection to the Australian cotton value chain, and the term ‘aspect’ covers the various aspects of cotton and its production and/or sustainability.

Table 11: Summary of Australian cotton stakeholders and sustainable value aspects

Types of Value	Stakeholders	Aspects	Source
Transaction	Growers, Ginners, Classers, Merchants, Textile Manufacturers, Garment Manufacturers, Retailers, Consumers, Textile Disposal and Non-Government Organisations (e.g. BCI)		Identified in Section 4.2
Use		Fibre Qualities, Haptic Qualities, Functional Durability, Branding, Emotional Durability and Traceability	Identified in Section 4.1 and 4.2
Societal	Employees, Local Community, Government and Australian Public		Identified in Section 4.2
Environmental		Water Management, Soil Management, Biodiversity, Land Use, Energy Use, Chemical Use / Pesticide Management, Organic / Genetically Modified Organism (GMO) Crops, Waste, End of Life and Circularity (i.e. biodegradable, recycling)	Identified in Section 4.1 and 4.2

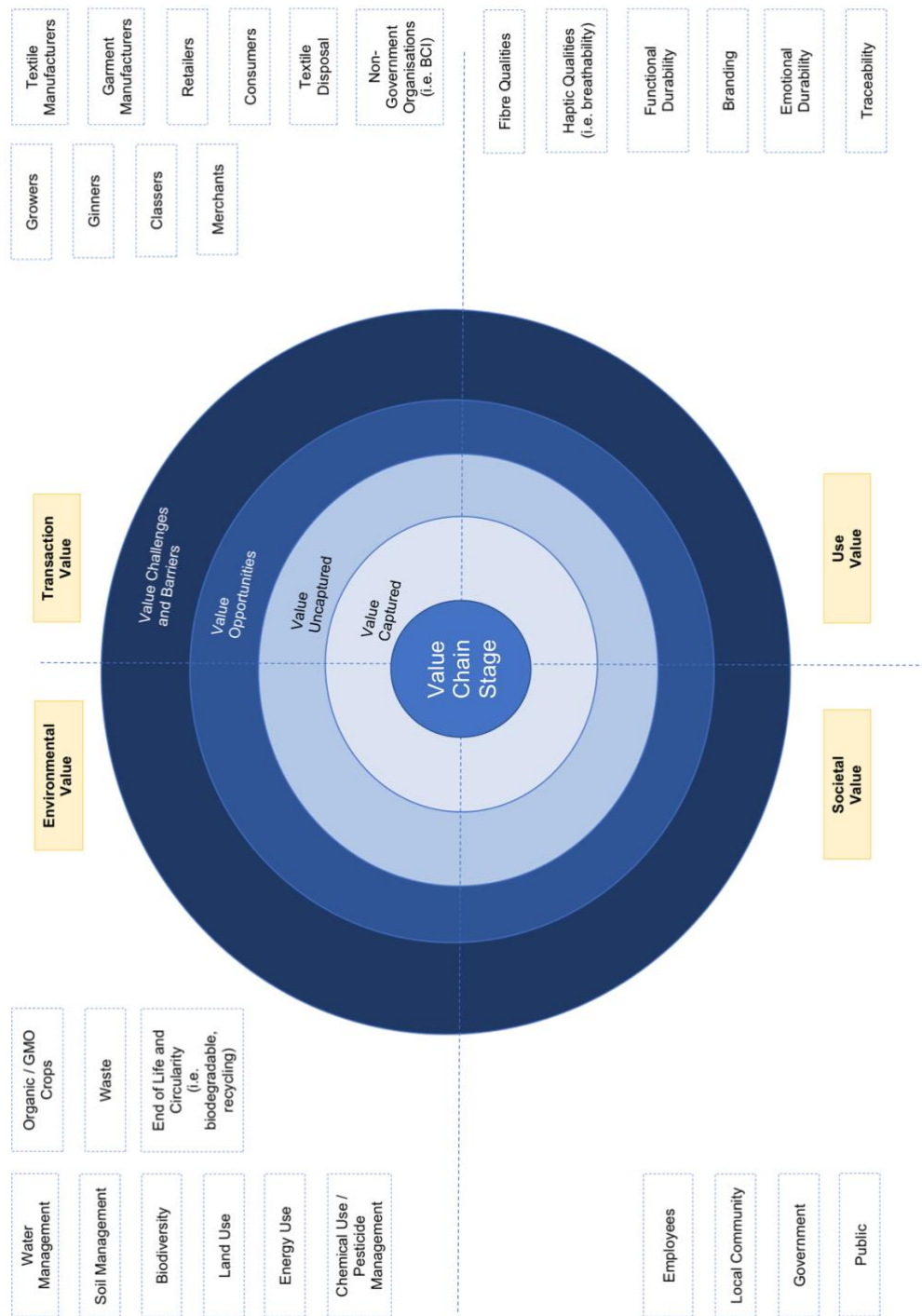


Figure 15: Adapted version of Cambridge Value Mapping Tool (Bocken et al., 2013) tailored to cotton stakeholders (Mellick, Payne, and Buys, 2021, p. 10)

Transaction value dimensions

Transaction value relates to the economic viability of value chains and the relationships between the various value chain stakeholders. Here value is measured in economic or monetary terms, but can also relate to benefits such as market access (Bocken et al., 2013). In the fashion and textile value chain, economic value is generated through a series of value adding activities that turn a raw material into yarn and into a garment that is then sold to consumers. This chapter has identified many stakeholders in the Australian cotton value chain. These include growers, ginner, classers, merchants, spinners, textile and garment manufacturers, retailers and textile disposal actors. Although consumers have not been interviewed in this research, retailers have a high level of knowledge about their preferences because they are ultimately informed by consumer choices and are key influencers in the performance of the value chain.

Use value dimensions

Use value refers to the aspects that customers value, which could be tangible, such as the utility of a good, or intangible such as comfort or suitability (Bocken et al., 2013). Cotton's use value can also consist of material value such as fibre quality (International Cotton Advisory Committee and Food and Agriculture Organization, 2015), haptic qualities and functional durability (Crewe, 2017; Entwistle, 2009), as well as immaterial values such as branding and emotional durability (Black, 2008; Chapman, 2012; Crewe, 2017; Entwistle, 2009), and the ability to trace production through to the origin of materials. The use value of Australian cotton is measured and determined at different points in the chain. For example, the quality of Australian cotton fibre determines its price (economic value) in the spinning market. In terms of cotton's material value and haptic qualities, the Australian Cotton Sustainability Report (2014) identified that cotton, when turned into a textile or garment, is durable, strong, non-allergenic and breathable, keeping the body cool during summer and warm during winter.

Societal and environmental value dimensions

This chapter has identified the environmental and social issues of greatest concern within the textile and fashion industry, focusing on cotton. These issues may be reframed as areas the chain needs to further explore under societal and environmental value. Starting with societal value, the connection between cotton and society is enormous as millions of people depend (either directly or indirectly) on the cotton value chain. For example, cotton provides employment in rural communities and can improve living standards (International Cotton Advisory Committee and Food and Agriculture Organization, 2015). Societal value in cotton value chains could relate to employees, such as labour rights and standards, health and safety, and equity and gender (International Cotton Advisory Committee and Food and Agriculture Organization, 2015). Applying Porter and Kramer's (2006) notion of shared value, other stakeholders could include the local community, government and the public. The environmental dimension refers to aspects in which businesses are responsible for environmental preservation. Environmental value in cotton value chains could relate to water, soil health, biodiversity, land use, energy use (such as GHG emissions), chemical use (such as pesticide use on-farm), as well as organic and GMO crops (International Cotton Advisory Committee and Food and Agriculture Organization, 2015). Noting the implications of fibre choices downstream, textile waste and end of life have also been included.

4.4 CONCLUSION

This chapter has presented the stages of the global Australian cotton value chain. First, the global fashion value chain is complex due to the involvement of multiple stakeholders, including growers, ginners, classers, merchants, agents, yarn manufacturers, textile manufacturers, garment manufacturers, retailers and waste actors. The Australian cotton value chain has a relatively high level of material coordination based on quality parameters, but lacks information sharing around environmental and social parameters among value chain members. However, this is typical in the fashion industry. A way that retailers have defined sustainable cotton is through sustainability initiatives and chain of custody approaches. However, this chapter has highlighted that quantifying and proving sustainability claims is difficult,

and doubly so given that tracing cotton back to a single origin is difficult. Second, as most of the Australian cotton is bought and sold as a global commodity, there are many different decisions and players that need to be considered. Among these actors, the retailers are particularly powerful players. The export-driven nature and need to process Australian cotton through offshore spinning mills mean that the industry's control of the downstream cotton value chain is diminished. In other words, the Australian cotton industry is effectively locked out of the chain once the cotton is exported to spinners. However, Australian cotton also flows in smaller quantities through traceable supply chains, which has emerged as a point of market differentiation for Australian retailers. Chains that have successfully brought Australian cotton to end consumers are the point of interest in this study because they carry the value of Australian cotton in some way. While this chapter has found that the Australian cotton industry is socially, environmentally and economically conscious, how this is valued across the entire value chain is not yet known. To better understand what sustainable value means in the context of this study, this chapter identified types of sustainable value and key stakeholders in the Australian cotton value chain and developed a tailored CVMT that was used to interview participants. The following chapters present the findings from the two chains, ACVC 1 and ACVC 2.

Chapter 5: Findings from ACVC 1

The sustainable value 'push' from the grower

This chapter explores how actors in the niche value chain construct Australian cotton's sustainable value. As established in Chapter 4, the majority of Australian cotton is sold on the commodity market and growers are not privy to who buys their cotton or where it ends up. The chain discussed in this chapter is very different. In this niche chain, the grower, spinner and retailers are connected through a single person, known as the converter. The grower's close connection to the converter enables the cotton to be 'pushed' downstream toward the niche garment manufacturers and retailers who value knowing every step of the supply chain. Through walking a niche value chain, the opportunities for the Australian cotton industry to capture sustainable value become more apparent because it is a site for testing the propositions of sustainable value established in the previous chapter. However, insights raise questions around the scalability of a niche model which omits the cotton traders. The chapter is structured around themes of connectedness, communication, and the im/materiality qualities of the cotton fibre. Throughout the chapter, the different forms of value established in the Literature Review (Chapter 2), namely the value categories (transaction, use, societal and environmental value) and value types (captured and uncaptured, value opportunities and challenges), are indicated through bolding and discussed. Some data and preliminary findings from this chapter were published in Mellick et al. (2021).

5.1 CHARACTERISTICS OF ACVC 1 AND PARTICIPANTS

In ACVC 1, the cotton was grown by farmers on one family-owned farm (**Participants GR01 and GR02**). The growers described the cotton in this chain as having a 'longer staple' and estimated around 700 bales (around 15% of their total cotton crop) were produced that season. The growers also produce cotton of middling staple quality (around 85% of their total cotton crop) which was sold into the commodity chain. The longer staple cotton is the focus of this study; however, the

growers do draw comparisons between the two types of cotton and their respective chains. The growers used the services of a ginner to separate the cotton lint from the seed and trash. The gin presses the cotton lint into 227 kg bales, which are then warehoused (**Participant GI01**) and supplied directly to a textile business, where the owner described themselves as a converter (**Participant TE01**). The converter orchestrated the production of the baled cotton into single origin cotton yarn and fabrics through liaising with a spinner in the United Kingdom (**Participant SP01**) and textile manufacturers in Australia to dye (**Participant TE02**) and knit or weave the cotton into a fabric (**unable to participate in this study**). The growers estimated that around 54 bales of cotton were sent to the spinner. The converter then received the knitted and woven textiles and distributed them to independent designers, who take the role of both garment manufacturer and retailer (**Participants RE01 and RE02**). Participant **RE03** was an independent designer who expressed interest in sourcing Australian cotton. They provide a voice in this study for understanding the various barriers and challenges for designers wanting to source Australian cotton. The second-hand clothing charity retailer (**Participant EN01**), although not directly receiving specific goods from RE01, RE02 or RE03, already collected cotton goods for reuse and recycling and had an existing connection with the Australian cotton industry's peak body. Finally, RE02 collaborated with an Australian mill and designer (**Participant EN02**) to turn their cotton textile off-cuts into products.

5.2 PERCEPTIONS OF SUSTAINABLE VALUE IN THE AUSTRALIAN COTTON INDUSTRY

Through the process of thematic analysis (as outlined in Chapter 3), this section explores ACVC 1 participants' perspectives collectively to identify differences and commonalities in their socially constructed experience around Australian cotton and its sustainable value. Three major themes were identified: connectedness, communicating Australian cotton's sustainable value, and im/materiality and circularity. First, the 'connectedness' theme describes how the chain is structured to create value, particularly focusing on how the grower worked together with the converter to 'push' Australian cotton through the chain to **capture use and transaction value**. Second, the 'communicating Australian cotton's sustainable value' theme explores how the growers **captured environmental value** through communicating on-

farm sustainability to key stakeholders using data and visual storytelling. Third, the ‘im/materiality and circularity’ theme explores Australian cotton’s **use value** in the marketplace through material and immaterial qualities, as well as options for textile waste and reuse to **capture environmental value**.

5.2.1 Connectedness

The ‘connectedness’ theme encompasses how and why actors worked together to ‘push’ Australian cotton through the chain. By taking the traders out of the chain and selling cotton yarn directly to niche garment manufacturers and retailers, the growers **created** financial security outside of the commodity chain and effectively doubled the **economic value** of their cotton through absorbing stockpiling margins. The spinner was pivotal in ensuring that the yarn was traceable and high quality, and the converter was a crucial actor in this chain due to their connections with local niche garment manufacturers and retailers. Importantly, the niche garment manufacturers and retailers (RE01, RE02, RE03) took a whole of chain view on sustainability and strived to only produce clothing made ethically and with low impact on the environment. Sourcing Australian cotton aligned to the niche garment manufacturers and retailers’ sustainable brand story and was effective in transferring the material and immaterial (**use**) **value** of Australian cotton. However, even though the grower’s story was valued by the retailers, the retailers reported they perceived that consumers considered Australian cotton a ‘bonus’ rather than a key purchasing factor, highlighting that Australian cotton’s sustainability and its value was not equally recognised in all contexts. Instead, the value of Australian cotton was in the high quality of the fibre, yarn and textile, and the final garment (which was controlled by the niche garment manufacturers and retailers).

Chain structure

To understand where value is created in this chain, it is important to take a close look at how the value chain is structured and how players are connected to each other. When discussing sustainability, the growers prioritised **creating economic (transaction) value**, and this was a key driver that led to the development of this niche value chain. This was not surprising as farm profitability is a success factor for agribusiness in Australia (Roth, 2010). GR01 and GR02 were particularly concerned

with the unstable price of cotton in the commodity market, as well as the rising costs of cotton production, such as electricity, seeds, other inputs such as fertiliser and labour. GR01 explained that in the commodity chain, growers have limited power in determining the **economic (transaction) value** of their cotton in the marketplace given that the price of cotton was influenced by the New York Futures, the Basis and currency, which can “go up and down quite dramatically”. Accordingly, growers “are price takers” (GR02), which demonstrates the limited power of farmers in buyer-driven global value chains (Gereffi & Appelbaum, 1994). Looking at the low cotton prices and inspired by \$5 and \$500 bottles of Shiraz wine, GR01 saw an **opportunity** to **create** a quality “niche [long fibre cotton] product”, attach it to the story of their farm and “make money” at the “top end”:

If you can grow a Shiraz, and a commodity Shiraz sells for \$5 a bottle and a Grange Shiraz sells for \$500, how is this possible? So some of it is about the story, and some of it is about the quality of the product. It is still Shiraz grapes. (GR01)

The longer staple fibre quality of the cotton in this chain was distinguishable from Australian cotton’s middling length, and therefore was a key focus for the cotton growers. However, GR01 encountered **transaction** and **use value challenges** with their “long staple cotton” yield, estimating it was worth “10–25% less than upland cotton”. As cotton farmers are paid on quality and yield output, the reduced yield meant the growers were “at least \$100 dollars” behind (GR01). The growers worked with a few Australian merchants to achieve a “minimum [premium] of \$50 a bale or 10% above the daily price sheet” to sell specific long staple cotton to mills, but mills “don’t want to pay the premium” (GR01). To achieve a “higher price again, per bale” with the long staple cotton, the growers worked with a converter to turn their long staple Australian cotton raw cotton into yarn and textiles, and sold it “at a competitive price” (GR02) to garment manufacturers and other retail brand owners in Australia. The converter was a key player in this chain. They used their industry knowledge to **create** a “more financially efficient” chain compared to “the traditional method” through “taking out the traders” (i.e. cotton merchants), which they described as:

[The] retailer specifies to [the] garment maker, ‘I want this’. They might specify the fabric. They might tell them the mill in Italy they want it

from, but that garment maker has to buy that fabric and own that fabric and then add the value of the garment manufacturer on to it. So, if you then specify a yarn, that yarns got to be bought by the fabric manufacturer. Maybe that's a weaver or knitter. Maybe that is sold to the dyer. Maybe then the dyer is selling that to the, you know, all of these people [are] going to take the margin [...] Once it's multiplied through the chain that could add \$50 to [a] t-shirt, which suddenly becomes unsustainable [...] So we're trying to turn that on its head. (TE01)

As the traders were taken out, GR01 explained “the further down the supply chain you sell it, you will achieve a profit”. In other words, the growers absorbed the stockpile margins traditionally added onto the cotton as it was turned to yarn, knitted and dyed. In turn, this value chain structure **created additional transaction value** for the grower. The converter (TE01) estimated that compared to selling raw cotton in the commodity market, they “doubled the profit per kilo of fibre” through selling yarn directly to garment manufacturers. The table in Appendix F shows the breakdown of gate prices at each stage in ACVC 1, which demonstrates the dramatic difference between selling cotton as a commodity and as a product.

Warehousing also played a key role in this chain. Typically, ex-ginned cotton is sold and shipped as soon as possible, but GI01 explained this process had “changed” in ACVC 1 as they needed to warehouse the cotton until the value chain was aligned. The ginner explained this was not a common practice amongst growers: “most people [growers] like to sell to a merchant and be done with it [...] there are people out there, a limited few, who are willing to take the risk on the supply chain” (GI01). The risk here was financial and refers to the grower’s ability to sell their cotton to actors downstream, whereas in the commodity chain, the merchant usually shoulders this risk when selling cotton to mills.

The competitive advantage the growers and converter offered to downstream stakeholders was a traceable yarn, which the niche garment manufacturers and retailers could market as ‘Australian grown cotton’:

I think [our supplier] already has a very interesting proposition in that [they] get, as I understand it, [they] get [their] cotton all from the one farm. And that kind of single origin story is really, really powerful. (RE02)

It was clear through interviews that the niche garment manufacturers and retailers valued the grower's story and sustainability efforts. However, it was less clear how the retailers marketed and advertised their Australian cotton products; instead, it appeared to be more of a talking point with their customers. Nevertheless, the traceability aspect of the cotton pointed to how **use value** was captured (which will be discussed later), but it also directly tied into how **transaction value** was captured for the growers. The converter explained that the storytelling model **created** more financial security for the growers compared to selling cotton on the commodity market:

We're taking out [the risk of] being trade exposed because we're creating a market based on the story rather than selling bales of cotton to the international market of cotton spinners [...] So, the idea is to create a model where the value is in the origin, and the story, and the quality, as opposed to the price of bale and exchange rate that day. (TE01)

This financial security was strengthened as the converter sold the cotton in small volumes, which was attractive to niche garment manufacturers and retailers. As one niche garment manufacturer and retailer commented:

I really connected with them because I find it quite hard being a small business [and] being able to afford really great quality fabrics. And obviously quality is all part of my label and why people buy into it. (RE01)

For the niche garment manufacturer and retailer participants, Australian cotton aligned with their sense of sustainable fashion, which they defined as involving: local production where possible, use of natural materials (such as Australian cotton as well as organic cotton, silk and wool), manufacturing practices that avoided textile waste going to landfill, design choices that promoted garment longevity through use of classic colour choice and styles, as well as offering free repairs and re-collection of garments at the end of their life. One niche garment manufacturer and retailer identified as a "sustainable designer" who 'produced less' and instead "[made] smaller quantities of beautiful garments that people are going to hold on to for a long time" (RE01). This aligns with Fletcher's (2010) and Black's (2008) slow fashion paradigm in which fashion is designed for long-term wear. The converter also explained that their made to specification business model **added environmental value** as it saved

“tonnes of waste and all the associated inputs and impacts” at the textile manufacturing stage (TE01). The waste TE01 was referring to was the stockpiling of yarns and fabrics by textile manufacturers; instead, the garment manufacturer received the cotton textile (i.e. the stock) in the quantity that they wanted, which created less waste. Added to this, the converter said the role of the garment manufacturer was also critical to the transfer of cotton’s sustainable value:

It takes no more effort to sew the armhole of a t-shirt of crap fabric and good fabric. So, if you’re gonna go to that effort of making that garment, make it from good stuff. (TE01)

Hence, the connection to the niche garment manufacturers played a central role in shaping the sustainable value created in this chain as it allowed for more consideration around the specification of cotton yarn, the volumes of fabric required and the design of the garment.

Another key characteristic of this chain that participants described in interviews was the strong relationship between the actors. For example, the relationship between the converter and growers was built around similar values and shared commitment to sustainability practices, or as TE01 described it: “this meeting of like nerdiness”. The growers and the garment manufacturers, however, do not have a direct relationship: rather they liaise with the converter. The garment manufacturers said it was “quite a small supply chain” and the converter was “accountable” and their relationship was based on “trust” and good communication (RE01). However, garment manufacturers said not knowing how to access Australian cotton was an area of **uncaptured transaction and use value**. For example, RE01 said using Australian cotton was only possible through meeting TE01 at a networking function, lamenting that “small designers and these [raw material and fabric] producers are not as connected as they could be”. RE01 said this was a **missed opportunity** for the Australian cotton industry, especially as small, local designers find it difficult to know where to source fabrics:

When you’re starting out and you’re looking on the internet trying to work out, you know, where you are going to get your fabric supplies from. It’s usually just what is quickest and easiest and will get things going. But I guess, yeah, just trying to make those connections between the fabric suppliers of the designers. (RE01)

As such, there was an **opportunity** for the Australian cotton industry to engage with niche garment manufacturers and retailers, and grow the demand for Australian cotton yarn. However, participants said scaling this model presented some **challenges**, especially noting the minuscule amount of Australian cotton (54 bales) that goes through the niche supply chain compared to the commodity chain (an average of 3 million bales annually). TE02 touched on this, explaining that the small scale of this value chain does not change industry standards:

Because it is such a small proportion of the cotton grown. It's a niche of a niche product. [...] You can't build an industry on a niche, you know. You can't build a business selling Ferrari cars. You know, you've got to sell Holdens and Fords, you know. (TE02)

Additionally, TE01 noted very practical **transaction challenges** that faced the chain, such as finding local and overseas suppliers willing to process small quantities of cotton. Interestingly, the lack of localised yarn production was a key reason why RE03 did not source Australian cotton. Participants spoke about many consequences arising from the geographical distance between the value adding processes within the chain.

Participants GR01, GR02, TE01, TE02 and RE02 spoke about the desire to re-shore spinning because the offshore processing of Australian cotton into yarn **destroyed multiple forms of value**. TE02 described ACVC 1 as a “broken chain” as “the value is done overseas” and “to add value to local cotton [...] you've got to use your advantages and not waste it in travelling around the Earth adding value to it”. The spinner agreed with this, noting that “every country does need its own capability” (SP01) to produce textiles, and the dyer added that Australia was the “only grower and exporter of cotton [...] of a reasonable volume that doesn't spin any of its own cotton” (TE02). TE02 also said the implication of breaking the chain was that “each person does what suits them. The least amount of resources in for the most return”. Both EN02 and RE02 spoke specifically to the loss of local employment and skills (**uncaptured societal and transaction value**) with offshore manufacturing, as well as a loss in **transaction value** due to the need to re-import the value-added Australian cotton. Instead, participants linked sustainable value to local production with the view that it **created** employment opportunities (**societal value**). For example, RE02 explained that they deliberately used local manufacturing where possible, and used an Australian mill

to knit the Australian cotton into fabric (this mill was unable to participate in the study): “it’s really important for us to keep that fabric manufacturing [...] onshore”. TE02 and EN02 explained that this ‘Australian export mentality’ was a “short-term view” (EN02) that limited the power of producers to claim more value for their raw produce:

For some reason [the industry] have either been pressured to, or jump to selling their product in its raw form and in bulk volumes for pretty low prices, you know, and have shipped off all of the value to other producers. (EN02)

Additionally, EN02 said offshoring value adding activities destroyed the brand value of Australian cotton, a point that is explored in more detail in Section 5.2.3:

There is no ‘brand’ around cotton in Australia. If all cotton products are processed or shipped offshore there’s no value in the public mind attributed to cotton products, due to lack of visibility and experience around processing (for example, employment, innovation) or product access (for example, wearing Australian cotton clothing). (EN02)

Beyond **use and transaction value**, TE02 felt strongly that offshoring production **destroyed environmental value**, describing the globalised supply chain as: “environmental vandalism to waste all the energy to bring it from one country to the next through the sea to the ports to the roads”. However, TE01 postulated that long distance travel across Australia to get cotton ginned and spun could have more impact on GHG emissions than shipping to their spinner overseas. Participants EN02, RE03 and TE01 also saw re-shoring as an opportunity to **create and capture use value** in Australia. For example, TE01 said re-shoring could lock-in the “integrity” of Australian cotton as a traceable, high quality and ethically produced fibre:

Controlling [cotton] once its yarn is so much easier because no one cuts the yarn batch, because it won’t dye evenly. So, all of the ethics get locked in when you make the yarn and label it, or tag it or whatever. (TE01)

While these perspectives are not surprising given the criticisms around the division and specialisation of activities within globalised supply chains, it does highlight that a

‘broken’ chain results in not only a loss of control over production, but is also at the expense of societal and environmental considerations. However, if spinning capabilities were to be brought back onshore, there needed to be an end user: “we want spinning back in Australia [...] you’ve got to have a market though. It’s market driven and you’ve got to have the market and the demand” (GR02). Although the Australian cotton industry produces enough cotton to clothe half a billion people per year (Cotton Australia, 2021g), the small market sizes / profile of Australian brands and retailers in Chapter 4 raises questions around whether there would be enough demand for Australian cotton within the local marketplace. Therefore, the viability of ‘right-shoring’ spinning and garment production in Australia could be a far-horizon **opportunity**. However, there are **challenges** around sourcing and tracing Australian cotton through the global supply chain, which will be explored in the next section.

Traceability

In contrast to the blended cotton dominating the commodity market, traceability was a distinguishing feature of ACVC 1 and fundamental to the connectedness theme in this chain as it linked the cotton in the product back to the farm. The growers saw the ability to trace the cotton back to their farm as part of the “intrinsic value” of this chain (GR01):

The traceable [cotton] is about our story. As far as use value, that is my intrinsic value of me as a farmer, because it is traced back to me. (GR01)

The “intrinsic” value GR01 was referring to was the tangible connection between the value of the physical product (in this case, Australian cotton) and the producer. The spinner, SP01, played a key role in **creating** this **use value**. SP01 explained that the Welspun case highlighted an industry-wide problem of cheating and corruption, in which spinners swap or blend cotton and sell the yarn under a premium or sustainable cotton identity to earn more money. SP01 added that TE01 had experienced issues with spinning Australian cotton in Chinese mills:

I’ll let TE01 tell you about issues with Australian [cotton], but what I understand is that even when Australian lint was transferred to China to

[be spun], it came back with Xinjiang cotton inside it. Because ultimately, it's cheaper and it allows the cotton to earn more money from it, and actually probably sell some Australian cotton under a brand name and make a bit more money. It's cheat[ing]. It's lying. It's deceitful and it's corrupt. So what I'm saying is I haven't seen a supply chain in the cotton industry that isn't corrupt. I haven't seen one. (SP01)

This highlights that in SP01's experience, swapping cotton was a highly prevalent practice in the industry. SP01 sought to disrupt this practice with their spinning mill. Specifically, SP01 described themselves as a gatekeeper to traceable and sustainable cotton yarn as they omitted materials associated with human or environmental harm, which reflects 'strong sustainability' ideals as outlined by Daly (1992). From SP01's point of view, the ability to trace the cotton through the chain **created use value** through ensuring transparency around product origin and quality, but also **created** accountability around the environmental and societal impact of fibres.

All participants in this niche chain agreed that customers were interested in knowing where the cotton came from. For example, RE03 (although not sourcing Australian cotton) said tracing material was "really important to our customer". This indicates consumer interest for information about raw materials, such as their site of production, **creates use value** (Crewe, 2017). However, RE01 perceived that Australian cotton was only an "added bonus" for consumers, and they were not willing to pay extra for traceability, the fibre origin story, or the sustainability practices (**uncaptured transaction and use value**):

I think it's just an added bonus [that it's Australian cotton]. I don't know if people would buy it just because of that fact. They need to like lots of other things about the piece and then to find out that it's Australian cotton is a really nice bonus. And then they'll probably tell their friends, and that becomes like a really nice talking point when they get compliments about it. But I don't think people ever go... because it's this, that's why I'm going to buy it. It needs to tick all the other boxes first. (RE01)

Here, the "other boxes" RE01 referred to were related to the tangible, material elements of the garment, such as style, fit, design, colour and quality. Similarly, RE02 spoke about the importance of firstly satisfying consumers' **use value**, while **environmental value** was secondary: "the reason [customers] come to us is that we

guarantee it is going to fit their body [...] it just so happens that we produce it in the most environmentally friendly way of doing it” (RE02). This affirms previous research that sustainability is not a key purchasing factor for consumers (Harris et al., 2015; Joshi & Rahman, 2015). The grower agreed, stating: “having a story isn’t simply enough”, adding customers “won’t pay that extra bit unless it’s a quality product as well” (GR02). In other words, consumers’ willingness to pay rested on quality expectations, rather than sustainability attributes or a fibre origin narrative. This is important to note as RE02 said that consumer value was the most important value driver in the supply chain: “it’s about understanding what our customers care about above all” (RE02). Nevertheless, through ‘pushing’ Australian cotton through the chain, the cotton maintained an identity and **created use value**, both in terms of its material value as a high quality fibre/fabric, but also its immaterial value, which is the story of the locally made cotton, traceable back to the farm. In other words, traceability **did not capture transaction value** alone, unless it was connected to fashion’s material and immaterial value. As such, the value of using Australian cotton and its associated sustainability practices (which will be explored in more detail below) was not based on consumer demand, but instead, on the moral preserve of the designer’s values. For example, RE02 said that sourcing traceable, local and sustainable fibres was a deliberate business decision, and perceived that consumers were not “prepared to necessarily pay more for it”:

I think it [traceability] allows us to tell a great story but I don’t think people are prepared to necessarily pay more for it for us. It’s just another sort of feather in the cap of doing things the right way. For us, we could get cheaper fabrics elsewhere, but we choose to buy beautiful fabrics locally owned, locally made, and yeah, where we can, you know, via our suppliers, we have that traceability, and that’s great. But you know, that’s not something that our customers are asking for. That’s something that fabric manufacturers have decided is something that they want to chase. And thankfully for us, we just get to jump on that bandwagon. (RE02)

For RE01, GR01 and GR02’s cotton **created** “unique” material and immaterial value through the beauty in the fibre origin story, and in the handle and feel of the fabric. Here, the **use value** of Australian cotton lay in the quality of the product:

The [Australian cotton fabric] is absolutely beautiful. It's really nice to work with, the grain is always really straight. Yeah, you can tell that it's been made with a lot of love and yes, it's really nice to work with. And being that little bit thicker, it's really nice to cut out. Yes, can definitely tell that it's a better-quality fabric. (RE01)

RE01 also married the fibre origin story with their garment design and branding:

Great background story, which for my label with the price point being a little bit higher, it's also nice to add that extra element. So, it's not just a unique design, but you're also getting a really unique beautiful fabric that you can see where it's come from, and its quite tangible who all the people are who are involved in the process. (RE01)

Additionally, RE01 also said that the connection to “where that garment comes from, how it's been made” feeds into consumers' emotional connection to the garment, which is another element of the slow fashion paradigm (Black, 2008). Nevertheless, the **sustainable value was captured** through the quality of the fabric, fit on the body and the aesthetic of the garment, which is consistent with Entwistle's (2009, p. 28) idea that the material and immaterial aspects of a garment “is the value” of fashion. The value in Australian cotton's im/materiality will be discussed in more detail under Section 5.2.3. Although traceability did not add an economic premium in this chain, GI01 said that “going forward traceability [...] will be an anchor for a lot of products coming out of Australia” and saw the value of traceability as a mechanism for “isolating risk [and] mitigating risk” for Australian farmers:

Say something came out. Something detrimental to the cotton industry. [...] It quickly isolates NSW, QLD or one valley over another, rather than putting the whole cotton industry into [the] limelight. (GI01)

GI01 anticipated that traceability “will only get positive in the next 5, 10 to 20 years” and there will be “more demand”. Nevertheless, the current buying and selling of cotton in the commodity chain is based on quality parameters, not valleys or individual farmers. One of the advantages of selling to a commodity market is that farmers can sell what they grow, whereas supplying for specific value chains comes with unique challenges around guaranteeing cotton supply. Furthermore, as the size of the cotton crops varies based on the availability of resources, the risks of growing and selling

niche cotton become more challenging with changing weather patterns and climate change; as GI01 points out, the crop size “fluctuates quite a lot with seasons” (GI01)⁹². Therefore, traceability could set up an unrealistic expectation for the buyers (i.e. retailer, spinner, customer) around tracing to a single farm or valley, which in turn presents **challenges** around scaling this model. This also raises questions around the trade offs in not using a merchant, which will be explored in ACVC 2 and discussed in Chapters 6 and 7.

5.2.2 Communicating Australian cotton’s sustainable value

This section explores how the farmers **captured** sustainable value on-farm and communicated this to stakeholders. The growers and converter effectively **captured** their on-farm environmental practices through visual storytelling and LCA data, which could be applied in industry-wide communications. A key finding from this chain is that the ability to communicate on-farm practices is contingent on stakeholders’ perception of Australian cotton and the availability of understandable information. This is important as participants highlighted information gaps in Australian cotton’s **environmental value**. Supporting local and Australian made were identified by participants as key factors that **captured societal and transaction value** for Australian cotton. However, the niche garment manufacturers and retailers highlighted that consumer’s negative views on the industry’s water use deterred their desire to purchase or support the Australian cotton industry. Participants identified **opportunities** around changing these negative perceptions, particularly around debunking water use inaccuracies. Additionally, the retailer perceived that they played a pivotal role in communicating sustainability information to consumers and the general public. Therefore, there is an **opportunity** for the grower and retailer to co-create sustainability messages for a wide audience. Nonetheless, participants noted that the industry needed to continually work on demonstrating that it was responsible to both the public and consumers.

⁹² Fluctuation of crop sizes also affects farmers’ ability to employ people and the ability to generate **societal and economic value**.

Creating sustainable value on-farm and capturing value through data and storytelling

Participants agreed that Australian cotton on-farm practices **created societal and environmental value**. Starting with **societal value**, the ginner (GI01) and growers (GR01, GR02) said the Australian cotton industry **created** employment in rural areas which fed money back into the economy of local communities. Participants further up the chain identified supporting local jobs and ‘Australian made’ as the key **societal** aspects **captured** in this chain. For example (and as mentioned earlier), RE01 said the value of buying Australian cotton was “tangible” because “you can see where it’s come from” and who it was benefiting, referring specifically to the growers. Growers said the connection with end users gave them a sense of satisfaction: “that feeling that someone is appreciating what you’re doing is really of significant value to them, that certainly makes the day go a lot better” (GR01). To which GR02 added, “it doesn’t add any monetary value to you, but it makes you feel so worthwhile”. Interestingly, worker welfare and social justice received less attention from participants. However, environmental aspects on-farm received the most attention, which this section will now focus on.

The ongoing environmental health of the farm, particularly soil health, was viewed as being equally important to financial sustainability for the growers. This was exemplified in how the growers collected and analysed the amounts of inputs (water and chemicals predominantly) applied during the season. This information assisted farmers in identifying ways to increase yields (which are linked to farm profit), as well as ensuring the efficient use of inputs (a significant business cost) and improving soil health (tied to the longevity of the farm). Although the growers **prioritised transaction value** for the use of water and land, the land was their long-term asset and investment. Added to this, GR01 said that Australian cotton growers **created environmental value** because they “are the most efficient growers in the world, bar none [...] three times more efficient than anyone else”. In this way, participants saw resource efficiency as a key aspect in how the Australian cotton industry **created** sustainable value. Namely, the growers acknowledged that natural resources were limited, precious and expensive, and because of this, creating more with less minimised their impact on the environment. Nonetheless, using Milne, Kearins and Walton’s (2006) spectrum of ‘strong’ and ‘weak’ sustainability approaches, the cotton growers’ financially focused response to sustainability would place them firmly within

the ‘business as usual’ sustainability paradigm. After all, the response does not prioritise growing cotton because of its ecological benefits for the land; rather the decision was based on which crop would deliver the most financial return on investment for the land and resources (such as water) to the growers. However, on closer examination, the response operates within the notion of neo-liberalism’s economic productivity and is aligned with TBL language, which establishes that continued success relies on not depleting environmental resources more than their ability to regenerate.

In addition to creating sustainable value through the management of natural and financial resources, the farmers used LCA data and storytelling to **capture** their **environmental value** and communicate this value to key stakeholders further up the chain. This is significant as participants further up the chain spoke about the ways in which measuring **environmental value** on-farm was ambiguous (and therefore its **value** was **not captured**). At the time of the interviews, GR01, GR02 and TE01 were undertaking an LCA on water use and carbon emissions so they could “confidently say we know exactly how much chemical, how much water has gone into that t-shirt” (GR02). The value of tracing the cotton back to their farm and capturing LCA data was in distinguishing their cotton from conventional cotton and making credible sustainability claims (such as the water used in making a t-shirt). For example, TE01 estimated that one of their Australian cotton t-shirts used “less than 30% of the global average use of water [...] including dyeing”. For SP01, the Australian cotton farming practices **captured** significant **environmental value**:

How does Australian cotton sit into this value chain? It is better. The cotton is better. It’s got better yields. It’s got better consistency. The fibres are better. In actual fact, it’s better for the environment and the agronomy. Everything’s better. (SP01)

Visual storytelling was another approach used to connect stakeholders to the farm and bridge understandings around what on-farm practices look like. Photographs were taken of the farm (such as animals in the wild or comparing the amount of chemicals used against a bale of cotton) and shared alongside the LCA data via the grower’s social media account. The converter observed that telling the sustainability story visually resonated with stakeholders more than data on paper:

I've got some really powerful pictures that show the total volume of say, the synthetic inputs versus the picked bale, which just shows how efficient it is. Some of that stuff just blows away figures on the paper [...] When you say yeah, there is frogs and snakes in the paddock that matters more than any data about soil performance. You know, it is that storytelling. (TE01)

The combination of visual storytelling with quantitative LCA data enabled the grower and converter to communicate environmental sustainability with dexterity to key stakeholders with different levels of sustainability interest and knowledge. As discussed in Chapter 2, the terms 'symbolic' and 'substantive' sustainability have been used in different ways in the literature to describe the actions taken by organisations. In this case, the growers symbolically communicated sustainability by conveying 'what sustainability looks like on-farm' visually through images of 'who' is impacted (i.e. the frogs and snakes (biodiversity) on-farm), as well as substantively through demonstrating 'how much' and 'what' inputs (i.e. synthetic inputs) were needed to produce cotton. Sustainability was substantiated through undertaking an LCA to quantify the amount of inputs to produce cotton; as TE01 said: "I can't imagine telling a story that I couldn't back up with data". GR02 explained that these practices were **captured** through using "a paper trail, it is not third party [...] I've got spreadsheets running that can easily show what inputs have gone into where". However, growers found that information about environmental practices (such as water use) can be difficult for retailers to understand, so they translated the data into "comparative figures" as a way for them to make sense:

I put a statistic out recently that there is more water used in producing a kilo of chocolate, than there is of cotton. That resonates with people because that is something that they can compare like with like: 'I never thought about that', 'that's actually not that bad'. You've got to put it into terms that, or values that, means something. If you talk about, we use 3,000 million megalitres of water a year, [...] that scares people. (GR02)

SP01 agreed with this approach, stating: "people don't buy hectares of cotton, people buy T-shirts or jeans". This is an important point, as the CRDC releases a sustainability report every five years (Cotton Australia & Cotton Research and Development Corporation, 2019), indicating that the **environmental value** at an industry level is lost as the report uses litre per bale terminology, which is difficult to translate. It was

clear from interviews with the niche garment manufacturers and retailers that the information from GR01 and GR02 was valuable. However, interviews revealed that the public's negative perceptions around Australian cotton and water use was a significant area of **uncaptured societal, environmental and transaction value**.

The fish kills in Menindee in 2019 were identified by the growers as a significant event in relation to the public's negative perception of Australian cotton and water use. Growers spoke about the negative attention from media organisations in the aftermath, which GR01 described as: “[the media] decided to blame us [the cotton industry] for the fish kills in Menindee” and for taking too much water. This negativity, coupled with what the grower perceived as factual inaccuracy, caused significant harm and distress for the farmers, which they described as “a stab in the heart” and “farmer bashing” (GR01). Underlying this were feelings of trepidation around their perceived value as a producer in Australia. For example, GR02 also said that social licence was influenced by the political climate⁹³, which had the potential to impact essential production resources, such as pesticide and herbicide use, as well as access to water and land use:

Social licence to farm [...] comes into the political game as well. [...] Sustainability isn't just about environmental, because the political background or whatever. Like our water, are they going to be taking away our water? Are they going to be taking away RoundUp? Are they going to be taking away these things? Because then that goes into our sustainability long term. Are we still going to be able to be farming here?
(GR02)

In other words, social licence was considered an essential part of the Australian cotton industry's operation. However, participants also explained that maintaining social licence to operate was considerably complex. For example, GI01 said that “there is a licence we need to operate” with water use as it is an “emotive” and “sensitive topic”, and particularly in years of drought “there's a fairly strong contingent of people that

⁹³ GI01 said that the government was an important stakeholder here and the industry needed “to keep revisiting the value we add to the economy” and have a “good relationship with the government at all levels to ensure we have their support” on issues so “they understand us”. Added to this, GI01 said that agriculture is a “small percentage” of the overall economy, and “cotton is an even smaller percentage [...] so it's quite easy to have the numbers stacked against us on a sensitive issue”, referring specifically to water use.

are against the use of water on cotton”. Further up the chain, RE02 said concerns with water use and water scarcity in Australia curtailed consumers desire to buy Australian cotton: “I have had people say they would never buy Australian cotton because of the water” [...] “water is the elephant in the room in the cotton industry” (RE02). TE01 also encountered comments from other retail customers, such as, “I wouldn’t touch Australian cotton at the moment”, and even garment manufacturers and retailers who used their Australian cotton had been “hit” with online trolling. This demonstrates that negative perceptions around water use on-farm created economic uncertainty for the growers and converter with respect to selling their Australian cotton yarn (**uncaptured use and transaction value**). Speaking to the intangible and symbolic value of sustainability, TE01 emphasised that consumers need to “feel good” about buying Australian cotton. Yet, consumers had conflicting feelings about cotton, largely because they enjoyed wearing it but felt “guilty” about its environmental impact:

They [consumers] love it, but they kind of feel like it’s a guilty pleasure right now. [...] If people are educated, if they’re really sustainability hardwired, [consumers say]: ‘I almost feel guilty [when] I think about buying cotton or enjoying cotton’. But they like it. [...] They prefer it maybe to bamboo or viscose or whatever. (TE01)

Interestingly, this also demonstrates a perception that consumers looking for garments with sustainable fibres may switch to other sources that they believe to be more sustainable options, which in turn, could affect cotton’s market share (**uncaptured transaction and use value**). TE01 also emphasised that social licence was even more important than the end product (yarn or garment): “social licence is of more value than any tech[nical] spec”. Therefore, maintaining social licence to operate is not only important at the farming level, but the Australian cotton industry also needs to consider how its social licence travels up the chain to end users.

When asked how the industry could improve its social licence to operate, GI01 said the cotton industry was “proactive” and already doing a “great job” in taking social licence seriously, but the work was ongoing:

We can never sit back on our laurels. It’s an ever-changing environment. [...] There’s always opportunities to improve. [...] The social licence and the work on the clean green image will never go away. (GI01)

However, one challenge with social licence was the need for the Australian cotton industry to constantly demonstrate that it is responsible. For example, GI01 said the “industry doesn’t have an endless social licence” and needs to “bend and change”. At the heart of this, GR01 and GR02 said there was a lack of public understanding of how cotton was grown in Australia. Specifically, participants pointed to a disconnect between Australian cotton’s sustainability practices on-farm and consumers’ perception that practices were not sustainable. Participants identified opportunities to address misconceptions around the farming of cotton, such as the “water myth, like how cotton uses an extraordinary amount of water in Australia to grow cotton” (GR01). Participants emphasised the need to debunk inaccuracies that damaged the industry’s reputation, such as that water was not taken but allocated to farmers (not crops) through a licence. RE02 also stated that the Australian cotton industry needed “to get much better at communicating the fact that it uses the least amount of water in the world”. The growers suggested that the Australian cotton industry could be more outspoken on water recovery in Australia, which would **add environmental and transaction value**. In addition to misconceptions around water use, GR01 said chemical use (such as pesticides) was another area that needed attention. For example, GR01 explained that there was a perception that chemicals were applied directly onto the cotton and then ended up in the final product (i.e. garments), but instead the “chemical [is used] to kill the weed so we can grow the cotton”. Growers thought there was an **opportunity** for more sustainability “stories”, stating that these “need to come from the growers” as this was more genuine than statements from industry bodies, and it “resonates with people a lot more” (GR02). The farmer and the ginner spoke about the importance of hosting tours for the public, as well as buyers from mills in Japan, China or Korea, as these events positively influence the reputation and perception of Australian cotton: “create a positive open clean and green image” of the industry (GI01). Although the Australian cotton industry has already invested heavily in communicating on-farm sustainability practices through their Sustainability Report (as discussed in Chapter 4), the findings in this chain indicate there is still work to be done in this space.

Lessons around communicating on-farm sustainability from this chain can be applied to industry-wide communication. For example, in contrast to public perception, the LCA study demonstrated that GR01 and GR02’s Australian cotton used

less water than the global average cotton, and this information was extremely powerful for retailers. For example, RE02 spoke about their role as a retailer in communicating Australian cotton's water use to consumers:

That's an opportunity for us to actually talk about how fantastic Aussie cotton is on those input costs and on the yield. [...] There's a stat which says on average a t-shirt takes something like 2700 litres of water to produce. Yeah. Whereas [TE01] has calculated that [their] cotton takes something in the range of about 800 litres. Yeah, so you know, that's right, thirty percent or even less of the water input cost, which is pretty phenomenal. And if more cotton is grown that way, the world might be in a better place. (RE02)

In terms of the value of LCA for the niche garment manufacturers and retailers, they spoke about using the information to support business decisions, such as sourcing materials that have the least impact on the environment. For example:

Simply calculate the input costs in any fabric. So water, carbon, I mean that's pretty much it I suppose. [...] It's taken so many litres to make it and going to [use] so much carbon to make it. Then it's eaten this much carbon. [...] That would allow us to communicate to people why they should choose one thing over another. (RE02)

In this case, the LCA data on Australian cotton was a value proposition from the retailer's perspective, which as RE02 pointed out, would be too time consuming for a retailer to undertake alone: "I don't have the time to go and work that out" (RE02). RE03 explained that LCAs were unaffordable for their small business and were a barrier for brands "that want to base their decisions off of evidence". RE03 looked to SAC and the Higg MSI for information, stating "you can do like Life Cycle Assessments pretty accurately through their systems". However, as noted in Chapter 4, the Higg MSI is a widely used source of information for the fashion industry, but its credibility has come into question due to the generalisation of the data (Kassatly, 2019). The dearth of information around LCAs meant that the growers' data in this chain **created** a value proposition for the niche garment manufacturers and retailers. However, as mentioned above, it was unclear how the retailers used this information to promote Australian cotton to their customers. For example, RE02 said: "I know what they [the growers] tell me about it [on-farm sustainability practices and LCA

data] and I communicate that to our customers”. It appeared that the communication of the sustainable value created on-farm was largely grower-driven, and the substantive and symbolic sustainability messages were mainly shared via the grower’s social media account. In other words, the growers owned the narrative of their Australian cotton and its sustainable value, and shared this information with the retailer. However, it was not clear where, when and how this information was being translated by the retailer to their consumers.

As the retailer was perceived to play a key role in communicating the growers’ sustainability story to consumers, participants saw an **opportunity** to leverage relationships with retailers and amplify Australian cotton sustainability messages. However, RE02 said this could open up questions that might undermine the efficacy of the Australian cotton industry:

I understand that it’s dangerous and sensitive [to discuss the water use] because it opens up the question as to whether or not we should actually be producing it [cotton] in the first place. (RE02)

This concern highlights the limits of sustainability measurements when it comes to questioning the sustainable use of resources, meaning that sustainability measures need to be accompanied by information around responsible use of resources. GR01 said that communicating on-farm practices and how the **environmental value** was **captured** on-farm was only possible through traceability: “[this] only happens if you know where your cotton comes from”. However, there are challenges to ‘pushing’ cotton towards garment manufacturers and retailers in the chain, as discussed above. Additionally, collecting LCA data at an industry level might **create challenges** because cotton farming is not standardised, and different farms require different processes and inputs. This then raises the question around what tangible value is to be derived from LCAs for the Australian cotton industry. However, when it comes to who pays for LCA information, there appears to be an unwillingness on the retailers’ side to invest time and resources into the LCA process. Rather, this information was coming from the cotton growers which, as identified earlier, received no tangible **(uncaptured) economic value** for this information in the chain; rather, it was perceived to be a nice to know or a bonus. While traceability and sustainability practices on-farm might not deliver a premium to Australian cotton growers in this

value chain, they are essential in proving that the industry is responsible and socially licenced, which in turn, ensures the ongoing production of cotton in Australia.

Cotton identity programs

This section now turns to a discussion around sustainability initiatives and their implications for communicating Australian cotton's sustainable value. Participants said that in the commodity chain, the definitions of sustainable cotton were largely tied up in identity programs. For example, TE02 said "retailers and manufacturers are more interested in [whether the cotton is] organic or is BCI [...] most of the world doesn't care if it's got Australian cotton or not". As established in Chapter 4, Australian cotton farmers can participate in BCI through the myBMP program. However, participants spoke about the ways in which sustainable cotton identity programs **did not effectively capture Australian cotton's sustainable value**. Particularly, participants noted that BCI's mass balance system, whereby the physical cotton and credit (which are called a Better Cotton Claim Unit (BCCU)) are traded separately (Better Cotton Initiative, 2016), did not effectively deliver **transaction value** back to Australian cotton growers. Although the growers, converter, textile manufacturer and niche retailers were not involved in the BCI program, GR01 and GR02 spoke about economic losses, as accreditation through the myBMP program cost time and money, and it was not always clear whether BCI delivered additional **financial value** back to the farmer. The cotton grower (GR02) further explained that even when growers 'earn' BCI credits through growing cotton, they "can't sell the credits separately so then you're not getting any value as a grower for growing BCI, for being BCI certified". Instead, GR02 explained that merchants reaped the financial reward of BCI: "[merchants] can make a ton of money with the BCI credits [...] the grower might get paid 50c a bale for the credits, but the merchant might sell them for \$5–10 each". When asked whether BCI attracts a premium, GI01 said it was "a bit of a hard question to answer" because a premium was "not always" guaranteed as it depended on the buyer: "you have to find a buyer who is willing to pay more for BCI cotton" (GI01). But in cases where a buyer was willing to pay a premium "the BCI added value [was passed] onto the grower" (GI01). However, GI01 saw the BCI program as a potential selling feature that added value to Australian cotton's "clean green image" in the global marketplace:

I don't think it [BCI] can be underestimated. The value of promoting a good image into other countries. I think that's very hard to measure the value at the time, but it could be the difference between making a sale and not making a sale, which is pretty positive, but very hard to measure. (GI01)

The growers did see BCI as **adding societal value** to global cotton through creating “significant social benefits” (GR01) by helping “third world cotton” (GR02) producing countries. In terms of **transaction value**, BCI worked with “how the cotton is grown and supplied” (GR01) in countries such as India, Pakistan and Africa, which differed from the Australian chain in two ways. First, cotton was hand-picked, and the size and scale of the farms were estimated to be around “1 to 5 hectares”, whereas in Australia cotton farming was highly mechanised with pickers that use GPS and RFID tagging, which allowed for a high level of traceability back to the farm (GR01). Second, there was no “separation” of the cotton at the ginning level in India, Pakistan and Africa (GR01). Instead, the farmer sold the cotton seed to the ginner which was then put in a “pile” and processed (GR01). In contrast, Australian cotton was separated all the way to the marketing stages, and farmers were paid based on yield and quality of the cotton. The growers postulated that as BCI grew in size, cotton from Brazil, America and Australia was needed to achieve higher volumes. The consequence of this, the growers asserted, was that the program was “not achieving the same thing that it set out to achieve” and instead was reduced to “ticking a box [...] marketing ploy” (GR02). SP01 agreed, stating that “everybody in that is jumping on bandwagons, whether it's BCI or whatever it happens to be” (SP01). In other words, certifications were perceived to be “paying lip service to it [sustainability]” and not moving the needle to change industry practices (SP01). SP01 also spoke of their experience within the supply chain, stating that brands were signing onto BCI because of the “marketing campaign, not because of the [sustainable] value”:

So, the challenge with this is that we are buying from GR01 and we're buying from [US cotton farm] because of the actual sustainability. Because [of] the actual ethical manner. Because actually it's responsible procurement. And you know something, I can't sell either of them in the open market. Because neither of them had BCI or GOTS or any of the other bandwagons, that actually don't mean anything. (SP01)

GR01 raised issues with BCI not being a quality assurance standard, noting that Australian cotton's myBMP program was more rigorous than BCI. Similarly, RE03 thought BCI was not strict enough because it did not set guidelines on reducing inputs, and comparatively, they felt assured that water use and soil health were all managed through purchasing GOTS certified cotton. SP01 also agreed with the growers, stating that a "one size fits all [approach] doesn't work", but BCI was gaining critical mass in the system:

If you go to the Australian cotton farmer and say, what differentiates you from a standard BCI cotton? Well, they'll say we're better. We're superior. So, why are you selling it through an inferior product offer range? Well the answer to that is because they've [BCI] got a market. They've got size. Well, they didn't have size ten years ago. I mean BCI is only a new construct. (SP01)

This highlights that although BCI is designed to **create** demand for sustainable cotton, the program **does not capture** the many facets of sustainable value. At the heart of this, SP01, GR01 and TE01 also saw issues with BCI not being a traceability certification, noting that they perceived that it might breed distrust of the program when consumers understand that mass balance does not guarantee that the cotton in the product was actually made with BCI cotton. For example, SP01 said that "because it's a mass balance process, we can't honestly sit there and say that the agronomy of that cotton has improved. They can't prove it". In fact, it was SP01's view that "there isn't one current standard that actually allows you to directly prove that you've got, if you wear a t-shirt, that cotton that is ethically grown". TE01 also said that BCI's mass balance program devalues their business model as their value proposition was based on traceability and storytelling. Overall, participants saw that sustainable value was lost when sustainability certifications 'watered down' standards in order to get more stakeholders on board to build critical mass, which at the same time, failed to implement meaningful change in their supply chain. Arguably, this chain **created** and **captured value** through LCA data (substantive sustainability) and visual storytelling (symbolic sustainability), as discussed earlier. This distinction between sustainable **value created** through on-farm practices and the marketing value of global cotton sustainability certifications/identity programs is an important finding from this chain.

Participants also spoke about Australian cotton in relation to other cotton production systems, such as organic cotton. Interestingly, SP01 said that brands were also squeezing the organic cotton supply chain to get the price they want, even though it was more expensive to produce:

There was one very big brand in Europe that recently announced that everything was going to be organic. [...] [The brand said] we do not foresee any of our prices increasing. So, if you ask the consumer today, ‘Do you expect your organic cotton product to cost you anymore?’ The answer is, ‘No’. Even though most people know, on a like-for-like basis, organic cotton is at least a third more expensive. (SP01)

This also demonstrates that there is an unwillingness to pay a premium for organic cotton. Participants RE02, RE03 and GR01 noted that consumers associated organic cotton with quality or as a better choice: “organic is seen to be the better choice by the consumer, rightly or wrongly” (RE02). To pick up on what RE02 was alluding to here, GR01 and SP01 explained that organic cotton does not typically mean better-quality cotton or more efficient use of resources. Additionally, SP01 spoke about the misconception that organic cotton does not use chemicals, stating that “some of the chemicals that can be used under the GOTS certification are illegal to use in Europe and America”. RE03 described Australian cotton as being the “exception” to “global issues with non-organic cotton [...] such as water use, pesticide use” because “a lot of research and science goes into Australian cotton”. Conversely, TE01 highlighted the need for more awareness around Australian cotton’s sustainability story and efforts, stating that international NGOs such as the Textile Exchange, which was a key organisation in the sustainable material space, did not appear to know a lot about the myBMP program. It was clear here that **value capture** was contingent on perceptions, education and data, which as SP01 highlighted, “the only way to tell the consumer is through a supply route that can be fully trusted, because everybody’s trying to tell them their cotton is better”. This section has highlighted some confusion around the nuances between the different types of cotton production, as well as gaps in information flow around Australian cotton sustainability practices (**uncaptured value**).

Turning now to opportunities, although participants identified areas in which BCI **did not capture** value for the growers in this chain, SP01 suggested that the Australian cotton industry should not walk away from BCI as there was consumer

recognition. In other words, Australian cotton/myBMP was not as recognisable as a brand compared to BCI. SP01 postulated there may be a point in the future whereby cotton regions (such as the United States) will try and distinguish themselves from BCI:

Would I say to Australian cotton, walk away from BCI? No. I can tell you now, categorically, that America won't walk away from it at the moment. What it will do is it'll keep their link directly to it until they get a critical size to say: 'No, we are better'. They will live with it. They'll influence it. They'll stay with it. And you know something, if it actually starts to do the things that they wanted to do, and start allowing them to add their value, they'll stick with it, because somebody else is helping them do their marketing for them. (SP01)

GR01 said opportunities for creating **transaction value** for the Australian cotton industry could be achieved through collaborating with blockchain enterprises. GR01 envisioned a blockchain system which could follow the cotton all the way through the commodity value chain (where it is blended with other cotton or synthetic fibres), and then consumers could scan a label or code if they wanted to know more about the story of the cotton. In addition to creating transparency around the product, the blockchain system could then prompt the consumer to pay an additional amount to the grower for the story, which could return a financial premium to the grower when the product was sold. However, SP01 identified “cheating” challenges around swapping bales out of the chain, and forensic traceability would be needed to prove the quantity of cotton at any point in the supply chain. This is also where the value of the BCI ‘mass balance model’ is emphasised, especially as demand for sustainable cotton grows. However, regarding BCI credits and returning **economic value** back to the growers, GR01 said that segments along the chain had found ways to make money out of selling BCI credits, and it would be hard to see that **financial value** returned to the grower.

Although the participants in this chain did not see BCI as **adding value** directly to them, it is important to recognise that BCI is part of the global system of cotton sustainability and that distinctions can be made with Australian cotton. Given the competition around sustainable cotton programs (as well as the allegations of forced labour with Xinjiang cotton and its connection with BCI, as identified in Chapter 4), SP01 and EN02 saw an **opportunity** for the Australian cotton industry to market itself in the global commodity chain as a trustworthy source of cotton that offered “complete

transparency in terms of its lineage and its quality [...] looking at the carbon footprint and the sustainability issues” (SP01). Specifically, the **opportunity** would be to **create** a “transparent Australian product in the UK and in Canada [...] because the consumers [are] wanting trust” (SP01). Additionally, TE01 and SP01 predicted that traceability will become an expectation from global retailers in the future, and forensic traceability could provide a solution to managing this demand. The role the Australian cotton industry could play was in making it easy for retailers to use their cotton: “you’ve got to put it in a nice pretty box with a bow that says: there you go, it’s priced right, it’s got the right product, it’s got the right credentials, it’s got a verified supply chain and it’s independent” (SP01). Here, a model in which there is traceability and a sustainability certification plus data could be an **opportunity** for Australian cotton to distinguish itself in the chain.

Nevertheless, SP01 explained that the actors who held the most power and **captured** the most **value** for using sustainable cotton were the retailers because of their connection to the consumer: “we haven’t got a mouthpiece to be able to tell people [consumers] about it and that’s what’s missing. It’s the route to the consumer and that sits with the brand”. However, SP01 said that retailers and spinners were chasing the lowest price and they were not interested in adding sustainable value:

People are chasing the \$0.01, the \$0.02 to \$0.03, and everything that we’ve talked about is added value. Added value? How did they add the value? Well they’re not interested when it boils down to it, they want it at the lowest price. (SP01)

In other words, there was a strong perception that brands and retailers were not willing to pay for sustainable value in fashion. SP01 also stated that it was not just the retailers, “everybody’s complicit with it” including the consumer, estimating that “99.99% of the market really doesn’t care”, while a “minuscule proportion” care and are “passionate about it”, and then “there are people that say they care, until they look at the price and then don’t”. Therefore, if the Australian cotton industry wants to see value for sustainability, it will need to build connections with retailers and markets that would see the value in it, which all things considered, may only be a niche set of players like the ones in this chain.

5.2.3 Im/materiality and Circularity

This section discusses how participants perceived Australian cotton's material/immaterial value, and its ability to participate in the circular economy. Following Entwistle's (2009) definition, **material value** refers to Australian cotton's tangible qualities, such as fibre quality, while immaterial value refers to the symbolic meanings around Australian cotton. Participants said that Australian cotton's high fibre quality **captured use value**, however its middle staple length limited its usability, and in turn, its ability to garner a premium. Participants compared Australian cotton's lack of immaterial value to wool's richer history, and spoke about the importance of Australian cotton collaborating with the right retailers. Textile waste was a key issue of concern and participants were actively exploring avenues that could leverage cotton's circular qualities, such as biodegradability and compost-ability.

Fibre qualities and branding value

As mentioned in Chapter 4, cotton quality is defined by staple length. Although GR01 and GR02 produced "long staple" cotton, SP01 clarified that the cotton was not the "Extra-Long Staple" used in fine shirts. In terms of Australian cotton's quality (generally speaking), participants described it as high quality, but still falling into the category of medium staple length. As a consequence, SP01 explained that (in general terms) Australian cotton fell into a saturated "marketplace with the cheaper cotton" where it was difficult to sell the differentiated quality, especially when compared to longer staple cotton, which was considered to be higher quality and more luxurious. TE02 added that Australian cotton was "just a speck in the market" and "there is really nothing unique about Australian cotton". Additionally, participants said that to the average consumer, cotton quality was difficult to differentiate between cotton types, whereas it was easier with other fibres such as wool: "they can tell between a coarse wool and a fine wool [...] but [with] cotton there is not a big enough difference to make it a selling point" (TE02). Therefore, although Australian cotton is regarded for its consistency and quality (as discussed in Chapter 4), its competitive edge is limited due to its fibre length.

Participants identified **opportunities** for Australian cotton to achieve higher market value through developing different end use avenues. For example, GR01 said that "the biggest competitors for cotton [are] not other cotton producers" but rather

“synthetics and modal”. RE02 suggested investing in cotton seed technology to mimic qualities in man-made fibres which could **create use value**, such as wrinkle-resistant / non-iron fabric that was easy to print onto digitally:

[Customers say] I love everything about the shirt you’ve made me, but I have to iron it all the time. If that wasn’t the case, that would be better, whilst maintaining 100% natural fabric. (RE02)

Instead of looking at mimicking synthetic fibres, RE02 also saw an **opportunity** for Australian cotton to talk about not being a part of the microplastics problem caused by synthetic fibres shedding. Other **opportunity** areas included “non-conventional” (GR02) uses beyond apparel, such as building materials, medical uses such as 3D printed bandage, noting that cotton’s characteristics make it ideal for novel value-added products: “there is no more pure form of cellulose than cotton” (GR01). However, given that the Australian cotton industry is largely export driven and the world market for cotton is highly competitive, these new market opportunities would lend themselves to niche value adding areas and markets, and in turn, potentially only create marginal returns.

When discussing areas of **uncaptured use value** around Australian cotton in the global marketplace, participants spoke about a lack of branding, especially when compared to Australian wool. Chapter 4 established that there are a few Australian cotton campaigns and collaborations with mass-market retailers; however, GR02 perceived that “zero dollars” in **economic value (uncaptured)** went back to Australian farmers who were creating the raw material, and instead the economic value went “back to the brand owners and the spinning mills”. GR01 mentioned “some other value” was **captured** around promoting Australian cotton as being of “higher quality” and supporting farmers as “a feel good thing”, whereas TE01 said that the collaboration was “free marketing material” and a “gift” to retailers. Furthermore, the growers saw collaborations with low value mass-market retailers as devaluing the high quality of Australian cotton, which could be more suited to a higher price point at around \$50 to \$100 per garment. The converter said cheap shirts use low quality, “crap cotton” (TE01) and the growers connected the low **financial value** of the shirt to consumers disposal mindset: “waste of resource going into a \$5 shirt [...] they [consumers] wear once and throw out and they do not feel for it” (GR02). GR01 also

noted that Australian consumers “tend to want to buy cheap quality”, and because of Australian cotton’s high quality it was more suited to markets which “really value quality”, such as Japan. Therefore, while Australian cotton can be found in mass-market retailers, the connection with low value brands (and therefore market saturation), cheapened the material and immaterial value of Australian cotton. Interestingly, the price points of the niche garment manufacturers and retailers in ACVC 1 could be categorised at a premium market level, and as mentioned earlier, the quality of Australian cotton worked well with their brands. The key takeaway here is that participants perceived that collaborations between retailers and Australian cotton needed to be matched in terms of their material and immaterial value (as achieved in ACVC 1). Collaborations also needed to allow for value to go back to the grower and the Australian cotton industry; whether that value was financial or reputational, it needed to be transparent.

Participants also compared Australian cotton and wool’s immaterial value. For example, EN02 saw a strong emotional link between the Australian public and wool, which they postulated was due to it being one of the first major industries that generated **economic value** for Australia:

We’ve got a really rich heritage with wool in Australia. [...] A rich history. [...] Australia has a significant cotton industry, but I’m not sure if cotton has the same place, the same role in the Australian identity or psyche. Like, it doesn’t quite have the same durability, I suppose. But potentially [it] hasn’t done as well marketing itself as a wonder fibre. And we’ve not processed it onshore to the level that we could have to value add to it onshore. (EN02)

TE02 agreed, adding that wool had a deeper, intangible dimension compared to cotton which they described as a “different romantic level”. Additionally, TE02 said “Australia dominates the apparel wool market”, whereas Australian cotton contributes 3% of the world’s cotton. Wool was also described as having more “tangible value” because it was “expensive so people value it”, whereas “cotton is cheap and so it’s not valued”:

You’ve got 50 cents worth of cotton value in a \$20 garment, and not even 50 cents. [...] Whereas if it’s wool, you might get a \$50 garment that’s got \$20 worth of wool in it. (TE02)

In addition to being more expensive, wool is a niche fibre that represents less than 1% of global fibre production, which is significantly less when compared to cotton's 24% market share (Textile Exchange, 2021). Building on the points raised earlier around retailer collaborations, EN02 saw **opportunities** for the Australian cotton industry to build an Australian cotton brand by highlighting how valuable cotton was in everyday life:

Build stories around how we use cotton in our day-to-day. [...] It's a daily fabric that we all use, because we also use cotton towels, cotton tea towels, all of those things. Jeans and t-shirts, all those things. Like, daily use, very everyday Australian. (EN02)

Participants saw engaging with other niche garment manufacturers and retailers as an area of **opportunity**. RE01 suggested developing "connections between the fabric suppliers of the designers" through holding farm tours or design competitions with education institutions which could add **transaction value** for the cotton industry. To further fuel interest and awareness for Australian cotton, TE01 suggested branching out and engaging with people who are not the usual suspects, such as fashion media "influencers", about cotton production and sustainability:

They're the bubble that encouraged the next designers. They're the bubble that the next generation of product developers are learning from. And some of those product developers will end up in Hong Kong, in London, in New York. (TE01)

RE01 noted that "Woolmark has done a really great job" engaging with emerging designers at high schools, universities and Technical and Further Education (TAFE) colleges through competitions, and "Australian cotton could do the same" to grow usage and demand, while also explaining the fibre's sustainability benefits (e.g. durability, biodegradability, which will be touched on in more detail below). RE01 added that highlighting cotton's **use value** as a material was a "great place to start for sustainable design [...] because every bit of fashion has to be made from fabric". RE03 extended this idea further, and saw **opportunities** to educate designers and retailers on the garment life cycle, such as fibre choices and their end-of-life implications. For example, RE03 said instead of thinking about fibre separating technologies as the answer to solving textile waste and recycling problems. The Australian cotton industry

could educate designers and other value chain members around the fabric they use, how to design out waste and design in textile recycling. Therefore, there is an **opportunity** for the industry to **create transaction value** and grow demand with retailers while also seeking to address sustainability issues, problems or pain points further up the chain, such as textile waste and reuse, which will be discussed in the following section.

Reuse

As identified in Chapter 4, textile waste is one of the biggest issues in the fashion industry. Participants recognised that textile waste presented a value gap:

The waste is a big issue. The waste of low quality is a significant issue. There is not very much waste in high quality, I don't think, because people wear them. Wear a shirt for 5 years, so they've got plenty of use out of it. They'll wear a poor quality. So, one wear and throw it away.
(GR01)

As discussed above, the garment manufacturers in this chain demonstrated a way to manufacture clothing locally which retained the value of environmentally friendly practices and ethical production, while maintaining a viable business without compromising economic progress. As part of this, the niche garment manufacturers and retailers used natural fibres because of their lower impact on the environment compared to synthetics. RE02 also saw that clothing made from high quality cotton would inherently last longer. For example:

We only use natural fibre because it's the right thing to do to the planet. There's synthetic blends [but] can't really be recycled. I'm sure that's going to change in the future, but you know, fast fashion's defined by effectively synthetic flings. [...] The longer we wear the clothes that we own, the better it is for the planet. And you know, we build things to last, and cotton lasts. (RE02)

Here, the garment manufacturers and their focus on garment longevity **captured use value** and **environmental value**. EN01 stressed the importance of “extending the life cycle of a garment, if you're talking about nine months, it's 20 to 30 percent reduction

in water, carbon and waste respectively, and that's a huge kind of impact". Interestingly, these statistics align with WRAP's (2012) investigation into the impacts of prolonging the lifespan of clothing. Although outside the scope of this study, EN01 spoke about how Australians' existing op-shopping culture generates different types of sustainable value, such as diverting from landfill (**environmental value**), as well as changing purchasing behaviour from buying new to second-hand which keeps clothing in use for longer (**environmental value**), while at the same time generating a 'thrill' of finding quality, unique items at a reduced price (**use and economic value**), and raising money for community programs (**societal value**).

The use-focus approach to defining sustainable value is important, as it connects Australian cotton to high quality, durable and well-fitting garments and allows for a circularity dimension. RE03 perceived that it was their "responsibility" as a designer to reduce impacts across the whole process, from sourcing materials to making the product, as well as factoring in pathways for the end of life: "you need to understand the full implication of making that product whatever waste or trail of destruction you create along the way and then what happens at the end of its life". Interestingly, these practices are aligned with what Fletcher (2011) and Black (2008) describe as a broad system-approach to sustainability, which considers implications across the whole chain, rather than at one discrete stage. Additionally, participants in this chain spoke about the various pathways they had **created** in order to avoid textile waste going to landfill. For example, participants RE03 and TE01 were trialling garment take-back schemes and piloting domestic and commercial composting options which leveraged cotton's biodegradability. RE01 did not use zippers, fasteners "or anything that would biodegrade at a different time to the garment". RE02 collected off-cuts and repurposed them into new products; they acknowledged that as their business grew, however, this would become unmanageable. RE02 had collaborated with EN02 to find ways to reuse and recycle their pre-consumer cotton textile waste.

EN02 worked with an existing wool mill in Australia but found "it very difficult to use their machinery because it is designed for wool, and cotton requires different machinery". In talking through the recycling process, EN02 explained that compared to wool, recycled cotton produced a thinner fibre which was "more slippery" and "harder to spin it into the yarn" (EN02). Interestingly, wool uses the same machinery for both virgin and recycled fibres, and their "prongs [...] lock together" to give the

yarn strength and thickness (EN02). Because of this, wool was “known to have recyclability value [...] [and its own] secondary market”, whereas EN02 did not “know exactly what that process looks like” for recycled cotton textiles. EN02 explained that this caused the fibre to degrade over time rather than staying at its highest value, “which is why cotton will end up being used in insulation rather than [in] new jeans until we can get that technology”. EN02 also explained that even if “there was no pricing around the cotton waste”, labour was a high cost because it required “more work [compared to] using the virgin material”. However, EN02 said that if the economics around waste changed and “you can create products with it that can be sold, then suddenly your cotton off-cuts aren’t wasted”. Clearly, there are many challenges in continuously reusing cotton, especially around strength, durability and cost. While a solution for effectively reusing or recycling cotton textile waste would change the way it is valued, current technologies (such as BlockTexx) are yet to be mainstreamed in Australia (as discussed in Chapter 4).

In addition to this, the charity retailer EN01 said that the way textile waste was currently being collected was another key problem. For example, EN01 noted that textile waste was “one of the biggest contaminants” in domestic waste. Additionally, around 30% of donations (soiled or heavily damaged) could not be sold and were typically sent to landfill or to an overseas service provider who turned them into other value streams, such as fuel blocks or rags which “extends its life beyond just going to landfill at that point in time” (EN01). Noting that continuing to landfill clothing and sending it offshore was not a long-term solution, EN01 also noted that there was a lack of industry collaboration in terms of tackling waste. This raises the question as to how the Australian cotton industry can play a role in preventing textile waste, which was identified in Chapter 4 as being the most important waste strategy. In RE02’s view, the Australian cotton industry should be leading in the field of waste management, and they clearly saw that the industry had a responsibility which extended beyond the farm gate and to the disposal of the cotton:

Most of the cotton industry, as I understand it, can be very very profitable. There’s a lot of money flowing around. Why aren’t they leading in that kind of circular space. You know, if they are responsible for growing it, they should be responsible to the end of life as well.
(RE02)

RE02 also added that the Australian cotton industry needed to acknowledge that “there has to be a role [for] recycled fabrics”, but “it goes against growing more cotton”. These sentiments do pose some potential practical challenges for the Australian cotton industry, especially as Chapter 4 established that cotton growers were not typically connected to the final product, which is dispersed through global supply chains. This also raises questions, such as: is it practical and feasible for the Australian cotton industry to collect, sort and repurpose/recycle all cotton products in Australia, even if they are not made from Australian cotton? Furthermore, what is the role of garment manufacturers and retailers in this, as they are responsible for buying raw (or recycled) materials and determining the quality of products that are sold to customers? Perhaps RE02’s views are foregrounded based on their business values of taking responsibility for what is produced (as they offer free repairs on their garments) and how it is disposed of.

This section has identified a need to establish better pathways to **capture** waste and **create environmental value**. **Opportunities** lay in the circular economy, which GR01 said “certainly the industry as a whole should be doing more of that”. For example, TE01 and RE02 agreed that having a viable option for textile scraps and off-cuts to truly close the loop was an opportunity for the cotton industry to add **environmental value**. Both GR01 and GI01 saw **opportunities** in cotton waste to energy such as bio-char. GR01 suggested looking into 3D printing (e.g. printing form-fitting medical bandages) from liquid cellulose: “there is no more pure form of cellulose than cotton”. TE01 and RE01 saw cotton as having inherent **environmental** and **use value** as a potentially biodegradable product, but noted that decomposition strategies for Australian cotton (or just cotton generally) had not been done at scale yet and there was more to be explored here. As identified earlier, Australia’s broken chain was an area of **uncaptured value**, and TE01 proposed that if a local mill was to be established, it could “twin” the spinning of virgin and recycled fibres, as this could buffer “the peaks and troughs of harvest quantities are going to ebb and flow much more because water is going to be less reliable”. However, EN01 said it would take “huge capital investment” to support local infrastructure, especially for finding local value streams for recycling textiles. Therefore, even though this **opportunity** could add **environmental value** around pathways for reusing textile waste, there were scalability and financial viability **challenges** around onshoring manufacturing, as

already discussed. Nevertheless, the sheer amount of activity around circularity projects within this chain points to a clear **opportunity** for the Australian cotton industry to collaborate with retailers, especially as textile reuse projects continue to gain momentum (noting that Chapter 4 highlighted current ventures, including the Goondiwindi project).

5.3 CONCLUSION

The growers were the key instigators of the niche chain. Driven by the goal of finding a financial premium, the growers ‘pushed’ their cotton up the chain and produced a single origin, traceable, sustainable cotton yarn. The novel structure of the chain aided this by taking the traders out and connecting directly to a spinner. A significant actor in this chain was the converter. They played a key role in ‘pushing’ the cotton yarn upstream to niche garment manufacturers and retailers, all of whom employed various practices that reduced the impact of clothing production, which simultaneously fed into their sustainable fashion brand story. The actors and their connectedness in this chain (in terms of knowing one another) was interesting, even though there was a sense that the chain was ‘broken’ by geography.

Hence this chapter has established that the sustainable value of Australian cotton hinges on the connection with the retailer, as these actors make decisions around which fibres to use, as well as how the clothing will be made and marketed to consumers. The niche garment manufacturers and retailers valued Australian cotton’s material value as a high quality, circular fibre (i.e. biodegradability, compost-ability), as well as its immaterial value as a ‘locally made fibre’ story. Despite this, a significant finding from this chain was that the niche garment manufacturers and retailers perceived or had experienced that their consumers were unwilling to pay for Australian cotton’s sustainability practices or traceability. Participants also highlighted the ways in which cotton sustainability programs and globalised supply chains failed to transfer the sustainable value of Australian cotton, and **did not return economic value** to Australian cotton growers (**transaction value uncaptured**).

Nevertheless, a finding in ACVC 1 was that the niche size of the value chain assisted in transferring Australian cotton’s sustainable value because actors could closely monitor and respond to the various needs across the chain, especially when it

came to defining sustainability within the value chain. For example, the growers effectively communicated how they **created environmental value** on-farm and **captured** this value through visual storytelling (symbolic sustainability) alongside credible claims with LCA data (substantive sustainability), which demonstrated their sustainability to different levels of stakeholder interest. This is a significant finding, especially as one niche garment manufacturer and retailer commented that consumers and the Australian public held negative perceptions around Australian cotton growers' water use. Although it is not known how consumers take up these messages, this could be explored in future research, and lessons can be taken from this chain and applied to industry-wide communications.

Participants identified **opportunities** to grow the market share of Australian cotton and **create transaction and use value**, such as growing awareness through collaborations with local universities, emerging designers and fashion media, as well as branding and amplifying sustainability information about the Australian cotton industry to retailers, consumers and the public. Other opportunities that could **capture** additional value included infrastructure for local manufacturing such as re-shoring spinning, as well as diverting waste going to landfill to **create environmental value**. However, there are challenges to this, such as the high level of financial investment required to support the re-shoring of manufacturing or the collection of textile waste. Other options for repurposing cotton textile waste include biodegradability and compost-ability, which aligns with current projects the Australian cotton industry is currently investing in, as discussed in Chapter 4. An additional challenge identified was the scalability of the storytelling model which took the traders out, particularly when compared to the commodity model (in which the Australian cotton industry contributes an average of 3 million bales per year) (Cotton Australia & Cotton Research and Development Corporation, 2019), which gives a sense of the enormity of the difference between the two models in terms of material scale and buying power. Table 12 below outlines the key findings from ACVC 1, and the following chapter bridges the gap between the commodity and niche value chain, and introduces the perspective of a mass-market retailer and their experience of 'pulling' Australian cotton through the chain.

Table 12: Summary of ACVC 1 Findings

Theme	Findings
Connectedness	<p><i>Chain structure</i></p> <ul style="list-style-type: none"> <li>- Growers doubled the economic value of their cotton by owning the cotton as it was processed into yarn. <li>- The converter was the key actor who ‘pushed’ the cotton through the value chain towards the retailers. <li>- Sustainability values were shared between the actors (e.g. use of natural fibres, consideration for product impacts across the life cycle). <li>- The locally grown, traceable and low environmental impact of the fibre, as well as the high quality of the textile and low minimum order quantity, were key aspects that were valued by the retailers. <li>- There was a strong perception that consumers only considered Australian cotton a ‘bonus’ and were unwilling to pay a premium for its traceability and sustainability attributes. <li>- Prior to connecting with the converter, the retailers did not know how to source Australian cotton, which was identified as an area of uncaptured value for the Australian cotton industry. <li>- Scaling a model which omits the traders would present transaction value challenges. <p><i>Traceability</i></p> <ul style="list-style-type: none"> <li>- Traceability captured the grower’s value as a producer (i.e. farming practices, fibre quality), but there were issues with swapping/blending cotton at overseas mills. <li>- Consumers were interested in knowing about where the cotton came from, but the material elements (i.e. style, colour, quality) of the garment were valued more. <li>- Traceability was valued by the retailers, and the story of the fibre’s origin meshed well with their sustainability strategy. However, there was a strong perception that consumers were not willing to pay more for traceability. <li>- There were scalability challenges around traceability due to seasonal variations which affected the size of the

Theme	Findings
	<p>Australian cotton crop. There were concerns that this could set up unrealistic expectations for buyers.</p>
<p>Communicating Australian cotton's sustainable value</p>	<p><i>Creating sustainable value on-farm and capturing value through data and storytelling</i></p> <ul style="list-style-type: none"> - Effective communication of on-farm environmental sustainability to different stakeholders was achieved through visual storytelling (symbolic sustainability), alongside credible claims with LCA data (substantive sustainability). - Negative views and misconceptions around Australian cotton's water use was an area of uncaptured value. - Co-creating Australian cotton sustainability messages with key stakeholders such as retailers, was an opportunity area. <p><i>Cotton identity programs</i></p> <ul style="list-style-type: none"> - There was a strong perception that the cotton sustainability program, BCI, did not capture the full extent of Australian cotton's sustainable value on-farm, and did not return economic value to Australian cotton growers.
<p>Im/material and Circularity</p>	<p><i>Fibre qualities and branding value</i></p> <ul style="list-style-type: none"> - Australian cotton's high quality as a fibre, yarn and textile captured use value, however its middle staple length limited its ability to differentiate and capture a premium. - Participants saw that Australian cotton lacked immaterial value when compared to Australian wool's richer history. A use and transaction value opportunity was to collaborate with educational institutions, media and fashion designers/retailers to grow awareness of Australian cotton. <p><i>Reuse</i></p> <ul style="list-style-type: none"> - Re-shoring spinning with recycled and virgin fibre capacities, as well as repurposing textile waste through leveraging cotton's biodegradability and compost-ability attributes, were key opportunity areas for use and environmental value; however challenges around scalability and financial viability were identified.

Chapter 6: Findings from ACVC 2

The sustainable value 'pull' from the retailer

This chapter explores how actors in the mass-market value chain construct Australian cotton's sustainable value. This chain is different to ACVC 1 because clothing is manufactured in large quantities for a mass-market retailer with several hundred stores across three countries. The mass-market retailer in this chain identified an opportunity to market a verified, traceable, Australian cotton capsule collection. The retailer 'pulled' the Australian cotton through their global chain, which involved connecting their garment and textile manufacturers with a trader to source the Australian cotton. Participants explained the difficulty in 'pulling' the Australian cotton through the chain, which demonstrates the complexities around sourcing, as well as tracing raw materials, within a global value chain. This chain presents significant insights as it is a microcosm of the challenges of the globalised fashion value chain. The different forms of value are bolded and flagged throughout.

6.1 CHARACTERISTICS OF ACVC 2 AND PARTICIPANTS

The Australian cotton grower (**Participant GR04**) was part of a myBMP/BCI corporate farm that was vertically integrated with multiple farmers growing cotton in New South Wales, which is then collected, ginned, warehoused, classed and marketed. In addition to trading their own cotton, the company also ginned and marketed other Australian farmers' cotton; however, this other cotton was not the focus of this study. This chain arose out of a collaboration between the corporate farm and the mass-market Australian retailer who designed an 'Australia cotton' range of menswear and womenswear. The grower estimated that approximately 10,000 bales of cotton ran through this chain. Participants from the mass-market retailer include a Sustainable Product Specialist (**Participant RE04**), a Knitwear Product Development Manager (**Participant RE05**) and an Ethical Sourcing Specialist (**Participant RE06**). Many actors were involved in the design of the Australian cotton garments, and the material and information flow of this chain was as follows: Participant RE05 worked with a

garment and textile manufacturer (**Participant GM01**) in China to develop fashion garments which also met technical requirements and expectations; this also included aligning the sourcing of Australian cotton to a specified cotton trader (**Participant AG01**) and spinner (**unable to be contacted**). A trader⁹⁴ from the corporate farm (**Participant GR03**) then worked with an agent (AG01) to coordinate the shipping and supply of Australian cotton. In other words, the retailer did not deal with the spinner or the fabric mill directly. Participant RE05 coordinated the collection of cotton samples at the yarn, textile and garment manufacturing stage and sent them to a verification provider (**Participant TR01**) to verify that Australian cotton was in the final product. Turning to end-of-life pathways, the retailer had a partnership with a second-hand clothing retailer (who was unable to participate in this study) to supply unsold garments, as well as consumer donations. The retailer also supplied Australian cotton womenswear products to a rental retailer (**Participant RE07**).

6.2 PERCEPTIONS OF SUSTAINABLE VALUE IN THE AUSTRALIAN COTTON INDUSTRY

The perspectives of participants interviewed in this second chain are organised around three key themes: connectedness, communicating Australian cotton's sustainable value, and im/materiality and circularity. 'Connectedness' explains the chain structure, particularly how the retailer works together with the verification provider to 'pull' Australian cotton through the chain to **capture use and transaction value**. The retailer also engaged in a dialogue with consumers and told a story about the Australian cotton products, and **created use and transaction value**. The theme of 'communicating Australian cotton's sustainable value' establishes how participants defined sustainability, the role of sustainability initiatives, how sustainable value was **captured** on-farm in Australia and communicated to stakeholders, and finally the importance of credible claims and measuring sustainability. The final theme, 'im/materiality and circularity' addresses cotton's fibre qualities such as durability, comfort and breathability, as well as recyclability, biodegradability and renewability, which are important characteristics for circularity.

⁹⁴ GR03 distinguished their role as different to that of a 'merchant', and called themselves a cotton trader or marketer. Therefore, throughout this thesis, GR03 is referred to as a trader.

6.2.1 Connectedness

The theme ‘connectedness’ establishes the state of play between the actors, and explores how and why Australian cotton was ‘pulled’ through the chain. The mass-market retailer’s storytelling campaign around the origin of Australian cotton fibre proved to be commercially successful as consumers were willing to pay a premium for these products. Tracing and verifying Australian cotton through the chain was an essential component of this. Participants said that traceability was valued as a tool to verify product claims (such as country of origin), as well as risks such as cheating and falsifying product claims, which was identified as a prominent issue. However, the traceability and sustainability practices did not attract a premium for Australian cotton growers. Retail participants also identified many challenges around ‘pulling’ Australian cotton through the chain, as well as the scalability of the verification model, such as chain structure and costs. Another significant finding is the complexity in defining what constitutes a sustainable fibre, especially because consumers were perceived to have a simplistic perception of sustainability.

Chain structure

The corporate farm in this chain marketed their cotton as a traceable and sustainable fibre to retailers, and the structure of the chain was crucial in executing this. The cotton trader (from the corporate farm) (GR03) and verification provider (TR01) each said that the Welspun incident was a tipping point that exposed practices of falsely labelled Egyptian cotton products. GR03 explained that cotton changed from being treated “like a generic product [...] ‘cotton is cotton’, no matter where it comes from and how it was grown”, to maintaining “more of an identity through the supply chain”. The ginner said that collaborations with retailers, such as the mass-market retailer in this chain, was of “tremendous” value to the Australian cotton industry’s “end game”:

That’s where we want to be. Produce local cotton and turn it into garments that are sold through those guys. [...] It’s what everyone’s end game is – looking for where you can keep it local, keep it local. (GI02)

In this study, the mass-market retailer ‘pulled’ the Australian cotton through the chain and developed a womenswear and menswear capsule collection. The gate prices

revealed that using Australian cotton was “\$2 or \$3 more expensive as a raw fibre” compared to “regular cotton” (RE05), and added between 40 and 60 cents per garment, and verification added 80 cents per garment (see Appendix F). It was not clear at the time of the interview if the grower received any additional economic value, but RE05 said that the costs were incurred through:

Working directly with the spinner who then works with the knitting factory, because this is a cut and sew fabric, who then works with the manufacturer, who makes that product to then ship it to us. (RE05)

In other words, in the mass-market retailer’s experience, the processing of Australian cotton into a yarn, textile and garment added costs. However, the mass-market retailer did not have an estimate on the retail margin for using verified Australian cotton at the time of the interview. Instead, they gave a relative comparison to their traceable wool collection, which was estimated to have increased the retail value of the garment by \$30. The mass-market retailer marketed the cotton’s Australian “provenance” story (RE05, RE04), which participants RE05 and RE04 said, “resonate[d]” (RE05) with consumers as a way of “supporting Australian Farmers” (RE04). TR01 confirmed this, stating that the retailer’s verified Australian fibres program had been “very, very successful. Incredibly. Even more successful than what they thought it would be” – the success TR01 was referring to here was the **transaction value captured**. TR01 explained that through connecting “the people, the place and the product” the retailer got the “messaging right” and was able to achieve a premium with their traceable wool collection: “so, are people willing to pay for it? Yes, if you can do the messaging right”. RE05 confirmed this, stating that the price increase did not detract from sales, but instead increased consumer desire for the product: “customers bought into [the wool product] more than they had before when it was cheaper. So, it did resonate with them and they saw value in that story”. RE04 highlighted that the retailer was “not just taking a higher margin”; rather, the price was reflective of the work involved in delivering a “responsible product”:

Having a higher price point, we need to educate the customers on the *why*: how many hands have been involved, what the actual raw material cost is, the cost of tracing it through scientific verifying. All of that is a

heavy investment. That's a challenge for us, trying to cut through to our customer to help them understand that we're not just taking a higher margin. That actually, there are some significant costs that we need to cover in order to deliver a more responsible product. (RE04)

TR01 said the retailer **created** a “dialogue” with consumers about Australian fibres through stories on their website, social media and product labelling, and “didn't just slap a label on it and say it was this and that, and 99% of people don't take notice”. TR01 argued that the “certification model” from 20 years ago “doesn't work”. In this chain, the retailers created a product story through their website, which pictured an Australian cotton farmer in the field wearing the ‘Australian cotton’ product, with an accompanying article about Australian cotton sustainable farming practices, specifically around soil health and water efficiencies. The campaign was also promoted via the retailer's social media account and through product labelling (i.e. a swing tag which indicated the product was made from Australian cotton). TR01 said the mass-market retailer crafted an “emotive connection” to Australian cotton, which TR01 added was a key part of their “strategic position” in the marketplace:

The brands are trying to form a connection between people [and] the products they sell. An emotive connection, not just, ‘I look nice with this [garment] on’. I could look nice with this [garment] on from five shops, literally around the corner. (TR01)

Here, the marketing campaign created an emotive connection through linking the consumer to the fibre origin, product and retailer's branding. It is significant to note that this is a point of difference in comparison to ACVC 1, as the mass-market retailer took ownership of the Australian cotton farmer's story and sustainability narrative. RE04 said that the focus on “supporting local” was a top-down decision from the “managing director”, and “supporting Australian farmers” was a key part of this:

It's definitely become an increased focus since our managing director started a couple of years ago. [They] really wanted to drive supporting Australian farmers. So, the social story is a big focus for the brand. And since we have kind of gone through a bit of a, not a re-branding, but really tightened who we are as a brand and what we stand for, supporting local was a big part of that. And so, that's why the traceable [Australian fibres] ranges have emerged so strongly - because

we really wanted to make the point that we're standing up for local growers, that we really value the provenance of our products, and that we want to support the underdogs, if you will. (RE04)

Interestingly, RE04 added that Australian cotton was only one strategy under this approach, noting potential risks around drought (an issue that will be discussed in further detail in Section 6.2.2):

[Australian cotton is] not the only option. Large-scale brands need to consider the implications of heavily investing in one avenue and manage the risks involved in drought, etc. This means Australian cotton won't be our only focus moving forward. It's a nice story though, and a way for us to give back to those in our own backyard. (RE04)

In terms of defining sustainability, the mass-market retailer said their overarching focus was around localness, and in particular, intertwining their Australian heritage branding with looking after the Australian environment and community:

[Our sustainability platform] is around protecting what matters. And what matters to us is the natural world. Particularly, [the] Australian landscape and all the things that are synonymous with who we are as a brand, you know. We shoot a lot in beautiful landscapes, and so it's a responsibility of ours to make sure that they remain protected and preserved. There's also the value in supporting community. We've always had community partnerships with [charity] and [second-hand clothing retailer], as a way to support the people within our community. (RE04)

However, the mass-market retailer said that 'sustainability' was difficult to define. For example, RE04 said:

Everyone's idea of sustainability [is] different. There's no cookie cutter definition for it. We need to identify what we stand for and drive that within the business. But this approach might not align to some people's values, and therefore they're not going to buy into what we're selling. [...] The word [sustainability] itself is quite problematic, so we do try and avoid that sort of terminology in our communications. (RE04)

The verification provider also commented on the complexity of defining sustainability: “sustainability means lots of different things to lots of different people, not all of them correct” (TR01). Notably, the verification provider and the mass-market retailer acknowledged that the term sustainability was not straightforward, which aligns with Henninger et al.’s (2016) findings that sustainable fashion has become a myriad of terms and definitions. RE04 said the focus of their sustainability platform was on “progress not perfection”, incremental change and “impact”, and “taking the customer on that journey too”. This sustainability as a ‘journey’ language echoes the ‘business as usual’ paradigm as raised by Milne et al. (2006) earlier. Hence, the mass-market retailer took a broad approach to sustainability, compared to the niche garment manufacturers and retailers in ACVC 1, who had a clear sense and set of parameters around sustainable fashion (i.e. use of environmentally friendly, natural fibres).

This challenge around defining sustainability for the mass-market retailer was met with trying to match the “breadth of customer demands” (RE04). RE04 spoke about the challenges in communicating a “strong, clear responsible sourcing strategy” and a “materials hierarchy” to consumers due to their varied perceptions of sustainability. RE04 described their approach as a “balancing act” between “research and customer feedback”, noting that the “maturity of conversation here in Australia” was at a “high level” and customers had a “strong sense of what’s ‘right’ or ‘better’ based on their personal experience”. For example, RE04 explained that “many customers have the perception that natural fibres are automatically ‘better’ than synthetics regardless of the sourcing practices or Life Cycle Assessments” (RE04). Interestingly, the agent stated “it is indisputable that natural fibre [are] more environmentally friendly than man-made fibre” (AG01). As the most used natural fibre globally, this perception is very positive for cotton.

The agent emphasised that brands and retailers play an influential role when defining cotton and sustainable value, which will be discussed in more detail in Section 6.2.2. For example, AG01 said: “we would like to emphasise that the sustainability of cotton depends on the brands’ preference”, and sustainability programs “remain heavily influenced by retailers’ brand identities and consumers’ awareness as sustainability becomes a global discussion”. RE06 acknowledged that the retailer was a “really valuable player” with “commercial power”, but they had limited resources within “a really big supply chain” and had to “pick and choose” which initiatives to

invest in. RE05 also acknowledged that meeting commercial obligations was a priority for the retailer:

Obviously as much as we don't like it, we are in the market to sell clothing and make budgets. So, as much as we want sustainability to be a key focus, and it is, it still comes back to a value equation, and how much we're willing to pay for that. (RE05)

Additionally, RE06 said that in instances where the retailer was a small part of a factory they “don't have a lot of leverage” to make changes. RE06 further explained, “it's a different relationship than [...] I think, the public thinks we've [got] all the power” but it “is not always clear cut” who has the power (RE06). This presents a key insight into the complexity of sourcing relationships within global value chains.

From the traders' experience, GR03 said brands only changed their supply chains and sourcing arrangements if they saw an advantage such as a “premium or improving their competitive position” or if little “shocks” in the system would otherwise “significantly disadvantage them”⁹⁵. GR03 said “it'll be a relatively small percentage of the supply chain that will just change voluntarily, like [this mass-market retailer] has”. Other participants also saw the retailer as the dominant actor in the chain, which TR01 succinctly summarised: “there's a big value gap between who can actually gain [from] [...] provenance and what that means, and talking about sustainability and what that means” as this was controlled by the retailer. TR01 explained that the “supply chain is very brand lead” but there was a “manufacturing gap of value” whereby the farmer had power as a raw material producer, but the retailer holds power because they have a relationship with the end consumer, and “the converters [are] in the middle, and the farmers [are] stuck at the end”. TR01 further said that “using sustainable cotton provides no value for the spinner [...] unless there's the willingness to pay for it on the other” side, referring to consumers and retailers. But it was TR01's view that the retailers were unwilling to “pay more” to bring that sustainable value through the chain:

⁹⁵ GR03 further explained this was the case with boycotting cotton from Xinjiang.

Bringing that value back through the supply chain is really challenging, because the brands don't want to pay more than what they're used to.
(TR01)

GR03 also asserted this position, adding that brands “put themselves on a pedestal, it's all about them and they've got the power, they wield the stick and all these textile manufacturers are desperate for their orders, so they just say it's just a requirement”. Ultimately, there was a strong perception that the costs around sustainability were pushed down the supply chain to the suppliers and the growers. GR03 added that even if “something is worth more to a consumer it doesn't necessarily mean [that] the merchant is [...] going to make any more money”. This demonstrates that even if a retailer achieves a premium for using sustainable cotton, this economic value does not flow down the chain.

Noting that ACVC 1 did not use traders, it is important to explore the value that merchants add to the chain. While GR03 identified as a cotton trader and did not consider themselves a merchant, they explained that in the commodity chain the merchants “fill that gap” between when the market is high and “the farmer wants to sell” and “when the mill wants to buy” when the market is low: “invariably you can't get them to agree [...] If you join it back-to-back, farmer-to-mill, it's always going to be hard”. In turn, the merchant “will try to make a margin” on the way through, but “it doesn't always work”. However, when it came to ‘pushing’ sustainable cotton, GR03 explained that in the commodity market, the merchants “don't necessarily care” if it is “organic cotton or BCI cotton or pink cotton or green cotton” or “poor-quality cotton or good quality cotton”, they just “want [to] make that margin”. Similarly, the “agent gets a commission, [and] doesn't care whether it's sustainable or not sustainable [...] they just want to be filling that capacity because [with] every bale that goes into that mill through that agent they take one percent” (GR03). This demonstrates that the merchant and agent do not influence market demand in terms of carrying sustainable value forward: “there isn't necessarily any extra value in all this stuff” (GR03). This tension around ‘who pays’ and ‘who says’ what is sustainable and ‘who captures value for sustainability’ is an important point that this chapter will continually revisit, especially when discussing the value of traceability and cotton sustainability initiatives below. Additionally, as there was a strong perception that as the retailer was the most

powerful actor in the chain, participants viewed them as the actors who were ultimately responsible for “upholding” sustainable value within the chain:

The brands are the ones that are grabbing most of the value. They [the brands] should be the ones responsible for upholding that value. Because they are the ones who are directly beholden to the consumer, [and] decide whether this is valuable or this is not. [...] The farmers could do more, and do this, and do that, and do that, and it could all be ignored because their customer won't pay more. (TR01)

Both GR03 and AG01 raised the point that the economic climate will also influence retailers progress around sustainability:

In order for demand for cotton as a sustainable, natural fibre to rise, we need to count on retail brands for recognising the value of high quality, recyclable materials. [...] The demand for niche, sustainable products depends on the overall economic climate. (AG01)

This matters because cost was a key consideration for the mass-market retailer. When discussing the future of the Australian cotton collaboration, RE05 said that they anticipated that there will come a point where consumers won't pay extra for attributes such as traceability, especially as the costs of materials were expected to increase over time:

But as raw materials continue to increase in price, and then you add sustainable attributes on top of that, there's going to be a cap as to how much more [consumers] will pay for that and what they see as value. (RE05)

Similarly, GR03 said because fashion purchases were dictated by discretionary spending, this was a key **challenge** with sustainability: “[purchasing clothing is] one of the first things that people stop doing if money becomes tight”. This section has demonstrated the complexities that the mass-market retailer was grappling with when it came to defining sustainable fibres. In any case, it is clear that in order to extract the *sustainable* value on-farm, the cotton needs to be ‘pulled through’ the chain by the retailer and communicated to the consumer. By and large, this model relies on the ability to trace cotton through the chain, which will be discussed next.

Traceability

A key characteristic of this chain was the ability to trace the cotton back to the Australian cotton farm, which **captured transaction** and **use value** for the mass-market retailer. From the grower's perspective, GR04 said that traceability **created** ownership around the sustainable value of the cotton in the value chain: “[it is] not lost then, someone owns it”. GR04 said this was important because growers do not have “much control or pull or push” over the cotton “once it leaves the farm”. GR04 further explained that even if farmers are supplying mills with “good quality cotton” it does not mean it will go into “good quality cloth at the other end [...] we’re at the mercy of the people buying our crop” (GR04). Additionally, GR03 said that traceability enabled the Australian cotton industry to become “more engaged with those end users”, while GR03 said they had not been “governed by what the consumer wants [...] as transparently” before (GR03). Therefore, traceability **added use** and **transaction value** for the Australian cotton industry in terms of building relationships and strengthening information flows between cotton producers and retailers. This also marks a change in supply chain relationships, especially as retailers were looking to understand sustainability on-farm more, which will be discussed in Section 6.2.2. The cotton trader (GR03) explained that the value of traceability for the mass-market retailer was in “supporting a story for them. Helping [them] tell a story. Giving them the confidence to tell it”, which RE05 confirmed. GR03 added that traceability can be used in two ways: either to “call out something good” which was the case for the mass-market retailer in ACVC 2, or “use it in a more negative defensive way [...] to just do it quietly in the background to make sure that you're getting what you're paying for”. However, it was not clear at the time of the interview if the cotton grower and trader received a premium from the mass-market retailer for their cotton. Importantly, as RE05 explained, they had encountered issues with ‘pulling’ Australian cotton through the chain, and verification helped to identify when instances of “grey cotton” had occurred:

It’s also highlighting [...] we had a grey cotton situation with the spinner, and they believed that what they were selling us was Australian cotton, but then [the verification provider] verified that it wasn’t Australian cotton. (RE05)

However, the mass-market retailer said that “traceability is not the end goal”, but a way to “identify risks and drive positive outcomes” (RE04):

Where are the opportunities? Where are the challenges? I think a lot of brands are kind of going around blind wanting to do the right thing. But without having oversight of what’s going on further down, it’s very difficult for them to really drive any change. It’s good to make that differentiation, that traceability is not a means to an end. It’s something that we really value as it allows us to identify risk and drive positive outcomes. (RE04)

TR01 also made a point to distinguish between the terms traceability and verification: “traceability is a tool to achieve an outcome”, whereas verification referred to assessing if “attributes, promises” were true “as it relates to products”. TR01 likened this to construction: “no one says they want a hammer, they would like a house that they can live in”. GR03 added that the “Welspun debacle”, and “seeing what it cost”, was a tipping point in which they foresaw that “traceability was going to become more important” for the industry and “brands needed to get into it to protect themselves”. GR03 thought that traceability would bring “peace of mind” for brands and retailers with high-value products such as a “\$200 dollar or \$100 Supima shirt” as an “insurance policy” against the risk of fraudulent cotton. However, GR03 said that “it’s been more difficult than we anticipated”, and while “brand owners” were “open about the fact they need it [traceability]” and acknowledged that “traceability is one of their biggest challenges”, they were “not willing to pay for it”. For example, GR03 explained that they had shown other brands proposals of verified Australian cotton which increased “the cost of a garment by 2 cents”, but they “weren’t interested” because the cost across “10 million garments a year” would equate to “hundreds of thousands of dollars”. GR03 further explained that this sentiment extended to on-farm sustainability practices as well: “they’re not willing to pay for it. None of this stuff, whether its environmental credentials, sustainability... all of those things come at a cost and someone has to bear it”. Therefore, in GR03’s experience, retailers were not willing to pay for traceability or Australian cotton’s sustainability practices. TR01 added that the Welspun scandal exposed “an industry problem” of “dirty secrets”, as well as the normalisation of “cheating” and substitution:

The brands were happily selling Egyptian cotton. The brands actually knew that they probably weren't getting what they were supposed to. But it's a competitive market. So if everyone is cheating, and I'm cheating, then we're all doing the same thing, so no one's at fault. (TR01)

GR03 affirmed this, stating that the fashion industry was rife with “evidence of bastardisation or cheating” with “falsified documentation”. However, this was not specific to Egyptian cotton. GR03 said there have been fraudulent cases with organic cotton too: “in India, 80% of the organic cotton that is produced is based on falsified documentation”. GR03 added that brands are complicit in this practice:

What's frustrating is when you question a brand owner that's selling organic, and they say that they have got the certificates. Well those certificates are crap, but 'we've got them, if we get questioned, we've got something to back it', until someone gets exposed, Welspun style. (GR03)

This reveals that sourcing and tracing cotton in the global value chain is complex in nature, especially as fraudulent practices ultimately undermine sustainability benefits.

Participants spoke about three main **challenges** around scaling traceability, namely complexity, costs and supplier relationships. In an effort to explain these three challenges, GR03 and TR01 spoke about the differences between tracing textiles and food. TR01 said the key difference was that traceability for the food sector was a tool “to track, manage or ascertain risks through a supply chain and then ultimately recalls”. TR01 explained that the cost of traceability in the food supply chain was “socialised” between government regulation, industry and consumers, whereas the fashion industry was not very supportive of increasing costs to include traceability: “we [referring to retailers] don't want our t-shirts to be any more expensive” (TR01). RE04 noted that “Blockchain and scientific developments” were very “expensive” and “limit[ed] how much we can do”, and “there's a real need for that democratic shift where it becomes a lot more accessible to brands”. Conversely, TR01 said that traceability was “not a technology problem”, but rather “the system isn't supportive of this approach” (TR01). TR01 explained that the spinning stage was “typically [the] biggest risk” because spinners buy raw cotton from multiple sources to “produce a yarn spec” (TR01). TR01 further explained that:

The challenge has been as we've developed our relationship with [cotton farmer and trader] is their customer, the spinner. Their immediate customer, is one who struggles to see value around anything other and above providing a cotton to the spec that they need to make it into the spec. [...] At the cheapest price they possibly can. Compare that to a brand which is interested in all of these things because they know the consumers' interest in them [...] So either end of the supply chain is trying to do the similar sort of thing, but there's this big gap in the middle [...] because [cotton farmer and trader] doesn't sell to [the retailer], they sell to spinners in Asia. (TR01)

TR01 also explained that the spinning mill was where the value of Australian cotton's onshore traceability information was lost: "it goes into a lay down [row for processing] with white fluff. That [RFID] barcode gets tossed away" (TR01). TR01 further described the yarn manufacturer as "not really a value adder" because there was "marginal difference between the price of yarn and the price of cotton"; rather "they are just a converter between this spec and that spec [of yarn]" (TR01). Added to this, TR01 explained that the global supply chain was in a constant state of flux: "they're constantly in a pricing war against each other and one guy might offer yarn cheaper than the other guy" (TR01). This elucidates the wider context in which cotton is bought and sold, whereby price and quality are the main chain drivers.

The second **challenge** around traceability is related to chain structure. Issues emerged when retailers had to "change" their supply chains when sourcing Australian cotton, which jeopardised relationships with suppliers: "once you start to do that, then it gets difficult because there can be some really long-standing relationships (between suppliers) where they've always bought their yarn from" (GR03). Equally, GR03 explained that if they "start to *push* something on[to] the customer, that is going to make the customer[s] life harder and more complicated, it's actually [a] risk to the agent" as it could jeopardise the volume they are selling. GR03 explained that some brands have found traceability "too hard" because supply chains are "complicated", and they either "walk away" or "do something trivial or token to show they have made the effort, but they don't do anything to make any significant changes". GR03 also added that scaling the sustainability and traceability attributes **created challenges** at the trading stage because it was "potentially adding more risk" and "adding more complication[s] and complexity", and could risk the "volume that they're currently selling to that spinning mill". Other times it'll be a "fluke" that suppliers are already sourcing Australian cotton, but it's "rare" (RE03). GR03 also highlighted that

Australian cotton was not “sitting around all the time [at the mills]. It’s got to be generally for something specific”. This presented a **challenge** in terms of scaling the efforts around Australian cotton. GR03 explained that mills do not process small volumes of Australian cotton, meaning orders have to be large enough to “justify” spinning as “a special run of fabric [otherwise] it’s just not worth their while for 500 metres”. In turn, GR03 added that:

That volume thing is really significant and it makes it very hard for these small Australian brand owners to get people to do stuff because it’s so paltry in their terms. (GR03)

This reveals scalability challenges that face Australian retailers when ‘pulling’ Australian cotton through the value chain. The cotton trader said the best way to get the most out of Australian cotton and retailer collaborations was through creating products of “reasonable volume, relatively basic” rather than “something that’s trendy this year”; otherwise “it’s not worth the effort” (GR03). The “effort” here refers to the “full segregation” of Australian cotton, which added “cost” as well as “a bit of a premium” for the trouble the suppliers need to go through. GR03 did not know the premium that suppliers would have charged in this chain, but suspected this cost would be added to the retailer’s order (and therefore passed onto the retailer), as highlighted earlier. GR03 further explained that traceability limited the spinner’s “flexibility” to “work a bit of magic and blend in 20% [of] stuff from India or something like that in order to get his raw material cost down to build in some margin”. GR03 said this was important to keep in mind as the “raw material is 75 percent” of the spinners’ cost. RE04 added that global supply chains are very “complex”, and TR01 noted they are in a constant “state of flux” (as stated above), which was another challenge to traceability as it “relies on a supply chain that is relatively static [but] textiles move around all the time” (TR01). TR01 also said that while retailers might know the “cut and sew” stages, they might not know who supplies them; and it was the “larger brands” who had the resources to invest in traceability. RE05 affirmed this, stating that larger companies have “entire teams of people [who work] on just traceability or just sourcing, whereas we don’t”. Additionally, it might not be possible for retailers to rely on each stage to double check that Australian cotton was being ‘pushed’ through the chain, as GM01 said they “have less knowledge of the Australian cotton industry” and

“just focus on producing from yarn to garments”. TR01 said traceability “rel[ies] on a system of compliance” and a “system that supports it [...] If someone writes on a piece of paper that it is X, Y and Z, you are reliant on assuming that X, Y and Z is truthful” (TR01). However, as the Welspun case demonstrated, cotton cheating and substitution is rampant, indicating that the wider system of fashion production is not designed to support traceability.

The final **challenge** was the number of brands using Australian cotton without verification, which the mass-market retailer explained presented problems for them when explaining the verification solution to the consumer: “[how do we explain that verification is an] added layer of assurance into [our] storytelling without undermining all of our other sourcing that may not be [verified or] certified” (RE04). Importantly, RE04 said they had to be mindful as the “everyday customer” doesn’t understand “the complexities of a supply chain”. RE04 and RE05 also said that verification was “time intensive” (RE04) and required the retailer to significantly invest their resources. For example, RE04 explained that “RE05 has to manage that relationship because it takes so much. RE05 has to make sure that the scientists are getting the right things at the right time”. Other brands selling Australian cotton without verification pose a risk to the industry’s reputation. For example, TR01 said that the Egyptian farmers were “the real loser” in the Welspun scandal and received “big consumer *push* back”, which led to brands “dumping Egyptian cotton programs” and taking up Pima cotton as the “next best” option. TR01 that it was a cautionary tale around Egyptian cotton not “preserv[ing]” and “protect[ing]” its brand. GR03 further highlighted that there was a real risk of a similar situation unfolding with Australian cotton because although some retailers have “got their checks and balances”, some are “pretty token [...] all desktop stuff”. TR01 said that Cotton Australia were “very honest” and make a “very clear statement [...] that any content claims are the brand’s responsibility” because “they don’t have the resources” and “know what it’s like through the supply chain and do not over promise it”. However, TR01 said if it “all blows up [...] ultimately the indirect losses are going to be the farmers” as it **creates** “risk” for brands who “don’t want to be tarred by that brush”. Therefore, it is important to recognise that supply chain risks have the potential to impact the reputation of the Australian cotton industry.

This section has explained the complex dynamics around traceability within the globalised Australian cotton value chain. In terms of **opportunities**, GR04 said

traceability will continue to “evolve” more into the future when “people are serious about wanting to know where their clothing is coming from”, whereas at the moment it was “pretty juvenile”. However, TR01 said that they “doubt that [traceability] is ever going to scale to the textile space”. Therefore, even though traceability allowed for numerous advantages in this chain, such as connecting retailers with local producers, storytelling around product origin and better visibility of the value chain, there are implications around scaling up traceability within global value chains, such as added costs, as well as risks around cheating and substitution.

6.2.2 Communicating Australian cotton’s sustainable value

The themes around ‘communicating Australian cotton’s sustainable value’ relate to Australian cotton’s on-farm environmental and social practices, the role that sustainability initiatives play in transferring **societal** and **environmental value captured** on-farm, and the importance of credible claims. The mass-market retailer defined sustainable cotton as BCI (which Australian cotton was benchmarked to), organic cotton and recycled cotton. As discussed earlier, the mass-market retailer took ownership of the Australian cotton product story and communicated how the industry captured sustainable value to consumers. However, this section found that stakeholders were confused around what sustainability meant on-farm, particularly as different cotton programs were competing in this space to say how they were better. More importantly, a sticking point was a lack of shared definitions around sustainable cotton practices, which generated important insights around Australian cotton. First, supporting local farmers was a key area of **captured value** (as mentioned above), and the industry’s labour practices gave the mass-market retailer a sense of ease when talking about Australian cotton. However, the mass-market retailer found it was difficult to understand environmental on-farm practices, particularly in relation to biodiversity, chemical and water use. Additionally, there was immense concern over Australian cotton’s use of water, which presented two risks for the retailer: reliability and guarantee of supply for the capsule collection, and feeling unequipped to talk about water use issues. The retailer saw an opportunity for the Australian cotton industry to provide more ‘understandable’ information around environmental impacts.

Participants reported that consumers also felt conflicted about Australian cotton: they liked cotton as a material and wanted to support Australian farmers, but were

concerned about issues in their own backyard, such as drought and the industry's water use. Participants discussed the ways in which BCI and myBMP **captured** and verified sustainability practices on-farm, but a key finding was that **economic value** and sustainability information was not evenly passed through the chain (**uncaptured value**). Particularly, there was a desire for credible and independent claims, especially quantifiable data around Australian cotton's water use. This highlighted gaps within current sustainability programs and their information flow (**uncaptured value**).

Communicating on-farm environmental and social management practices

The purpose of this section is to explore how Australian cotton sustainability practices **create multiple forms of value** and how these are communicated and transferred to stakeholders further up the chain. Starting with Australian cotton's **societal value** from the mass-market retailers' perspective, RE04 said they were "comfortable" with Australian cotton labour practices on-farm. This was important as RE04 explained that "there are concerns with every cotton source globally", but the advantage of using Australian cotton from the retailer's perspective was they did not worry about labour issues in cotton production:

Given what we know about Uzbekistan, and other areas with child / forced labour issues, and with much less regulation around wages and conditions, I definitely feel that Australian cotton has merit from a social standpoint. (RE04)

RE06 added that customers were "becoming more aware of" social issues in the supply chain, which GR04 also acknowledged, noting that "it was not an issue for us":

Consumers that desperately want to know where their clothing comes from, and that it's not been stitched together by child labour or it's not been farmed by slaves or you know [...] it's not an issue for us in Australia. It all comes back to being able to trace it. (GR04)

In addition to labour practices, there was strong consumer support around 'buying locally made' with Australian cotton. For example, RE05 said they had received "a lot of positive feedback about supporting Australian producers". RE04 said that "investing in Australian communities through employment" was important, and they

had a “real obligation to support regional Australia going forward in terms of economic opportunities”. GI02 spoke about how the Australian cotton industry brings prosperity to the whole community through employment opportunities:

The more people we’ve got working for us, the more kids in schools, the more mechanics needed in town, the more tyre services, the more groceries get sold, more clothing gets bought, more petrol gets bought.
(GI02)

This demonstrates that the Australian cotton industry creates multiple layers of **societal value**, which are also aligned to the mass-market retailer’s sustainability strategy and brand story, which focused on localness.

Turning now to on-farm environmental practices, it is first important to note that similar themes to ACVC 1 were discussed by participants. For example, GR04 said sustainability at the farm level required “longevity” and “protect[ion]” of the land and water to ensure the “ecosystem” didn’t “fall down”, which went “hand-in-hand with yield increases” and “getting a return out of that asset”. When discussing how **environmental value** was **captured** on-farm, GR04 explained that they focused on “maintain[ing] soil health [as well as the] sustainable use of water [...] always working on water use efficiencies”. Water was a key talking point with the grower. GR04 connected water management to soil health practices, stating that “rainfall either ends up in the soil or ends up in our storage”, and all water was “recycled, no water leaves the farm”. GR04 also said that biodiversity on-farm flourishes “when it’s got water” and acts as a “huge wildlife refuge”. GR04 added “especially now that we are using GMO crops, you know, it’s a fairly safe habitat for them”. Unsurprisingly, GR04 explained that water was “a very expensive asset” that was being “spread thinner and thinner”⁹⁶. Further up the chain, the agent (AG01) was aware that “the water supply in Australia is very uncertain”, and Australian cotton growers are “facing more challenges as they do not have subsidies from the government” like other cotton

⁹⁶ The cotton trader said the biggest challenge for cotton will be around financial viability, particularly in relation to the cost of resources such as water: “there’ll be dynamics within the global trade and the global environment that will *push* people to grow different things based on... the cost of water, is a classic example. You look at California and they grow bugger all cotton now and that could happen here one day if we keep on... if the cost of water keeps going up and the cotton price doesn’t go up significantly, then we might not be able to afford to grow cotton here” (GR03).

producing countries. This highlights the environmental and financial risks facing Australian cotton farmers.

When discussing the value of the environmental practices, GR04 said they “struggle” to put a value on it: “if you see reduced yield and things like that, and then your returns are going backwards”. Evidently, **environmental value** was inextricably linked to the idea of growth. There was also a clear emphasis on **economic value** when making decisions around which crops to harvest: “you know, we love growing cotton, but if there was something else that gave us the returns we needed then we’d all love that too” (GR04). However, GR04 said the biggest challenge at the farm level was climate change, which was out of their control: “we’ve just got to stick to doing what we’re doing. We’ve got to adapt and roll with the punches”. Climate change’s impact on the environment also has implications for **societal value**. For example, GR04 spoke about the difficulty in managing a workforce of permanent, casual and seasonal workers through the ebbs and flows of drought: “it’s a real mixture and it takes a lot of managing. Like it’s the hardest thing about farming”. When discussing opportunities with resource use, GI02 highlighted that there was always room for improvement, especially if it increased profitability and productivity (which was also referred to in ACVC 1): “[it is an] ongoing process [...] it’s one of those things that’s never going to end” (GI02). Further up the chain, participants described Australian cotton’s on-farm practices as being “largely supportive of the environment” (TR01). Although cotton producers were highly focused on balancing environmental health with financial viability and profitability, the mass-market retailer identified many concerns around on-farm practices that were areas of **uncaptured value**.

For the mass-market retailer, Australian cotton’s water consumption was the main environmental concern, especially when it came to consumers: “many people are unaware of Australian cotton practices outside of how much water is used” (RE04). RE04 also acknowledged that explaining Australian cotton and sustainability to consumers was “complex”:

Our customers are either happy with it just being Australian, as they care most about supporting Aussie farmers, or they’re not happy with the water or they want to know more about why it’s not organic [...] given local cotton growers do not offer organically grown cotton, this makes

both the sourcing decision and supporting communications more complex. (RE04)

To quickly pick up on the point around organic cotton, GR03 said that there was a perception that organic cotton was “better” because it was “just tied to the word organic”. RE04 added that “many want to support organic farming practices as they’re more familiar with this term in the food space and understand the benefits”. This reinforces findings from ACVC 1 that cotton and sustainability are tied up with perceptions around identity programs, which will be discussed in more detail below. Turning back to Australian cotton, another point raised by RE04 was that they were not clear “whether or not it’s a sustainable crop long-term”. RE04 further added that “for now we are supportive of the Australian cotton industry”, but they were interested in knowing how the industry was going to “future-proof” itself, especially in regards to the unpredictable nature of droughts, which have an impact on yield (which in turn would have a direct impact on the mass-market retailer’s ability to continue the capsule collection). GR03 highlighted that “one of our strengths” was the ability to grow cotton annually because that gave farmers flexibility, especially in years of drought when water was unavailable (compared to permanent plantations such as almond trees): “we can turn the tap on and off if the farmers can sustain that cycle if you like. But that’s an advantage of cotton, not a disadvantage”. The verification provider mentioned that the market mechanism around water in Australia helps to capture the economic and environmental value of resources: “[it] establishes where that value gets distributed. So when water becomes more expensive, too expensive for the rice guys, then it becomes too expensive for the cotton guys” (TR01). RE04 was also concerned about “the issues of water licences” and the “politics of the Murray-Darling”, acknowledging “we’re not in politics [...] we’re a retailer” but that it is a “very sensitive issue” and a “precious resource”. At the heart of this concern was the impact on the retailer’s “brand reputation” through its connection to selling Australian cotton:

We want to partner with credible suppliers. Ever since the issues with unregulated irrigation of the Murray-Darling a couple of years ago, we have been cautious about which Australian farmers we partner with, wanting to ensure that we’re supporting best practice. That said, even if it is above board, it’s still a crop being grown in a drought ridden country. (RE04)

The mass-market retailer said these concerns were mainly felt amongst their Australian consumers, who were concerned about issues in their “backyard”:

I do believe that people care about their own backyard. So, whilst you can empathise that some other country has a drought issue, people are much more passionate and sensitive about what’s going on within their own country. (RE04)

Participant RE05 said “there is always some feedback about cotton production in Australia, especially around the water consumption”. Participant RE04 said that on social media they “don’t get a lot of comments around the Australian cotton [collection]”, but have “played it down in the past” due to controversy surrounding the industry:

We were going to go out with a big campaign last year but we toned it down because it was at the time of the Four Corners episode. It was still on internal tags and I think even swing tags, but we toned down our digital storytelling. (RE04)

This shows that the mass-market retailer was unsure about the dangers around Australian cotton in terms of contested facts and the vagaries of public opinion. Furthermore, this highlights that even when ‘pulling’ Australian cotton through the chain and leveraging certain value elements (such as the ‘Australian made’ sentiment), there was a sense of unease around promoting Australian cotton, especially during times of negative publicity, which could jeopardise the relationship with the mass-market retailer.

Speaking to the negative misconceptions around Australian cotton and water use, the grower said the industry needed to make sure the “conversation about water doesn’t get away from us” (GR04). GR04 acknowledged they had seen a lot of negative misconceptions around water use on social media: “just talk blatant mistruths a lot of the time”. GI02 said the positive news around Australia’s sustainable value does not “get out there”:

The Australian cotton industry would have to be the best in the world, you know, environmental issues, the whole thing right through. But the Australian people don’t see that. (GI02)

The rental retailer shared a similar perspective, stating: “Australian cotton doesn’t do a good enough job marketing itself about how good it is. How good locally made cotton is [...] It doesn’t get through at the other end at the customers level” (RE07). Both GR04 and TR01 said that concerns around Australian cotton were most likely founded on perceptions of the industry 30 years ago. For example, GR04 said pesticide use was a “big issue” in the 1980s to mid-1990s, but the industry had “cleaned it up to the point where we are world leaders” (GR04). This was important as GI02 said the reputation of the Australian cotton industry “as environmental vandals” was not the reality of “what goes on out here in the country [...] you’ve got to look after your country, you know, your land”. Therefore, similar to the findings in ACVC 1, negative perceptions around Australian cotton and environmental sustainability were found to be an area of **uncaptured value** in this chain.

The participants suggested many **opportunities** around changing public opinion around Australian cotton’s on-farm sustainability practices. For example, participants suggested that the Australian cotton industry could leverage labour practices as being substantially less exploitative in light of Xinjiang and modern slavery laws. Secondly, TR01 suggested there was an **opportunity** to change the narrative and talk about the ‘national value’ that cotton offers Australia as a “sector that is an innovator rather than just a resource deplet[or]” and “generating X amount of dollars” for the economy. TR01 said that while Australian cotton was “arguably the most sustainable production site of cotton globally”, there was an opportunity to communicate how the industry used innovative technology such as sensors and drones “to utilise the resources that we have for the most economic[ally] efficient sustainable way forward”. Thirdly, the grower saw that collaborations further up the chain **created positive reputational value** for the Australian cotton industry. GI02 said that “getting the story out there” through a “trusted retailer” that “people kind of listen to what they say” was “extremely important” to “get[ting] the truth out there” about how sustainable the Australian cotton industry is. GI02 added that it was “extremely valuable [...] you can’t put a price tag on that”. Relatedly, GR03 said that the connection to “end users” strengthened the information flow around “the quality of the cotton, but also the other characteristics in terms of environmental credentials and traceability”. Participants also spoke about the **value created** through farm tours. For example, AG01 said that visiting cotton production sites **created** “transparency of product quality and

workplace environment (labour practices and community engagement)” which “boost[ed] buyers’ confidence and interest in Australian cotton”. GR04 agreed, stating that the farm tours were important because they were “educational”, otherwise the value of sustainability was lost: “it’s all nice talking about sustainability and what not, but if you’re not actually seeing it being done or in the flesh, it probably has little meaning”⁹⁷. However, at the retailer’s end, RE05 said that they have “limited or no conversations” with Australian cotton industry bodies. This indicates that there was limited information sharing between the retailer and the Australian cotton industry around Australian cotton garments and consumers’ feedback. This is a **missed opportunity** for the Australian cotton industry, especially in term of gaining a better understanding of consumers’ perceptions, as well as addressing brands’ concerns around the industry’s reputation. What also emerged here was a lot of complex detail around cotton farming practices and sustainability, which was found to be difficult to translate to retailers, which constituted **uncaptured value** in the chain. There was also confusion around how to communicate Australian cotton’s **environmental value**, which will be discussed in more detail below.

Cotton identity programs

The mass-market retailer defined sustainable cotton as organic, BCI and recycled cotton; however, a key finding in this chain is a lack of shared definition around sustainable cotton farming. Before discussing sustainability initiatives, a distinction between product claims and sustainability claims must be made. TR01 said in this chain, they could verify “product attributes” or “content claims” such as that the yarn was Australian cotton (which they called “actionable insights”), but “can’t determine if the children that made that garment were over [a certain] age, and paid [a certain amount]” (TR01). This is where sustainability initiatives such as BCI, myBMP and organic cotton **captured value**: through verifying sustainability practices. However, the ways in which this value was distributed were not always straightforward. For

⁹⁷ The grower shared an interaction with a student, noting that the farm tour “changed” their negative perception of the Australian cotton industry to a more positive perception: “[they] said ‘you know, that was really great, you’re actually not the monsters that you’re sort of portrayed to be’, which both shocked and surprised me a little bit. She’d been reading all the negative press and really came to a conclusion there. And when she got out here and found that we’re just normal people trying to do our job, it was quite enlightening” (GR04)

example, RE04 said there was complexity around the “different [cotton] farming practices globally”. When defining Australian cotton, RE04 said:

You can't just say it's organic versus conventional, because conventional means all sorts of different things and it has these negative connotations associated to it. Australian cotton is not organic, but it's not conventional, it's something in the middle. And you don't really know what this level playing field is, and what you are basing those judgements on, when there are different farming practices globally. (RE04)

In an effort to standardise, demonstrate and communicate sustainability on-farm, the Australian cotton industry developed the myBMP program, which is benchmarked to BCI. The Australian cotton in this chain was myBMP/BCI accredited. The grower said that the myBMP program brought “many on-farm practices to the forefront” and implemented “the practical side” of government legislation and regulation (GR04). The grower added that the value of the myBMP program was that it demonstrated to key stakeholders that they were the “real deal” and “we're actively trying to farm the country properly” (GR04). The trader said that it was very important to “show that we're growing [cotton] in a sustainable way, which we are” (GR03). For AG01, myBMP **added** tangible **value** to the **environment** and **society**:

Australian growers minimise pesticide use, maximise water use efficiency with monitoring programs, improve soil health with rotations, and so on. These measures, along with workplace and community wellbeing, contribute towards environmental and social sustainability, while also successfully increase the yield. (AG01)

AG01 added that myBMP demonstrated that the industry was “actively practising sustainability, with high information transparency”; and this was Australian cotton's value proposition: “[a] significant selling point with marketing value for retailers, and a trademark to strengthen growers' credibility”. GI02 agreed, stating that these practices were a key reason why the mass-market retailer was sourcing their cotton:

Consumers want to know the conditions that cotton was grown under, how it was treated, chemical usage, labour usage [...] So you know the environment was looked after, the people were looked after, there was virtually zero chemicals. (GI02)

GR03 added that myBMP gave traders a framework to answer retailers' questions around how sustainability was managed on-farm: "we are well placed to answer them due to the work we do with myBMP". The grower also said that BCI and myBMP demonstrated that Australian cotton growers had "nothing to hide" as retailers can "trace [...] back" the "environmental credibility [...] right back to the plant being grown" (GR04). TR01 also acknowledged that myBMP was a way to "see that value on-farm get translated into off-farm [value]"⁹⁸. However, as alluded to previously, there are information gaps between practices on-farm and retailers' understanding and ability to communicate this to consumers, especially around Australian cotton's water use.

As noted earlier, myBMP has been benchmarked to the BCI program. The farmer did make a clear distinction between BCI and myBMP in terms of who received the value, stating:

BCI is more at arm's length and is the next step past BMP [...] it is more of a thing between merchants and the spinning mills than it is for the farmers. BCI is still developing and there is [a] little premium in a financial sense for growers. The value is all in BMP for us [growers] at the moment. (GR04)

The farmer added that BCI was the "most direct way" to translate the value from the environmental practices through the supply chain: "we're trying to get people to pay a premium for our product because they know it's been sustainably grown and safe and things like that" (GR04). Interestingly, AG01 said that myBMP had been growing in recognition:

The BMP trademark is in fact value adding as more retail brands request the use of BMP cotton (equivalent to Better Cotton Initiative 'BCI' Cotton) as part of their social responsibilities / brand identities. (AG01)

⁹⁸ The verification provider explained that programs such as myBMP also seek to capture the intergenerational view, as well as a 'cultural' dimension of sustainability: "there's a lot of care and nurturing and value that gets placed on anything that comes off farmers' property. That's the hours away from their family. That's the late nights. That's the early mornings. That's stressful calls with the bank manager. That's everything. Because they value it so much they really do care about what happens after it. And I think that mindset, as well as societal regulatory things, there may have been a lot of the reasons why culturally they started with myBMP, and how it's got taken up because they really value what they do and the hours that they do and what they're trying to do for their children, and their children's children" (TR01).

Turning now to the brands' perspective, as identified earlier, sustainable cotton in this chain was defined as BCI, organic and recycled cotton. RE04 listed many benefits around using BCI cotton, such as, "being able to connect to a global organisation", and said that supporting sustainable cotton production through mass balance was "feasible" in terms of cost and scalability. Surprisingly, RE04 said that BCI was a pathway to having "more impact" and being able to "scale up sustainable farming practices quicker than an organic farming scheme", which would otherwise require them to "invest heavily in the premiums that come with organic [cotton] farming" (RE04). In terms of costs around sourcing BCI, RE04 said initially they received "pushback in terms of a premium" for BCI from their supplier, but the premium had "dissolved" over time: "I think when suppliers don't understand something, their immediate pushback is that's extra work, it's going to cost you money". RE05 confirmed there was "no premium on prices for BCI cotton, it's the same price as regular cotton". As to whether BCI garnered a premium for cotton growers, the cotton trader (GR03) said it was dependent on "supply and demand [...] when the world is washed with BCI cotton, there's no premium for it". Nevertheless, GR03 said the value of BCI was that it "makes our [Australian] cotton more attractive to that spinning mill" that has orders for BCI yarn, which in turn, **captures transaction value**; otherwise "the mill would go somewhere else in order to fulfil that demand". GR03 added that buyers "can't switch between origins" and must purchase BCI credits in the same country, which gives merchants and traders a competitive advantage in the marketplace (and in turn, **captures transaction value**). GI02 agreed, stating that BCI "gives us [Australian cotton] an edge over other [cotton] producing countries because that's what the spinners are looking for". GR03 said that:

In a lot of cases, I don't end up charging a premium [for BCI], but it helps me get something sold that I wouldn't have been able to sell if I didn't have the BCI credits to chuck in with it [...] might be just what keeps us in business [...] as opposed to the cotton from the guy up the road. (GR03)

Similarly, TR01 said BCI "does come down to market access. You may not get more [money], but it allows you the ability to sell". As market demand for BCI increases, the number of Australian cotton farmers in the myBMP/BCI program will become

important. However, GR03 said Australian growers are “commercial [and] business savvy”, and a premium was a key driving incentive for them to sign onto myBMP/BCI; however as has been discussed, the premium was not always available. GR03 said it was unclear “whether or not, or at what point do we start to see some value from it”, and while the industry was “always talking about looking for a premium”, it was not always there. This is important to note, as participants have mentioned both strong perceptions and experiences where retailers were unwilling to pay a premium for Australian cotton’s traceability, as well as sustainability attributes.

Participants also noted that BCI created positive outcomes for the cotton industry. For example, GR03 said that BCI generated positive educational and promotional outcomes for cotton growers: “BCI’s done a lot to dispel a lot of the myths around cotton-growing [...] cotton has had a very chequered history, not in Australia, we’ve had our challenges, but globally it’s had a chequered history” (GR03). In turn, GR03 said that **transaction value** was added in the sense that BCI “keeps people using cotton because it keeps confidence and keeps demand there for cotton, then it keeps the merchant in business”. Of course, this directly affects merchants’ bottom line, which GR03 acknowledged: “[merchants want] production and consumption [of cotton] to be maintained at healthy levels” and “to be handling volume” in order to make a margin, “the worst thing for a cotton merchant is if everyone switches over to polyester and there’s stuff all cotton traded”. In addition to increasing the demand for cotton, GR03 said BCI meets the objective of helping farmers move towards more sustainable practices: “it’s made it better for the people who grow it”. For the mass-market retailer, the BCI program also added (**captured**) **value** through aligning them to suppliers with a shared “vision”:

We have had to ask suppliers to become BCI members, and it has become evident throughout this process which suppliers are keen to join us on this journey. (RE04)

What is notable here is RE04’s reference to a “journey” which, as highlighted in the Literature Review (Chapter 2), is the language used by companies to promote minor sustainability changes while continuing to operate in the ‘business as usual’ paradigm (Milne et al., 2006). RE04 added that BCI had been “educational” for their suppliers, explaining that when they first started sourcing BCI cotton “no one really knew what

BCI was”. One of the criticisms of BCI, which was also identified in ACVC 1, was the mass balance system. GR03 said that “a lot of people have been very critical of the BCI mass balance system”, but the credit system was “extremely practical” and worked well with supply chains in other countries where cotton was blended at the gin, and “segregation” was “unrealistic” as “you have got no idea what farm it [the cotton] has come off”. GR03 further explained that from the trader’s perspective, the process of selling the cotton and the credits was straightforward:

You just do what you’ve always done and ship the most appropriate cotton based on quality and other factors to that customer against that contract, and then you do the credits. (GR03)

GR03 said the convenience of the credit system was also an advantage of BCI for retailers: “I think once [retailers] do go down that [traceability] route they realise just how good mass balance and credit systems [are]”. Arguably, this was where BCI **captured transaction value**, because the program works within the current production and consumption systems of cotton, whereas traceability adds complications that limit the scalability of transferring the sustainable value of cotton through the value chain. However, RE05 said that “credits [aren’t] easy to explain” or to “sell to customers”. When describing BCI, TR01 recounted the program as a “rough and dirty mass balance system” that was scalable because “it doesn’t promise too much” like “a content claim”, such as country of origin. However, participants saw that retailers’ needs were changing, particularly in light of BCI’s connection to Xinjiang’s modern slavery. TR01 said that brands were wanting “something better than mass balance”, such as “some form of verification” or “content claim”, but BCI had resisted “because that doesn’t fit [with] their original interests in which it was developed” (TR01). A future headwind that TR01 pointed out was “the whole trade issue” between the United States and China, which at the time, was perceived to be “creating some really big sustainability questions”. TR01 said there was an **opportunity** for the Australian cotton industry to carve out supply chain “integrity”. However, the cotton trader saw a place for both mass administration and physically segregated cotton, and that demand would fall on a spectrum from “full-blown organic” to “cotton is cotton”, adding:

I think there are different areas in the supply chain that can't look at each other as competitors. It's just meeting different demands. [...] Some people are willing to pay for it, some people aren't. (GR03)

Ultimately, the uptake of cotton identity programs comes down to willingness to pay.

This section has explored the complex dynamics around the value of cotton sustainability programs in this chain. Although it was found that BCI did not achieve a premium through this value chain, the value of BCI was in marketing Australian cotton to spinners and retailers to effectively meet and **create** market demand for sustainable cotton, whereas the value of myBMP was in benchmarking sustainable farming practices in Australia. A key finding here was that participants perceived that merchants, agents, spinners, textile and garment manufacturers were disengaged when it came to the transfer of **societal** and **environmental values**, except when certifications were stipulated as a requirement. This accords with Ecker's (2010, p. v) findings which showed that middle chain actors, such as wholesalers, distributors, manufacturers and retailers, "were generally unconcerned with the transfer of social and environmental sustainability values, with the exception of some actors in certified supply chains". The findings in the mass-market chain also reveal a distinction between product and content claims (such as country of origin), and sustainability claims which were linked to certifications. However, as will be explored below, there are gaps in information around sustainability programs, particularly in regards to making credible claims, which will be discussed in the following section.

Credible claims and measuring sustainability

Interviews with the mass-market retailer revealed that measuring sustainability, and being able to make credible claims, were an important part of communicating their sustainability strategy. To determine what constituted a sustainable material, RE04 said they gathered sustainability information from "independent certification(s) and resources", as well as sources they trusted, such as Textile Exchange. Significantly, Textile Exchange was mentioned in ACVC 1 as not knowing very much about Australia cotton's myBMP program, which was an area of **uncaptured value**. RE04 said an area of **uncaptured value** was a lack of "measur[ing] claims and impact" for all types of cotton production, particularly noting that "unsubstantiated claims is one of the industry's biggest problems currently". TR01 agreed, stating: "there is very little

due diligence done in the space”, especially with organic cotton. RE04 elaborated that it was “difficult as a brand to identify” credible claims as sustainability information was “vast” and “unregulated”, adding “we can’t keep up with the amount of frameworks, standards or certifications arising”. RE04 said they wanted to “cut through to get to the truth” and “have integrity in our (the brand) claims”. RE04 said this was where **verification added use value**:

There’s no level playing field. It’s a real struggle around claims, and unless a brand is speaking to a specific standard that is verified by a third-party, claims can be based on internal efforts unknown to the customer or those outside the company. So, it is tough, and that is why our partnership with [traceability company] is so important to us, particularly from an origin claims perspective, because it gives us the assurance that our Australian [fibre] claims are independently and scientifically verified. We are not marking our own homework. (RE04)

However, as stated above, this chapter has made a distinction between product claims and sustainability claims. TR01 also said that verification helped to evidence sustainability and “differentiate” brands in a noisy marketplace: “everyone wants to say, we’re sustainable and everyone wants to say we’re doing this [...] How do you differentiate?” An area of **missed (uncaptured) value** with Australian cotton was the lack of “independent information” to verify sustainability claims (RE04). RE04 explained that current information around Australian cotton and sustainability was from “spokespeople for an industry” who have a vested interest in making the industry ‘look good’:

I have been told by [industry body] that there’s significantly less water used in the way that Australian cotton growers operate, compared to ‘conventional’ global farmers. But as brands, we are not on the ground, and therefore rely on information provided by others. Retailers would benefit from having more accessible, independent information regarding inputs and impact. (RE04)

This shows that no matter CRDC’s and CA’s sustainability reporting, people will question it. Additionally, RE04 said that another area of **uncaptured value** was the difficulty in translating scientific information about environmental practices and measurements of inputs on-farm to a generalist audience, especially around chemical use and regenerative agriculture:

When I talk to [Australian cotton industry body] to better understand chemical use in the Australian farming context, it gets technical very quickly, and so it is hard to translate what they're saying. We are told that the chemicals are *not bad* for the environment, but again, without having an informed conversation it is tricky. [...] Whilst our teams understand some of the principles behind the terms, rotational grazing, replenishing soil health etc., it can be difficult to define and measure terms without having studied agriculture. And then second to that, we are armed with the role of trying to educate customers who may be even less educated. (RE04)

This demonstrates that, because each stage is specialised, sustainability knowledge is not spread equally through the chain, meaning trust around sustainability claims becomes a crucial element. Furthermore, although the Australian cotton industry's reporting is thorough, it has not appeared to cut through to its audience. RE04 also suggested that scientific information needed to tell the sustainability story of the farm, but at the same time measure impacts on soil health and biodiversity:

I would be interested to better understand how brands can measure their support for biodiversity – i.e. is there a way to measure what kind of native landscapes farmers have around their property and how this is supporting local flora and fauna? Or how farms are managing biodiversity loss more generally? (RE04)

This is important for the Australian cotton industry to note, as RE04 said that the “next iteration of our strategy will have a strengthened focus on biodiversity and soil health”. RE04 also added that this level of detail was the next step beyond traceability:

Having traceability within the supply chain back to farm level is the first step, but once you have this visibility you then need to question farming practices – from soil management, water use, seed ownership, etc. (RE04)

Therefore, there has been a notable shift from ‘cotton grown on this farm’ to ‘this is how the cotton was farmed’, further highlighting the need to tell the sustainability story of Australian cotton. RE04 was also interested in having “more information around the exact water usage of [Australian] cotton products”. RE04 said the value of this information was in understanding their “impact as a business”, which they wanted to “share with our customer the impact that we're having and then what we're doing to

counteract that impact or where we're focusing to improve that impact". GR04 said that data for their Australian cotton was available: "[it] is there or is accessible if someone wants to dig a bit deeper". However, GR04 acknowledged that "people can get bogged down in [the data] and you lose interest in the person on the street". This demonstrates that data, while important, also needs to be contextualised within the context of the farm. Related to this point, RE07 spoke about storytelling as a powerful tool to cultivate a strong sense of what sustainability looks and feels like on a cotton farm. RE07 shared an experience of hearing the Chief Storyteller at Patagonia's⁹⁹ perspective of the cotton fields in California, which persuasively set up a dichotomy between organic as "good" and conventional cotton as "bad". Specifically, an organic cotton farm was described as "smell[ing] like a farm": "earthiness", "trees", and "cow manure", whereas the conventional cotton farm "was heavily pesticide based" and "didn't smell pleasant, it felt very sterile". In this instance, there was a strong message in this story: that organic cotton production was more natural and sustainable for the environment compared to conventional cotton production. Leaving aside the implications of this comparison of the different cotton production systems, what can be taken away from these findings is the need to tell the on-farm sustainability story of Australian cotton, as well as the need for sustainability data and measurements that are meaningful to key stakeholders.

Participants identified **opportunities** for marketing the sustainable value of Australian cotton. Although the cotton industry is highly dependent on the world commodity market, GR03 said the Australian cotton industry was "really well positioned with our systems and the way we do things" to reap the benefits of marketing sustainable value. For example, RE04 said "there's an opportunity to equip [the] industry and customers [...] with information that makes sense [...] through an independent voice". The rental retailer also saw an **opportunity** in bringing greater awareness around Australian cotton to consumers through storytelling collaborations with brands and retailers:

It comes down to storytelling, right. People see a video about where it lands on the runway and the amazing process of how it's grown. Like

⁹⁹ Patagonia is an American outdoor clothing company founded by Yvon Chouinard.

that's actually these days a very good story and a very good marketing formula. And it's up to businesses like us to also help with that. (RE07)

However, AG01 stressed that there needed to be a “mutual understanding” between brands, retailers and the Australian cotton industry, as well as a strategy to boost awareness around the value of Australian cotton’s sustainability to consumers:

With more global brands promoting environmentally conscious apparel, consumers are willing to purchase these higher priced products, although not necessarily aware of their added values such as cotton traceability. In the long run this would require a mutual understanding between brands and the cotton industry, leading to effective marketing strategies [which] boost consumers’ awareness. (AG01)

RE04 also saw the government could have “an important role to play” through “stricter legislation and monitoring”, otherwise “it will be up to the brands and industry to undertake the necessary due diligence to ensure any claims are verified and progress is meaningful”. TR01 suggested that the Australian cotton industry could leverage its existing “authenticity” of on-farm practices through independent verification¹⁰⁰, which could differentiate Australian cotton in the marketplace and **create value**, especially in terms of “comparison to other content claims” such as organic cotton: “a lot of value could get created” (TR01). Given the current context of misinformation around cotton production (as discussed in Chapter 4), credible claims around Australian cotton’s sustainability could assist with the industry’s competitive advantage, especially for stakeholders further down the chain, such as retailers.

6.2.3 Im/materiality and Circularity

This section outlines participants’ perceptions around how cotton **captures use value**, especially when compared to other fibres. A key finding is that Australian

¹⁰⁰ Interestingly, TR01 saw that the certification model would “diminish” in the future, noting there was “not a huge amount of value [creation]” and the reason why there are a lot of “non-for-profit certification bodies” was “because they can’t make a profit, because they don’t understand the value and they don’t adequately charge for it”. Instead TR01 postulated that retailers would instate a “self-certification model”, observing three key reasons: firstly, cost, “because then they don’t have to pay an external party”; secondly, they can control their “own the narrative”, rather than “certifiers narrative”; and thirdly retailers can “write the rules around what sustainability means for [them]”.

cotton was highly valued by spinners, and consumers liked the feel and handle of cotton. Participants mostly compared cotton to polyester, which they described as more durable, cheaper and easy to care for (i.e. such as non-ironing). **Opportunities** identified for cotton's **use value** were around mimicking qualities found in synthetic fibres, such as non-iron fabrics. Nonetheless, participants saw that cotton would be one of many fibres that retailers would use (although there might be an eventual shift away from polyester because it is a non-renewable resource). Emotional durability was identified by participants as a key strategy for keeping garments in use for longer, and cotton achieved this through its human elements such as supporting local farmers (i.e. as an important livelihood), which polyester and man-made fibres could not compete with. This section also found that the mass-market retailer was focused on increasing the use of recycled fibres and textile waste; however, the role that the Australian cotton could play within this is not clear.

Fibre qualities and branding value

Fibre quality is an important measure of cotton's **use value**. Participants AG01, GM01, GR04 and TR01 said that Australian cotton had a reputation for being high quality, consistent, and containing no "plastic contamination or insect honeydew like whitefly, sticky cotton" (GR04). AG01 said that spinners generally pay a premium for Australian cotton's **use value (captured value)** because it has "high spinning value" and they can "produce a high quality yarn to sell to fabric manufacturers". TR01 added that spinners valued Australian cotton as a pure, white fibre that was consistent (largely because of irrigation). GI02 added that consistency was due to the use of GMO seeds which "makes a whole difference to the whole supply chain right through". Comparatively, TR01 said cotton from Africa and India were "typically dirty, got a lot of trash in them in [...] [and is] not consistent which is because they're usually dryland cotton". TR01 also added that organic cotton had consistency and quality problems with colour "because the water quality can be all over the show". GR04 said this was also the argument for why Australian cotton farmers "should be getting a premium for Australian cotton because it's clean and sustainably produced". Participants stressed that Australian cotton's reputation as a high quality fibre was very important in terms of maintaining relationships with agents, mills and spinners. GR04 explained: "because our production goes up and down with very varying production [...] [it is]

our reputation that keeps the foot in the door”. In other words, fluctuating supply could jeopardise Australian cotton’s ability to **capture transaction value** in the marketplace. Nevertheless, AG01 believed that “in general there is always [a] market for Australian cotton”. The findings demonstrate that maintaining consistent and high quality cotton is important for the viability of the Australian cotton industry. Equally important in this chain was understanding how Australian cotton’s fibre quality was valued once it was turned into a garment.

Turning to the mass-market retailer’s perceptive of Australian cotton, it is important to understand that cotton was just one of many fibres they sourced. For example, RE04 said they “are a heavily natural fibre brand, but we do have the odd bit of elastane and synthetic fibre”. RE04 explained that synthetic fibres had a clear place in more fashion-forward pieces (for example, RE04 said pleating was “best achieved through synthetics”), whereas cotton and linen suited their more casual garments. Positively, RE04 said consumers wanted to see more natural fibres in the retailer’s collection:

Given the climate that we live in, breathability is really important, and so people do tend to try and go for a natural fibre over synthetic as it’s more comfortable in the Australian summer. (RE04)

The rental retailer also said that consumers saw cotton as a “more pleasant fabric [...] to wear” (RE07). RE05 described Australian cotton as being of a higher quality compared to other cotton, but said it was not a luxury fibre like Extra-Long Staple cottons such as Pima:

Australian cotton is longer, stronger and whiter than cotton grown in other areas. It’s also slightly thick[er] than Pima (for example) [and] there are some limitations on construction that can be achieved with Australian cotton. (RE05)

TR01 agreed, stating Australian cotton had “very good quality attributes for certain things” but because the staple length was “not fine enough” it could not be made into certain products such as fine shirting and bedding. Nevertheless, GM01 said “garments [made from] Australian cotton look premium and can attract customers to buy it”. The findings present Australian cotton’s material qualities as bordering the everyday and

comfortable with the potential for luxury (although not as luxurious as Extra-Long Staple cotton).

The mass-market retailer said there was a strong desire for natural fibres which mimicked synthetic properties. RE04 said they were looking for “natural fibre-based innovations that can mimic the look and feel of what is currently synthetic-based”. GR03 agreed that cotton had **challenges** in terms of “ironing”. Interestingly, GR03 saw that synthetic fibres were trying to mimic natural fibres and had “caught up in terms of performance”, stating: “we have seen ads for different things that are just straight out saying that ‘it’s just like cotton’”. In terms of fibre longevity, the rental retailer found that synthetic fibres, such as polyester, had “tended to last longer than cotton or non-polyester products” when laundered multiple times; but it was not that “longevity is horrible for cotton” (RE07). AG01 added that polyester “significantly lower costs”, which posed “constant challenges for the entire cotton industry”. However, GR03 took a wider view on cotton’s place within the fashion system; that cotton would only be one fibre of many: “you’re never going to take over the world. If you look at world textile consumption [...] we are never going to fulfil all the man-made” fibre. Rather, GR03 said that the ideal goal should be to “maintain” or “increase” consumption of cotton “a bit”. Noting the divergent views on sustainability and cotton above, as well as the demand for other fibres, the trader (GR03) saw an **opportunity** “to change the image of cotton and capitalise more on the underlying fact that it is natural and sustainable”. For example, compared to polyester, GR03 said cotton’s unique “competitive advantage” in terms of sustainability was that it was a “natural” and “renewable [fibre], as opposed to something that’s made from oil” (GR03). TR01 also added that polyester was not a viable, long-term fibre, especially as it relied on “pumping oil out of the desert”. GR03 saw an **opportunity** in promoting the “underlying” benefits of growing a “natural and sustainable” fibre that was also “good to wear”, referring to cotton’s haptic qualities such as breathability. While this is positive for Australian cotton, it is clear that there is direct competition between synthetic and natural fibres. However, sustainability is not only concerned with the physical/material properties of fibres, as participants spoke about the growing importance of immaterial value.

Interviews uncovered that the mass-market retailer sought to create emotional connections to Australian cotton which, as discussed in the Literature Review (Chapter

2), is a potent part of ensuring clothing has an enduring existence (Chapman, 2012). RE04 said that “trying to build emotional durability into our customers’ transactional items” was a “key focus” for the mass-market retailer. RE04 said emotional durability was “a really important part of sustainability” because it was linked to consumer care practices such as keeping clothing in use for longer which **created environmental and use value**: “durability of a garment is anchored on whether someone cares about it”. RE04 postulated that the “emotional connection to what we’re buying” had been lost. For example, RE04 said that consumers were “trained to expect garments to be very cheap” and “there is a re-education” that needed to happen through telling the story about the garment and where the fibre was grown: “it lends itself to someone caring about the garment more”. As discussed earlier, the mass-market retailer created a dialogue with their customers, which RE04 explained was important because they needed to “take them [consumers] on this journey” around why their goods were at a “higher price point”. RE06 added that a change in consumer mindset was necessary:

Getting the customer to understand that the concept of value [is] not just about money and buying clothes. So, you’re actually buying something that means something because it’s being made by someone and grown by someone, and it has these particular sustainable characteristics and labour characteristics that make it an item that you want in your wardrobe, rather than just going out and buying a new shirt cause you need a new shirt. (RE06)

In other words, consumers need to connect to the fact that they are not just buying an item of clothing, but they are also paying for the labour and environmental management practices that went into making it. RE06 also explained there was a **financial value** aspect to this for the retailer as well, because the verification initiative did “cost more money” which increased the price of the final product (a point raised earlier in Section 6.2.1 by RE04). A key part of the mass-market retailer’s storytelling was around explaining why the garment costs more, as well as “being able to tell those stories [about the producers] to the customer in a meaningful way” (RE06). This demonstrates that the mass-market retailer was building emotional values into their garments as part of their sustainability strategy, and using Australian cotton was a key component in executing this.

Reuse

As identified in Chapter 4, textile waste is a prominent issue within the fashion industry. RE04 said the end goal was to use “more recycled fibres”, noting that “we live on a planet with planetary boundaries, the sourcing of virgin fibres is not going to be a future focus for us”. Although recycled cotton was considered to be part of the retailer’s sustainable cotton offering, RE04 said that switching to recycled synthetics was easier to manage at the moment, although “it’s not perfect”:

We are looking more to recycled synthetics now and whilst this doesn’t deal with the issue of microfibres, it does deal with the issue of crude oil and the use of virgin resources. It’s not perfect, but we are looking to try and minimise the use of synthetics overall, and then switch out synthetics with recycled. (RE04)

RE04 said their end goal was to move away from taking “garments that can’t be resold and reworn” and “down cycling” them into rags, and instead focus on unlocking the “value in being able to reuse those fibres” (RE04). However, RE04 said there was “very little infrastructure locally to support” this, and that current technology was only at the level of small scale “pilot project[s]” or “repair style initiatives” (RE04). RE04 acknowledged that decisions around fibre choices were also important, such as whether the “advancement of technology that can deal with blends” would be accessible or if they needed to “move away from blends” altogether (RE04). Added to this, recycled (mechanically or chemically) cotton has fibre strength issues when used in yarn, making scalability and usability difficult. Recycled cotton also has implications for cotton producers. For example, GR03 saw recycled cotton as potentially decreasing the demand for virgin cotton: “we don’t necessarily want a third of the world’s annual cotton consumption to be replaced by recycled cotton”. TR01 also commented on this, stating:

The biggest thing that scares the sector is the recycl[ing] side of it, and particularly recycled cotton. If they can figure out how to recycle cotton really really well at scale, then it will kill the farmers because there is not the volume needed on it. How do you compete with that? (TR01)

While the use of recycled materials was identified by the mass-market retailer as a growing area of interest, it was not clear to them what kind of role the Australian cotton

industry would play in this space¹⁰¹. Therefore, a key **opportunity** for the Australian cotton industry would be to engage with retailers and build relationships around how and where they could play a role within the circular economy space. However, GR03 said if recycled cotton could be “blend[ed]” in a way that was economical with virgin cotton “to increase the total cotton consumption annually then that would be great”, particularly because only a “relatively small percentage” of recycled cotton can be used “to make a decent garment”. It was not clear ‘who’ would lead the charge in the recycled cotton space. For example, GR03 assumed that it would just happen one day: “it’ll happen, won’t it?” TR01 proposed that “compostable cotton” would be a “really simple” **opportunity**, but also acknowledged that it would require more value chain partnership to ensure that the dyes would not impact the environment. Added to this, RE04 predicted a future where “designers and brands are responsible for end-of-life”. RE04 said, “going forward it will be the expectation that you are producing something, so you need to give customers or equip customers with an end-of-life solution”. As clothing reuse and garment end-of-life pathways was a key strategy for the mass-retailer in this chain, it is important for the Australian cotton industry to consider the role they could play in this.

Strategies that fall under textile reuse, such as compost-ability, will be a key **opportunity** area moving forward, and one in which the Australian cotton industry is currently investing in (Cotton Research and Development Corporation, 2021a). Another point of consideration is that the rental retailer mentioned their growing influence and power in the fashion value chain, particularly as renting garments was becoming a prominent circular fashion business model. This was affirmed by the mass-market retailer who said that the collaboration with the rental retailer was important as “customer behaviour is changing” and they want to “engage with fashion [...] without the ‘burden’ of ownership” (RE04). Additionally, RE04 said that the rental partnership was also an opportunity to collect valuable insights and LCA data around garment durability and use patterns: “we will be interested to see how our garments shape up after 30 washes and 30 wears” (RE04). According to RE07, rental also **adds**

¹⁰¹ It is important to note that there are other areas of the Australian cotton industry that are actively pursuing circularity beyond the farm gate. For example, GI02 spoke about recycling plastic wrap, re-using cotton trash as either stock feed or compost and spreading it back onto farm country to improve soil health, but this is not a source of income for them.

environmental value as it re-distributes clothing and allows for multiple wearers/wears:

If an item is rented out 20 times, that's arguably 19 other times it never needed to be manufactured in the first place - 19 over 20 is a 95% reduction of the amount of inputs required to satisfy the same amount of demand. (RE07)

It must be noted here that there was not an opportunity to go back to the mass-market retailer and confirm if this partnership would in fact decrease their volume of production. In addition to **capturing environmental value**, RE07 estimated that the rental model could “double to triple” the **economic value** of clothing compared to selling a single garment, adding: “it goes to show you how much value is left on the table by the retailers who just buy it and sell it”. However, in order to actually achieve these benefits, RE07 said that “the real important formula in rental is longevity”, and polyester performed slightly better than cotton when laundered multiple times. Nevertheless, RE07 said polyester was not perfect and microplastics were an area of concern. Noting the rising influential power of the rental retailer, and the competitive advantage of polyester products within this model, there could be potential implications for cotton and its preference as a fibre. Overall, this section has established that circularity is a way to enact sustainability and reduce impacts. As such, circularity is on the long-term agenda for the fashion industry globally, which has implications for all fibre producers.

6.3 CONCLUSION

The above analysis of ACVC 2 identified that ‘pulling’ Australian cotton through the globalised chain was challenging. Verification technology emerged as a critical tool to ensure that products were made with Australian cotton, particularly as there had been instances of grey cotton. While power relations across the chain were not always straightforward, many participants perceived that the retailer was the most powerful actor as they controlled, influenced and set chain requirements. In general, participants perceived that actors in the middle of the value chain (such as merchants, agents, spinners, textile and garment manufacturers) were disengaged from the transfer of **societal** and **environmental values**, unless certifications were required (e.g. BCI).

For example, the trader and the agent supported the sustainable production of cotton, but they were largely focused on the **economic value** derived from trading cotton and meeting market demand.

The mass-market retailer in this chain defined sustainable cotton as BCI (which Australian cotton is benchmarked to), organic cotton and recycled cotton. However, the mass-market retailer spoke about the convoluted nature of defining sustainability (particularly as sourcing Australian cotton was just one product strategy), which highlighted the complexities around communicating sustainable value to a wide audience (consumers). The retailer defined Australian cotton's sustainable value as relating to labour practices (i.e. no child labour) and supporting local farmers; however, environmental practices were harder to define. Localness was a key theme in this chain, both in terms of how the retailer framed their sustainability strategy and how consumers bought into Australian cotton as a way to 'support Australian farmers'. In contrast to ACVC 1, the mass-market retailer perceived that localness framed consumers' willingness to pay a premium for the Australian cotton product and its story. However, this additional **economic value** went to the mass-market retailer and not to the Australian cotton grower. In addition to this, participants were of the view that retailers and consumers were not willing to pay a premium for traceability or sustainable cotton practices, which also occurred in ACVC 1.

While the grower highlighted that significant effort had been directed to on-farm practices which enhanced (rather than damaged) the environment, translating this to consumers and retailers was an area of **uncaptured value**. This highlighted gaps in knowledge around sustainable cotton, particularly around how to communicate what sustainability looks like on-farm (which the growers in ACVC 1 **captured** quite well). A key finding in this chain was that a shared definition around sustainable cotton farming was lacking, and there was an inability to readily communicate credible and measurable claims around Australian cotton's on-farm sustainability impacts to key stakeholders. Further to this, the mass-market retailer said that customers cared about issues that were relevant to their 'own backyard'. For example, the issues around social licence to operate, particularly in regards to water use with cotton production (also raised in ACVC 1), were present in this chain. The retailer was also sceptical of sustainability information from the Australian cotton industry, and looked to

independent sources and certifications for sustainability information. Therefore, when it comes to sustainability, the message is just as important as the messenger.

The retailer pointed out that power within the global value chain was not straightforward, and size and scale were key factors that affected who could influence chain flows. Despite this, upstream participants emphasised the point that the retailer was key to bringing sustainable values through the chain as they pick and choose what is important, and in turn, play a key role in defining and communicating sustainability to the end consumer. In terms of **use value**, participants were confident that cotton was positioned in consumer minds as a more sustainable fibre when compared to synthetic fibres. The mass-market retailer’s focus on recycled fibres and end-of-life solutions signalled that the Australian cotton industry must focus its sustainability efforts beyond farming cotton as a crop, and encompass cotton as a reusable resource that can be composted back onto the farm. Table 13 below outlines the key findings from ACVC 2, and the following Discussion chapter will draw together the findings from Chapters 5 and 6.

Table 13: Summary of ACVC 2 Findings

Theme	Findings
Connectedness	<p><i>Chain structure</i></p> <ul style="list-style-type: none"> - There was a strong perception across the chain that the retailer was the key actor who defined sustainable value. There was tension around ‘who says’ what sustainable value is and ‘who pays’ for the creation of that sustainable value. - The connection to the retailer was key to ‘pulling’ Australian cotton through the chain and communicating its sustainable value to consumers. - Interviewees said that Australian cotton’s on-farm traceability and sustainability practices did not attract a premium. - A product narrative (via digital marketing and product labelling) created a dialogue with consumers and captured transaction value for the retailer. The ‘supporting Australian farmers’ strategy, according to interviewees, resonated with consumers and influenced their willingness

Theme	Findings
	<p>to pay. However, this premium went to the retailer (and covered verification and supplier costs), and it was not clear if the cotton grower received a premium.</p> <p><i>Traceability</i></p> <ul style="list-style-type: none"> - Fibre verification captured use and transaction value through identifying risks, and ensuring accurate product claims for the retailer, especially as instances of ‘grey’ cotton emerged. - Complexity, costs and supplier relationships were key challenges around the scalability of traceability.
Communicating Australian cotton’s sustainable value	<p><i>Communicating on-farm environmental and social management practices</i></p> <ul style="list-style-type: none"> - The locally made, ethical cotton story was strong, but environmental sustainability on-farm was less understood by the retailer. - There was a perception that consumers felt conflicted about Australian cotton: wanting to support local, but also concerned about water use. Negative views and misconceptions around Australian cotton’s water use was an area of uncaptured value. - The lack of information sharing between the retailer and the grower around consumers’ perceptions of Australian cotton’s sustainability was an area of uncaptured value. <p><i>Cotton identity programs</i></p> <ul style="list-style-type: none"> - Using Australian cotton was one sustainable product strategy for the mass-market retailer. The retailer defined sustainable cotton as BCI (which is benchmarked to myBMP), organic and recycled cotton. - The cotton sustainability program myBMP was perceived to capture sustainable value on-farm, while BCI captured market value. - The middle chain actors were perceived to not be concerned with the transfer of societal and environmental value, unless certifications were a requirement. It is likely that a range of sourcing approaches will be employed by retailers’ depending on their willingness to pay: from ‘cotton is cotton’ to BCI to organic cotton.

Theme	Findings
	<p><i>Credible claims and measuring sustainability</i></p> <ul style="list-style-type: none"> - Credible, understandable and measurable claims around on-farm impacts was an area of uncaptured environmental value. - There was an opportunity for storytelling collaborations (based around showcasing Australian cotton’s sustainable value) between Australian cotton farmers and retailers. - Sustainability information from Australian cotton industry bodies was viewed with scepticism, whereas there was a clear desire for independent sources and certifications.
Im/material and Circularity	<p><i>Fibre qualities and branding value</i></p> <ul style="list-style-type: none"> - Australian cotton’s consistency and high quality captured use value, however there was a desire for natural fibres which mimicked synthetic properties (e.g. non-iron fabric). - Natural fibres were seen to be more environmentally friendly (i.e. natural and renewable) compared to synthetic fibres. - Building consumers’ emotional connections to clothing through telling the story of a garment’s journey (e.g. fibre origin) was a key focus for the retailer. <p><i>Reuse</i></p> <ul style="list-style-type: none"> - The mass-market retailer was focused on increasing their use of recycled fibres and finding solutions for garments at the end of their life; but the role that the Australian cotton industry could play in these areas was not clearly defined. - Recycled cotton was perceived by growers to be a threat to virgin cotton production. - Composting cotton as an end of life strategy was seen as a key area of opportunity.

Chapter 7: Discussion

The 'push' and 'pull' of Australian cotton's sustainable value

Through cross-analysis of the two alternative Australian cotton value chains at the heart of this research, this chapter unpacks the 'dance' that actors engage in as they pull and push Australian cotton and its sustainable value through the value chain. The term 'dance' is used to illustrate that the concepts around sustainable value are not static. Rather, they are constantly moving and being negotiated between the actors. In tracing the push and pull 'dance', this chapter reveals the factors within the globalised value chain that enable, amplify, accelerate or limit the transfer of the sustainable value created on-farm. Cross-analysis elucidates power dynamics in these chains, tensions around how to measure and communicate sustainability on-farm, and knowledge gaps/absences needed to support shared understandings, and opportunities to engage with circularity.

7.1 UNRAVELLING VALUE CHAIN POWER DYNAMICS

In this subsection, I explore the value chain structure and power dynamics that either contributed to or constrained the transfer of sustainable value. Based on the analysis of both ACVCs 1 and 2, I argue that in order to extract sustainable value on-farm, the cotton needs to be 'pulled' through the chain by the retailer.

7.1.1 Chain structure

The two chains in the present study are the best articulation of local, traceable and potentially circular chains currently possible, which is why they were the focus of the study rather than the commodity chain. The commodity cotton value chain mostly operates under a market governance model, in which value chain actors are at arm's length and fragmented (Gereffi & Fernandez-Stark, 2016). This is because in the commodity market, actors will accept cotton supply from wherever they can get it and

blend different qualities together to make yarn at a certain specification at a certain price (as identified in Chapter 4). The gate prices across both chains demonstrated that using 100% Australian cotton added an additional cost compared to buying cotton as a commodity (see Appendix F). My findings have affirmed previous research that fashion supply chains are buyer-driven, whereby retailers are the dominant leaders in the chain, and they have a demand-pull relationship with the suppliers along the chain (Gereffi & Appelbaum, 1994). While ACVCs 1 and 2 are different to the commodity chain, and to each other in terms of structure and size, each chain exhibited a high level of coordination amongst actors to ensure that Australian cotton was processed along the chain into a final product. Based on the evidence in this study, varying levels of power were held between actors in the value chain, which contributed to the ease with which Australian cotton could flow through the chain. In ACVC 1, the growers took the traders out and doubled their **economic value** of the cotton through owning the cotton as it was processed by the manufacturers, and absorbing the stockpiling margins traditionally added. The quality of Australian cotton, combined with offering smaller minimum quantities, made it easier for niche retailers to lean into using Australian cotton. The converter played a key role in ‘pushing’ the Australian cotton through the complex and convoluted chain towards the niche retailers. In ACVC 2, the mass-market retailer did not deal with the spinner or fabric mill directly, but requested their garment and textile suppliers to source Australian cotton through a specified cotton trader. In terms of who drove demand in the chain, it was clear in ACVC 1 that the grower and converter were generating demand while ‘pushing’ the cotton towards the niche garment manufacturers and retailers, whereas in ACVC 2, the retailer saw using Australian cotton as an opportunity for market differentiation, hence they used their buyer-power to ‘pull’ the cotton through the chain via their suppliers. Connected to this, participants acknowledged that current fashion production and consumption needed to become more sustainable, and change needed to happen. However, participants took different approaches to actioning this change based on their position in the chain.

Interviews with participants across the two diverse value chains demonstrated that within the Australian cotton value chain, actors possessed different values, agendas and commitments towards sustainability. When participants defined sustainability, they referenced the language of Elkington’s (1998) Triple Bottom Line

(i.e. environmental, economic and social aspects) in a hierarchy, rather than ‘in balance’. Participants spoke about how **economic value** was entwined with environmental aspects (i.e. for farmers: water and chemical use), social aspects (i.e. for farmers and retailers: on-farm labour practices, supporting local farmers and communities) and use aspects (i.e. for retailers: longevity, quality). It was not surprising that **economic value** was the main priority, as this is in line with the dominant market-based capitalist society paradigm. This section will now take a closer look at sustainable value across different stages.

Starting with the cotton production stage, it was clear that the cotton growers followed best practice standards on-farm, which in turn created **environmental** and **societal value**. The farmers demonstrated a sophisticated understanding of sustainability on-farm, particularly related to water consumption, soil health and biodiversity. The farmers prioritised farming practices that were environmentally sustainable and took a long-term view of their **economic** and **environmental value** creation. Yet, the farmers’ decision to grow cotton was based on which crop would deliver the highest financial return for the land and resources (such as water and labour). For the growers, there was a direct correlation between **transaction** and **environmental value** with a focus on efficient use of resources and high economic outputs, which aligns with the neo-liberal economic productivity paradigm. Farmers also spoke about the benefits of growing cotton in rural regions, which included the generation of employment and economic activity. Altogether, these practices reflected the TBL notion of environmental and social management, as well as profit. Farmers were also interested in how the **sustainable value created** and **captured** on-farm was transferred along the value chain, hence their investment in communicating this value to stakeholders further up the chain. Across both chains, the farmers acted as partners (rather than suppliers) with the retailer, and in turn, influenced how Australian cotton’s sustainability was valued. Similarly, Ecker’s (2010) research found that a farmer as partner approach assisted and underpinned the development of sustainable supply chains.

Turning now to how retailers approached sustainability, the niche garment manufacturers and retailers in ACVC 1 demonstrated a whole of chain approach when considering their sustainability impact, which aligns with Fletcher’s (2011, p. 170) and Black’s (2008) notions of slow fashion and sustainable design. For example, the niche

retailers took a more radical and disruptive approach to garment production, and focused on the use of natural materials, local manufacturing, garment longevity, free repairs, zero waste or use of textile waste, and end-of-life pathways. Here, the niche garment manufacturers and retailers focused more on how they implemented sustainability as part of their design process. Interestingly, SP01 in ACVC 1 shared similar values, and sought to omit material that was unethical or not environmentally friendly, whereas the mass-market retailer in ACVC 2 focused on local sustainability, and in particular, intertwined their Australian heritage branding with ‘looking after’ the Australian environment and community. The mass-market retailer focused on supporting local fibre producers and environmental sustainability through their materials hierarchy, as well as end of life and reuse initiatives (i.e. rental and second-hand clothing collaborations). The differences between the two retailers are likely due to their size. Interestingly, the mass-market retailer said they had limited control over their production and had trouble influencing suppliers, especially in instances where they were only a small customer. In other words, the mass-market retailer perceived that commercial power within the value chain was not always clear cut. The mass-market retailer closely aligned with Savitz and Weber’s (2007) definition of companies transitioning to more sustainable practices/products. This falls into the incremental improvement and ‘business as usual’ paradigm, and showcases the constraints on sustainability within capitalism. Across both chains, commercial viability was paramount to participants: they sought to reduce the environmental impact of garment manufacturing, as well as to promote longevity and circularity pathways for garments. In any case, it is clear that economic imperatives are a key driver for the actors across both chains. This also reveals new insights into how sustainable values held by actors influence value chain dynamics.

Interviews also revealed points of tension around who should receive the economic value (if there is any) for sustainable cotton practices. The mass-market retailer in ACVC 2 was worried about the price and cost of sustainable cotton, and saw that supporting BCI was a way to ‘push’ the scale of change towards more sustainable cotton production. There has been scant research around the role of the BCI program within global value chains. However, one study examines the role of regulatory intermediaries of BCI within India and Pakistan, which moves this discussion into a question of who has the power to define sustainable cotton (Riisgaard et al., 2020).

This research found that international retailers proclaim that “customers are often unwilling to pay extra for sustainably produced commodities” and ‘push’ costs down the chain towards producers, even though there is more effort, energy and time required for farmers to meet sustainability standards (Riisgaard et al., 2020, p. 221). Here, “lead firms [...] define and govern sustainability at a distance” which reflects the structural power dynamics within global value chains (Riisgaard et al., 2020, p. 217). This was affirmed in the present study as the mass-market retailer did not expect to pay a premium for BCI cotton. Separate to this, the mass-market retailer found that the Australian cotton collaboration was commercially successful as consumers were willing to pay a premium to the retailer. However, RE04 said this premium was a reflection of the additional cost of verification and suppliers (instead of an additional margin for the retailer), whereas in the ACVC 1 chain the niche retailers said that Australian cotton meshed nicely with their brand and product quality, but consumers were not willing to pay a premium for it. The growers in ACVC 1 were sceptical about whether or not BCI directly added value to them (although they were not accredited at the time). Particularly, GR01 and GR02 spoke about the loss of economic returns in relation to the time and money it took to get accredited through the myBMP program, citing that it was the merchants who reaped the financial rewards of BCI. GR01 and GR02 strongly believed that if they were the ones generating the sustainable value on-farm, then they should get paid for it. Clearly, the cotton growers in ACVC 1 saw sustainable value as being realised when there was a premium attached to their cotton. However, a premium was not always clear, whether for BCI or in this case for Australian cotton, which demonstrates that growing Australian cotton sustainably could be considered as a baseline, rather than as a factor for which growers can necessarily receive added economic value.

Impediments to scaling 100% Australian cotton supply chains were related to external market forces, lack of an integrated value chain approach due to the highly segmented nature of the global textile and fashion industry, and a huge disconnect between producer and consumers. In the commodity chain, the Australian cotton industry mainly exports cotton to spinners in Asian countries rather than directly to retailers. In other words, there is no direct ‘pull’ through the chain. In turn, once the cotton leaves Australian shores, the industry is effectively locked out of the chain and does not have control over how the cotton is processed and what product it is turned

into. Similar to Ecker's (2010) findings, participants perceived that middle actors were disengaged from the transfer of sustainable value, except in instances where certifications were a requirement (i.e. BCI). One notable exception in this study was the spinner (SP01) in ACVC 1. The trader (GR03) in ACVC 2 acknowledged that market advantages for Australian cotton were attributable to having cotton certified (i.e. BCI); however, it was clear that market access and price were the most important attributes. In other words, a premium for certified sustainable cotton was not guaranteed as it depended on the buyer and the market. The trader explained that depending on market demand and willingness to pay, the cotton market fell on a spectrum from organic cotton to 'cotton is cotton'. Interestingly, the spinner in ACVC 1 sought to prevent the processing of 'unethical and unsustainable' cotton, which reflected 'strong sustainability' ideals, as outlined by Daly (1992). This is important to note as participants in the chain spoke about cheating and substituting cotton as a common practice at the yarn manufacturing stage in the commodity chain. The Welspun case, where products were fraudulently sold as Egyptian cotton, was frequently referred to during interviews. Particularly, participants in ACVC 2 noted that it was the Egyptian farmers who were the losers in this case, and they received consumer and brand 'push' back. TR01 warned a similar situation could unfold with Australian cotton if the branding and marketing of products were not preserved and protected. Therefore, the ability to trace cotton through the chain was important for brands, retailers and cotton growers, especially when it came to managing product risks and reputations. However, findings from this study demonstrated the complexity of sourcing Australian cotton, especially as instances of 'grey' cotton emerged.

7.1.2 Traceability

The complexities around traceability at the spinning mill are largely due to going against the dominant practice of blending cotton of different fibre qualities together to achieve a yarn specification at a certain price. As blending is a widely dominant practice of **value creation** that has been locked in over time (and, as participants noted, this practice is often supported by retailers), any change to the prevailing operation is likely to be met with strong resistance. Participants recommended re-shoring production as a way to achieve more control over Australian cotton as it was turned into yarn. In particular, there were strong calls in ACVC 1 to re-shore manufacturing

as a strategy to lock in the integrity of the fibre (this theme was not strong in ACVC 2). Participants in ACVC 1 described the commodity chain as a ‘broken chain’, in the sense that the spinning of Australian cotton was offshored. As discussed in Chapter 4, there was renewed interest in re-shoring and right-shoring manufacturing, which may present local manufacturing as a far-horizon opportunity. However, participants also saw that if Australian cotton could be independently verified along the value chain, then locally spun cotton would not be needed.

Yet, the high cost of traceability was identified as another notable barrier, especially as retailers were not very supportive of increasing their costs to include traceability. In fact, TR01 doubted whether traceability would become mainstream. Traceability also presented risks for the Australian cotton industry, especially around supply (with the ebbs and flows of drought), which could set up unrealistic expectations with stakeholders. Additionally, taking the traders out and scaling the storytelling model may not be feasible, particularly as the merchant in the commodity chain provided a link between the farmer and spinners, as the farmers’ selling times do not coincide with spinners’ buying times. As farmers and retailers rely on actors in the middle of the chain (such as merchants, agents, spinners, textile and garment manufacturers) to transfer sustainable value, they would be an important focus for future interventions; which was a similar recommendation in Ecker’s (2010) research. However, difficulties around existing trade relationships and the international nature of production were identified. For example, participants said a change in supply chain relationships was usually required at the spinning and/or textile stage so that Australian cotton could be ‘pulled’ through, and mills usually required large orders of Australian cotton to justify spinning. Participants spoke about sustainable cotton initiatives providing a sourcing standard, but in reality, sourcing was messy and there was contamination present at the mill/spinning stage. In these ways, the middle of the chain actors’ ability to transfer sustainable value is constrained by locked in practices. It is evident that market forces alone cannot drive sustainable fashion value chains, despite growing consumer awareness. Rather, the ability to **capture**, **create** and transfer sustainable value depends on whether actors in the value chain share similar values and/or approaches to sustainability.

7.1.3 Storytelling

Retailers across both chains marketed products as ‘Australian grown cotton’ and used a storytelling narrative around the origin of the fibre to communicate and raise interest in Australian cotton’s sustainable value to consumers. As such, tracing the cotton back to the farm was a key characteristic for both the chains in the present study. Participants acknowledged that the value of traceability was in giving the retailer confidence to make product claims about the fibre origin, as well as a tool to understand risks in the supply chain, noting that cheating and falsely labelled cotton was a common problem. Participants across both chains, including the growers, trader and the verification provider, either had experienced or developed a strong perception that retailers and consumers were unwilling to pay cotton farmers a premium for traceability or sustainability attributes. However, the retailers in ACVC 2 achieved a premium for Australian cotton from consumers (although at the time of the interview they did not have an estimate on the exact premium). A method of communicating the sustainable value of Australian cotton in ACVC 2 was through creating a dialogue with the consumers, which included a feature on their website, promotion via the retailer’s social media account, and product labelling (i.e. a swing tag which indicated the product was made from Australian cotton). A prominent finding from this study was that a strong product story (which links the fibre origin, product and branding) assisted in the transfer of Australian cotton’s sustainable value. For example, the findings from the study demonstrate that where retailers can verify and communicate sustainable value to their customers and embed this in their brand story, consumers are more likely to pay for sustainability. In this instance, the retailers in ACVC 2 found that the local, farm connection influenced consumers’ willingness to pay a premium for cotton products. As Ha-Brookshire and Norum (2011) argue, however, consumer willingness is contingent on the target market. For example, they found that organic or sustainable fashion products appealed to younger female consumers, and many respondents were willing to pay \$5 or more extra for a t-shirt (retailing at \$30) which contained organic, sustainable or cotton grown in the United States (Ha-Brookshire & Norum, 2011). Conversely, retailers in ACVC 1 perceived that consumers were mainly concerned with price, fit and style, while the Australian cotton story was an “added bonus” (RE01), and did not translate into additional **economic value** for the grower. There is research that supports the notion that willingness to pay a premium for sustainable fashion rests on complex intersections with consumer target markets, and that fit, style,

colour, quality and price are the most prevalent factors in purchasing decisions (Entwistle, 2009; Niinimäki, 2010; Ottman, 2011; Visser et al., 2015; Yan et al., 2019). Previous research also found that consumers were unwilling to pay higher prices for sustainable products (Radhakrishnan, 2017), and eco-aspects could only add value for the consumer if the product was attractive (Niinimäki, 2010), cost no more and did not compromise quality (Carrigan & Attalla, 2001). As the use of Australian cotton became a market advantage for the mass-market retailer, this section will now examine the factors that enabled this.

The differing results between the two chains could be explained by exploring how the retailers marketed their ‘Australian cotton’ products, as well as the different approaches to ownership of the Australian cotton and sustainable value narrative. For example, in ACVC 2 the retailers developed a marketing campaign that showed a farmer in the cotton field wearing the ‘Australian cotton’ product with an accompanying feature about Australian cotton sustainable farming practices, specifically around soil health and water efficiencies. The campaign was also shared via the retailer’s social media account, and the products were labelled ‘made from Australian cotton’. The mass-market retailer’s ‘Australian cotton’ story was strategically developed to **create** ‘intangible’ **use value**, which appealed to their consumers’ desires, aspirations and sustainability awareness, while at the same time connecting to the tangible garment in the fashion image, to inspire consumers to buy the product (Entwistle, 2009). Here, the storytelling enabled an emotive connection with the consumer, and Australian cotton’s local story was an engaging, authentic use of narrative, and implied that buying this product would support Australian farmers’ livelihoods. It is important to note that while the retailer achieved a premium in ACVC 2, this **economic value** was **not captured** by growers, whereas in ACVC 1, the marketing of Australian cotton’s sustainable value was predominantly grower-led. As discussed earlier, the growers used symbolic (through images) and substantive (through LCA data) sustainability to communicate how their farm captured sustainable value, which was shared via their social media account. Interestingly, previous research found that heritage and local production were important themes in sustainability marketing, and ‘locally made’ has been found to positively influence consumers’ willingness to pay (Niinimäki & Hassi, 2011; Tey et al., 2018; Veit et al., 2018). However, Visser, Gattol and Helm’s (2015, p. 8431) study testing respondents’

buying intentions with an advertisement emphasising local production over global production found “no significant difference”. Visser, Gattol and Helm (2015, p. 8431) postulated that this may have been due to respondents’ unfamiliarity with the brand, in which case, “results might be different for a well-known brand”. This is significant, as the mass-market retailer in ACVC 2 is well-known and appeals to a wider audience/target market, whereas RE02 in ACVC 1 acknowledged that their product appeals only to a certain customer. It was interesting to note that the niche garment manufacturers and retailers had a clear set of parameters around sustainable fashion (i.e. use of environmentally friendly, natural fibres), whereas the mass-market retailer took a broad approach to sustainability. The mass-market retailer also spoke about the challenges and complexity around defining what is sustainable, and in particular, managing both consumers demands and perceptions around sustainability. Nevertheless, both retailers in ACVCs 1 and 2 shared an interest in the transfer of Australian cotton’s sustainable value. However, the findings across both chains demonstrated that if there was **economic value** to be **captured** around Australian cotton’s sustainability, this value went to the retailer, rather than to the grower.

Furthermore, Chapter 4 established that there are a few Australian cotton campaigns and collaborations with mass-market retailers, and the growers had two different perspectives around the value this **created** for the Australian cotton industry. For example, GR01 and GR02 in ACVC 1 saw no tangible, **financial value** going back to the farmers from these campaigns. On the other hand, participants in ACVC 2 saw that intangible value was created as consumers ‘felt good’ about Australian cotton’s sustainability practices, and the campaigns got Australian cotton’s sustainability story ‘out there’ to consumers and the public. This suggests that even though **economic value** (tangible value) was not likely to flow back down the chain to the growers, value was added through positive perceptions (intangible value) around the industry and its sustainability practices. Both ACVCs 1 and 2 demonstrate that actors could co-**create** chains which better incorporate Australian cotton’s sustainable value¹⁰², but it was

¹⁰² Similarly, Ecker’s (2010, 289) PhD research proposes that actors can either “accept the dominant paradigms of production or consumption”, or can co-create new systems; but the later approach relies on relationships based on shared sustainability values, as well as interventions and arrangements which support the “resistance to dominant” systems.

clear that retailers were the key influencers of how material and information flowed along the chain.

The question around scalability and sustainability impacts remains, especially in relation to the volumes of cotton generated through these value chains. For example, the growers in ACVC 1 estimated around 54 bales of cotton were sent to the spinner, and in ACVC 2, GR04 estimated that “less than 10,000 bales” were used in the mass-market retailer’s capsule collection. Based on the industry average of 3 million bales of cotton¹⁰³, the cotton sold as part of ACVCs 1 and 2 would equate to, respectively 0.002% (ACVC 1) and 0.33% (for ACVC 2) of total production. Compared to BCI, which had 48 licenced Australian farmers (Better Cotton, 2020, 2021b)¹⁰⁴ produce 31,000 metric tonnes of BCI lint in the 2019–20 cotton season, this equated to less than 5%¹⁰⁵ of Australian cotton. It is important to recognise here that these are small amounts of cotton going through the value chain (with BCI cotton at 5%, and ACVCs 1 and 2 less than 0.4% combined), compared to the commodity chain where more than 90% of Australian cotton is sold (and it is not known into what chains this cotton goes). While both ACVCs 1 and 2 are in the early stages of development, and participants anticipated them growing in the future, it could be hypothesised that the ‘storytelling’ model will continue to be one tactic for Australian cotton’s marketing. However, due to the small volume of fibre used in both value chains, it is also hard to know the sustainability impact when compared to larger supply chains, which arguably have a significantly higher impact due to their scale.

This section has explored the value chain structure and power dynamics that were identified by participants as having contributed to or constrained the transfer of Australian cotton’s sustainable value¹⁰⁶. Table 14 below outlines these factors.

¹⁰³ Noting that the supply of Australian cotton can vary quite considerably, as mentioned in Chapter 4, (Cotton Australia, 2021j; Biki, 2021).

¹⁰⁴ However, Cotton Australia data estimated the figure to be around 68 growers (Cotton Australia, 2021d).

¹⁰⁵ Using the average of 3 million bales (680,000 metric tonnes of cotton) (Australian Cotton, 2021a).

¹⁰⁶ It should be acknowledged that the conceptualisation of how and which factors contributed to or constrained the transfer of sustainable value draws on Ecker’s (2010) idea to identify ‘drivers of and impediments to the transfer of sustainability values in the case study of supply chains’.

Table 14: Chain structure and power dynamics that contributed to or constrained the transfer of sustainable value

The factors that <i>contributed</i> to the transfer of sustainable value	The factors that <i>constrained</i> the transfer of sustainable value
<ul style="list-style-type: none"> • Whole of value chain organisation • Awareness and concern about sustainability issues facing the fashion industry • Fibre verification enabled credible product claims and assisted in identifying supply chain risks (i.e. substituted cotton) • Certifications assisted with the transfer of sustainable value, particularly with middle chain actors • A product story/narrative linking the fibre origin, product and branding • Potential market advantage (i.e. certifications, sustainable product narrative) • Value chain actors shared an interest in transferring Australian cotton’s sustainable value, but the retailer was the key influencer of material and information flow along the chain 	<ul style="list-style-type: none"> • Tensions around who pays for sustainability on-farm • A premium for sustainable cotton was not guaranteed for growers • Sustainability practices may be considered a baseline requirement • The distance between growers and retailers in the value chain • Middle chain actors disengaged from the transfer of sustainable value, unless certifications were a key requirement • Complex global supply chain relationships, organisation and market forces • Locked in practices (e.g. blending at the spinning stage) • Financial resources, such as time and traceability costs • Small market size and demand

7.2 COMMUNICATING AUSTRALIAN COTTON’S SUSTAINABLE VALUE

Marketing was a key mechanism for raising awareness around the sustainable value of Australian cotton products to consumers. My research found that understandings around Australian cotton’s sustainable value differ due to the complexity of cotton production, as well as the differences between cotton identity programs. Drawing on participants’ perceptions and experiences, I argue that making farming practices visible is critical to the transfer of sustainable value, and the Australian cotton industry should co-create sustainable marketing strategies with key stakeholders.

7.2.1 Australian cotton's sustainable value

My research demonstrates that the retailer plays a crucial role in communicating Australian cotton's sustainable value to the consumer. Participants perceived that brands were the 'mouthpiece' to consumers and an important relationship for the Australian cotton industry to have in order to get the industry's sustainability story 'out there'. In terms of Australian cotton's sustainable value, participants said the 'locally made', 'ethical cotton' story was much stronger than the environmental sustainability credentials/efforts around Australian cotton. The mass-market retailer was 'comfortable' with Australian cotton's labour practices because of Australian laws, especially as this retailer was generally more concerned about forced labour and child labour in developing countries. In terms of contributions to society, participants said the Australian cotton industry generated economic activity and employment in rural communities. Participants acknowledged that Australian cotton farmers responsibly used resources, and farmers said they were constantly looking to make improvements to their soil health, water consumption and chemical use. However, **environmental value** aspects were less clearly understood by retailers when it came to on-farm practices.

Through looking at each stage along the chain, what becomes apparent very quickly is the limited nature of value chain knowledge held by different actors. For example, the spinner in the commodity chain does not understand the complexities of two different consumer market segments as this knowledge is held by the retailer. Likewise, cotton farmers do not know how to spin cotton into yarn, and retailers would not know how to manage the cotton crop from farm preparation to harvest. Within this, each actor had a depth of knowledge and understanding around the various practices and their sustainability within their stage, and some of this knowledge was partially visible and some was not as easily shown. The Literature Review (Chapter 2) established that communicating sustainability was complex due to the fragmented nature of supply chains, which in turn, has led to very narrow approaches to sustainability through the lenses of environmentally friendly and/or ethical materials and processes (Niinimäki, 2010). More importantly, the Literature Review (Chapter 2) revealed a gap in knowledge as to whether or not perceptions around sustainable value were aligned within the context of the value chain. This present study addresses this gap by showing how participants identified both real and perceived barriers to creating

sustainable value with Australian cotton, highlighting that varied understandings of Australian cotton and sustainable value existed. This is an important contribution to knowledge as clearer perspectives are needed to further advance understandings around what constitutes sustainability (Thomas, 2008). A distinct contribution of this study is in the development of concepts and constructs around how Australian cotton farmers **create** and **capture** sustainable value through on-farm practices that can be used to communicate to key stakeholders.

Knowledge related to understanding environmental sustainability on-farm was built as an interactive process between the grower, converter and retailer in ACVC 1. The growers distinguished their cotton by visually conveying symbolic sustainability through images of ‘what sustainability looks like on-farm’ and ‘who’ is impacted (i.e. the frogs and snakes (biodiversity) on-farm), as well as substantive sustainability through ‘how much’ and ‘what inputs’ are needed to produce cotton (i.e. LCA data). Additionally, growers in ACVC 1 used their data on water consumption to show that water use was lower than the widely cited World Wildlife Fund (2013) figure which stated that 2700 L of water was required to make a t-shirt. Retailers in ACVC 1 described this as powerful and compelling, and ‘pushed’ this message out through their social media account, as well as to retailers. Similar to ACVC 1, the grower in ACVC 2 saw farm tours as an important part of ‘showing’ how sustainability is managed on-farm. However, the mass-market retailer found sustainability information around Australian cotton’s water and chemical use was too technical and hard to translate, and they were also interested in further understanding biodiversity on-farm. The mass-market retailer also felt unequipped to talk about Australian cotton and water use, particularly during times when there were negative stories about the industry in the media; this led to a ‘winding down’ of communication about their collaboration. Therefore, it is important that stakeholders have understandable information around Australian cotton’s sustainability.

What is interesting here is that participants in either chain did not refer to the Australian Cotton Sustainability Report (Cotton Australia & Cotton Research and Development Corporation, 2019) when discussing cotton sustainability measurements and practices. While the Australian cotton sustainability report does speak to environmental, social and economic indicators, information was presented as either the percentage of reduced water use, water use “per bale” or per hectare (Cotton

Australia & Cotton Research and Development Corporation, 2019, p. 10). This study has found that translating scientific information around on-farm environmental practices (such as water use, chemical use and biodiversity) and input measurements to a generalist audience is critical in transferring sustainable value to actors downstream in the value chain. As evidenced in ACVC 1, connecting sustainability data with storytelling was also an effective way to communicate the complex and multidimensional aspects of on-farm sustainability to relevant stakeholders. Participants said that the value of sustainability data also lay in supporting sustainable business decisions and actions for retailers, such as sourcing materials which have the least impact on the environment, and communicating this to consumers. These insights could be applied by the Australian cotton industry in the form of education or communication campaigns, which would be undertaken in partnership with retailers. This could also include the development of other communication tools such as simplified labels or codes that could be scanned by consumers if they want to know more about Australian cotton and sustainability on-farm. These insights present stepping-stones for further theorisation around the effective communication of sustainable value (Han et al., 2017; Li & Leonas, in press; Dahlstrom, 2014), as well as lessons that the broader Australian cotton industry can adopt to increase stakeholder knowledge and engagement.

7.2.2 Cotton identity programs

Before turning to a discussion around cotton and sustainability identity programs, it must be noted that the retailers across both chains took different approaches to defining sustainable fibres. In ACVC 1, the retailers only used natural fibres, which included Australian and organic cotton, but also wool and silk, whereas in ACVC 2, the mass-market retailer used predominantly natural fibres with a small amount of man-made fibres. The mass-market retailer in the study defined sustainable cotton as either BCI (to which Australian cotton is benchmarked), organic cotton and/or recycled cotton. The mass-market retailer acknowledged many **challenges** around communicating cotton's sustainability to consumers, and relied on attribute signalling through certifications, labelling, marketing and product sustainability narratives/dialogues, as well as sources they trusted (e.g. the Higg MSI, Textile Exchange) to make decisions and communicate sustainability to their consumers.

Previous research revealed that retailers relied on labels as a way to ‘communicate’ sustainability practices and approaches¹⁰⁷ (Henninger, 2015; Thomas, 2008; Morris et al., 2021; Mukendi et al., 2020). It must be noted, however, that cotton sustainability programs do not decrease production volumes, which is arguably required to address the root of fashion’s sustainability problem.

Interestingly, participants spoke about tensions around shared definitions of sustainable cotton (i.e. certifications and labels, organic cotton versus conventional cotton) and a lack of adequate data around sustainability, especially around environmental attributes. In particular, the mass-market retailer said that cotton’s sustainability was complex due to the different types of cotton farming programs, and it was hard to explain the nuances between the programs to consumers. For example, Australian cotton was hard to define because it was not organic, but not conventional, but also fell under BCI, but was different to BCI.

The growers in ACVC 1 were critical of BCI for not quantifying specific measurements and standards to concretely say *in what ways* the cotton was sustainable. Therefore, in instances where on-farm practices were not measurable, participants perceived this as ‘paying lip service’ to sustainable value¹⁰⁸. The growers also argued that BCI not only **failed to capture value** on-farm, but also failed to transfer this value to retailers and consumers. This was, in one sense, affirmed when the mass-market retailer in ACVC 2 confessed that BCI’s mass balance system was hard for consumers to understand, specifically because the cotton grown under the BCI program was not physically tied to the garment. The grower in ACVC 2 (who was BCI accredited) took a different point of view, and saw BCI as more of a ‘thing between traders’ as it worked within the current system of trading and enabled market access for Australian cotton sustainable value. In contrast, myBMP **captured** the ‘actual’ **environmental** and **societal value** on-farm through standardising practices and building knowledge. The trader in ACVC 2 saw the BCI program as helping to dispel myths around cotton production (such as high water and chemical use), while assisting growers in

¹⁰⁷ According to Visser, Gattol and Helm (2015) the rise of eco-labels came in response to consumer mistrust of ‘green’ marketing, especially as the industry promoted sustainable or environmentally friendly products without modifying products or processes (i.e. greenwashing).

¹⁰⁸ As mentioned in Chapter 4, Better Cotton is moving towards a Life Cycle Inventory (LCI), which is the ‘data collection’ component of LCA, and is more straightforward compared to LCA’s multi-step, life cycle impact (Better Cotton, 2021b).

developing countries to acquire ‘more sustainable’ farming practices. In this way, BCI **created transaction value** by raising the profile of cotton as a sustainable fibre to consumers and retailers, which in turn generated market demand around cotton. While on-farm sustainable cotton practices are important for the ongoing longevity of the farm, cotton identity programs act as a mechanism to **create** and promote sustainable value **captured** at one stage of the supply chain (on-farm) to other stages (such as retailers). This study has uncovered the complex dynamics in which cotton sustainability programs, myBMP and BCI, simultaneously and asymmetrically **create** and **capture** sustainable value on-farm.

The question of how consumers perceived the different types of cotton production and their sustainable value was raised by participants. While consumers have become more aware of sustainability issues (as highlighted in Chapter 2), participants perceived that consumers had a simplistic understanding of sustainability (e.g. natural fibres are better than synthetic fibres, organic cotton is good and conventional cotton is bad), which aligns with previous research on consumers’ knowledge around sustainability (Bick et al., 2018; Blazquez et al., 2020). Participants also perceived that consumers understood organic cotton production as more sustainable, which is consistent with previous research (Hustvedt & Dickson, 2009; Lin, 2010; Lundblad & Davies, 2016; Rieple & Singh, 2010). However, participants in this study also pointed out that organic cotton does not typically mean better quality, nor does an organic label indicate impacts, such as efficient use of resources. To come back to a key point highlighted earlier in Chapter 2, there are environmental and social impacts associated with every fibre choice and every stage of the fashion industry (Fletcher & Grose, 2012). What is interesting to note here is the importance of perception when it comes to sustainability, as garments made from organic cotton or conventionally grown cotton are indistinguishable in terms of sight and touch. In addition, participants perceived that consumers cared about local issues in their ‘backyard’, and there were conflicting values with Australian cotton. For example, water use in a drought country was a concern, but there was also a strong desire to support local farmers. These findings around communicating Australian cotton’s sustainable value builds on existing evidence that sustainability means different things to different people, and consumers lack knowledge and understanding around sustainability (Harris et al., 2015; Henninger et al., 2016). Participants in this study

identified that consumers were able to consider the local elements of sustainability (i.e. impacts on their backyard), however, these elements were based on perceptions, rather than tangible evidence. For example, consumers purchased ‘Australian cotton’ products as a way to support local farmers, however, this study has revealed that in the case of the mass-market retailer, any additional economic benefit for using Australian cotton was not returned to growers. Interestingly, there was limited knowledge sharing around consumer feedback between the mass-market retailer and the cotton farmers. Strengthening information sharing along the chain would assist the cotton growers in being more responsive to the mass-market retailer and their needs around sustainability communication. It was clear that establishing consumer understanding around sustainability would be an important factor in **capturing** Australian cotton’s **sustainable value**.

Participants saw an **opportunity** to bring greater awareness and marketing of Australian cotton to consumers, which could be achieved through storytelling collaboration with brands. The efficacy of this would require further research focused on consumer desire for and responsiveness to such storytelling. While consumers are actors in the fashion value chain (Niinimäki, 2010), it is important to maintain a focus on retailers as they define sustainability and its value in value chains. Furthermore, toying and froing around ‘who’ needs to change is a moot point, because change needs to happen at all levels. Nevertheless, the point remains that the Australian cotton industry should beware of being ‘at arms length’ from consumers, and the findings highlight a need to reconnect, listen and understand the consumer perspective, and this needs to be done in collaboration with retailers. A salient point that remains for the Australian cotton industry to address, however, was the concern around water use, especially as this curtailed consumer desire to buy Australian cotton. Retailers across both chains also raised the question as to whether water should be used to grow cotton in Australia. Participants identified a need for storytelling that ‘busts’ myths and misconceptions around farming cotton. Areas that should be focused on included cotton requiring a significant volume of water to grow, and the differences between GMO versus organic cotton. The **opportunity** for ‘myth busting’ was considered very important, as participants also emphasised that consumers needed to ‘feel good’ about Australian cotton as a sustainable fibre.

7.2.3 Credible claims

While stories, labelling and attribute signalling were used by retailers to raise consumer awareness, participants said that the fashion industry was rife with unsubstantiated claims. Previous research found that the pervasiveness of greenwashing had contributed to consumer distrust around ‘sustainable products’, and questionable claims and messages that lacked specific meaning regarding sustainability pointed to a need for a system of regulation (Delmas & Burbano, 2011; Guyader et al., 2017; Peirson-Smith & Evans, 2017). This study found two opposing results in relation to trust around Australian cotton sustainability claims. In ACVC 1, the niche retailers, converter and growers had ‘built trust’ around their sustainability claims, as discussed earlier. On the other hand, the mass-market retailer in ACVC 2 was sceptical of information that came from the Australian cotton industry, and identified a lack of independent information or third-party verification of sustainability claims, as an area of **missed value** for Australian cotton. However, the question of who would be the independent agency to certify or make claims about Australian cotton needs further exploration. Participants clearly stated that it would need to be a trusted and credible source, such as a government body. This raises the question of who should pay for the costs of establishing such a system; however, a clear answer to this did not emerge during interviews.

It is clear however that retailers were largely unwilling to pay more for credible claims. There were also questions around whether the measurements would be farm-specific or country-specific, as there are many scalability **challenges** around this, such as variability in seasons, and also the difficulty in comparing practices on one farm to another. This also raises questions around whether actors want to understand the ins and outs of cotton farming, or just want to know that the cotton is sustainably made – which is the role of cotton identity programs. For example, the original premise of BCI was that retailers did not want to be experts in cotton production. My research points to a need to strike a balance between due diligence and sustainability messaging (i.e. how to communicate whether ‘this is a sustainable fibre’). However, the findings show that the steps to achieving better communication of Australian cotton’s sustainable value were not straightforward or one-dimensional. For example, depending on a retailer’s requirements/interests, a certification model approach through BCI, or a more evolved visual storytelling (symbolic sustainability) or data-driven (substantive

sustainability) approach may be taken. Interestingly, this study demonstrated that the latter increased retailers’ and consumers’ engagement and understanding around Australian cotton’s sustainable value. This further indicates the value of co-creating sustainability messages with key stakeholders.

This section has explored the communication dynamics that contributed to or constrained the transfer of Australian cotton’s sustainable value as identified by participants. Table 15 below outlines these factors.

Table 15: Communication dynamics that contributed to or constrained the transfer of sustainable value

The factors that <i>contribute</i> to the transfer of sustainable value	The factors that <i>constrain</i> the transfer of sustainable value
<ul style="list-style-type: none"> • The retailer played a crucial role in communicating Australian cottons sustainable value to consumers • Australian cotton’s ‘locally made’, ‘ethical cotton’ story appealed to consumers • Use of ‘understandable’ information, or symbolic (visual storytelling) and substantive (LCA data) sustainability communication strategies • Attribute signalling through certifications, labelling, marketing and product sustainability narratives/dialogues • Retailers used sources they trusted (i.e. the Higg MSI, Textile Exchange) to make decisions and communicate sustainability to consumers 	<ul style="list-style-type: none"> • Environmental aspects on-farm were less clearly understood by retailers, especially when information was too technical, pointing to a lack of shared understandings and measurements of environmental sustainability on-farm • Tensions around shared definitions of sustainable cotton (i.e. organic cotton versus GMO cotton), as well as complexities in communicating differences between farming practices and cotton identity programs • Consumers had a simplistic level of understanding around sustainability (e.g. natural fibres are better than synthetic fibres; organic cotton is good and conventional cotton is bad) • Inadequate information flows between different value chain actors (particularly information around consumer value going back to the Australian cotton industry) • Scepticism around industry-funded sustainability information

7.3 IM/MATERIALITY AND CIRCULARITY

While the fibre quality of Australian cotton was a key indicator and focus of captured value, a garment's materiality (more specifically, its fibre composition and quality) played a key role in determining its longevity and potential for circularity (recycling or reuse processes). My research has found that the Australian cotton industry needs to look beyond the material value of cotton as a fibre, to issues further down the chain, such as textile waste. I argue that whole of chain collaborations are required in order to enact more circular approaches, and the Australian cotton industry needs to reach further up the chain and work with retailers. However, participants perceived that the Australian cotton industry lacked immaterial value and needed to cultivate and build cultural capital. Leveraging the 'supporting local' Australian cotton story would accrue meaning and foster connections, attachments and relationships between consumers and their clothing, which is a key factor for sustainability and keeping garments in use for longer.

7.3.1 Fibre qualities and branding value

Participants frequently compared Australian cotton's material and immaterial value to other 'cotton identities' such as Egyptian and Pima cotton, and other fibres such as Australian wool and polyester. In terms of quality, participants said that Australian cotton's middling staple length did not reach the category of Extra-Long Staple cotton, which garnered a higher **use** and **transaction** value in the marketplace. It was interesting to note that participants in ACVC 2 commented on Australian cotton garments "look[ing] premium" (GM01) compared to garments made from commodity yarn, although Australian cotton's fibre characteristics were limited compared to longer staple cotton, such as Pima. Relative to other fibres, participants said it was difficult to distinguish between different cotton types, whereas this was easier with wool (coarse, fine, etc.). It was largely agreed that Australian cotton had a good reputation for its consistent fibre quality, especially compared to organic cotton and cotton from Africa and India. Australian cotton was typically used to make the base quality of the yarn and blended with lower quality cotton to make it go further. Quality was noted by Australian growers, ginnerers and traders as being important for maintaining supply chain relationships, especially during seasonal ebbs and flows that affected yield.

In terms of cotton's haptic qualities, consumer (**use**) **value** was an important dimension to understanding this. Participants said that cotton directly aligns with consumers' lifestyles and values due to its breathability and comfort in Australia's climate. However, across both chains, participants (RE02, RE04, GR03) said there was an **opportunity** for natural fibres to mimic synthetic qualities such as non-ironing. The rental retailer also found that synthetic fibres, such as polyester, were more durable compared to cotton, but acknowledged the issue of microplastics shedding with polyester. In addition to communicating on-farm practices, the Australian cotton industry needs to promote cotton's materiality as a sustainable fibre. Participants said consumers perceived natural fibres to be more environmentally sustainable when compared to synthetic fibres. For example, participants said that relative to polyester, cotton's sustainable value proposition was its renewability, naturalness and biodegradability. In this way, the Australian cotton industry could pivot communications from 'doing less harm' through reducing inputs on-farm, to how cotton as a fibre 'does good' for people (i.e. supporting farmers' livelihoods) and the planet (i.e. renewable and biodegradable).

Relatedly, there was a strong perception that Australian cotton lacked immaterial value when compared to Australian wool. In particular, EN02 saw a strong emotional link between the Australian public and wool. This point supports Ferrero-Regis's (2020) observation that wool is a symbol of Australian heritage and identity, as well as Crewe's (2017) notion that specific sites of production **create** immaterial (**use**) **value**. Ferrero-Regis's (2020) study examined how the unification of wool and fashion through newsreels between 1946 and 1974 moved the fibre's status beyond its technical and economic value, towards a cultural and fashion identity. In other words, fashion design was an important element because it added immaterial value to an agricultural commodity, thus shifting it to the realm of culture and a product for consumption (Ferrero-Regis, 2020). Looking now to Pinar and Trapp's (2008) examination of Turkish and Egyptian cotton, they offer that 'ingredient branding' was an effective strategy for carving out a competitive advantage in the marketplace. Notably, 'ingredient branding' hinges upon the ability to arouse and connect to consumers' emotions (Pinar & Trapp, 2008). For example, Pinar and Trapp (2008) posed questions, such as what comes to mind when one hears the word 'cotton', or 'English cotton' or 'Egyptian cotton'? Is it a pleasant thought? A specific memory? A

negative reaction? As such, ‘ingredient branding’ would require the Australian cotton industry to develop an identity with its end user, the consumer. However, raw cotton is not sold directly to the consumer. Rather, Australian cotton is a component of a product (e.g. a t-shirt). Therefore, in order to develop an identity, the Australian cotton industry needs to work with retailers to ‘pull’ the cotton through the chain and design products that are available for consumers to purchase in the marketplace.

Drawing on participants’ ideas around ‘branding Australian cotton’, and building on Crewe (2017), Pinar and Trapp (2008), and Ferrero-Regis’s (2020) work, there are **opportunities** for the Australian cotton industry to reposition itself and build immaterial (**use**) **value** and cultural capital. This could be achieved via iconic cotton products, such as towels, t-shirts, jeans, and the like, through collaborations with retailers. This could also be matched with amplifying the marketing around Australian cotton’s sustainable values, such as ‘supporting local’ and ‘locally made’, as well as symbolic and substantive sustainability communication strategies (as identified in Section 7.2). Noting the disconnect between the niche garment manufacturers and retailers and Australian cotton, as identified by RE02 in ACVC 1, the Australian cotton industry could adopt a program similar to the Woolmark competition and engage with emerging designers to showcase product innovation, beauty and the versatility of cotton, as well as sharing the Australian cotton sustainability story. Retaining some use of Australian cotton for local designers could also enact Fletcher’s (2008, p. 140) “antidote to unsustainability”. A barrier to this however, as explained earlier with traceability, is the difficulty in ‘pushing’ 100% Australian cotton up the globalised value chain. This is also partially due to the fact that cotton spinning facilities are located offshore, which impedes Australia’s capacity to convert raw cotton into fabric domestically.

The connection between the garment and the Australian cotton origin story could also bring additional sustainability benefits through emotionally engaging consumers with their clothing. Participants made the point that consumers had become used to ‘fast fashion quality’, and there was a lack of appreciation and ability to compare and differentiate between qualities. The availability of ‘cheap’ clothing was an important point, and consistent with that of Niinimäki (2010), who also found that price often deterred consumers from buying more expensive or better-quality clothing. Using Australian cotton could help develop consumers’ emotional connections to clothing,

which as research has found, is a key factor for sustainability and keeping garments in use for longer (Chapman, 2012) (in turn, **creating use** and **environmental value**). For example, consumers could shift away from thinking ‘this is a shirt’, to seeing ‘who made my shirt’. Given that consumer value affects the lifespan of garments¹⁰⁹, the power of consumer preference should not be underestimated. Earlier observations showed consumers were concerned about Australian cotton’s impacts in ‘their backyard’. Therefore, there is a need for the Australian cotton industry to reconnect, listen, understand and appeal to the consumer perspective.

7.3.2 Reuse

The retailers across both chains signalled that circularity, textile waste and use of recycled fibres was the future frontier for the fashion industry; however, the role that the Australian cotton industry could play in this needed more definition. While cotton’s biodegradability and compost-ability were leveraged by retailers in ACVC 1, the mass-market retailer in ACVC 2 was interested in recycled fibres, and in particular, was switching from polyester to recycled polyester. Although there is research that suggests that recycling polyester weakens polymer strength (Oliveux et al., 2015), the recycling of fibres has been considered less urgent because the cost of virgin material is low (Dissanayake & Weerasinghe, 2021). Putting aside the fact that reverse logistics and local infrastructure to deal with textile waste is a limited but burgeoning area of commercial activity in Australia (e.g. BlockTexx), participants perceived that either mechanically or chemically recycling fibre would potentially decrease the demand for virgin cotton, which would have huge implications for the Australian cotton industry. However, this is perhaps a perceived threat, rather than an actual reality. For example, Heikkilä, Fontell, Määttänen, and Harlin (2018) found in their research that cotton production had stagnated at 19.6 million tonnes annually (120 million bales) since 2005, and could not meet the current annual textile consumption of ~90 million tonnes per year. Simultaneously, it was estimated that 92 million tonnes of textile waste was being sent to landfill each year (Global Fashion Agenda and Boston Consulting Group, 2017; Niinimäki et al., 2020). Textile recycling has been considered an appealing

¹⁰⁹ There has been research which indicates that fashion consumers buy clothing based on emotional needs and the name of the fashion designer (Solomon et al., 2006; Strähle, 2017), and bonding has been proposed as a strategy to keep garments in use for longer (Niinimäki & Hassi, 2011).

option to address the increasing demand for raw materials and reducing textile waste. Previous research has identified a plethora of frameworks to move towards more circular practices such as circular design, design for longevity, recycling and composting, repair, and sharing, but the main challenge is the fragmented, global supply chain which consists of many different actors (Dissanayake & Weerasinghe, 2021; Mishra et al., 2021). Solutions suggested by participants in the present study included onshore spinning which could twin virgin and recycled fibres, as well as biodegradability and compost-ability (although future research would need to focus on compatible dyes and finishes on cotton garments). Yet to enable circularity, there is a need for value chains to be rearranged into localised circuits of production and consumption (Dissanayake & Weerasinghe, 2021). This highlights the value of the two chains in this study, especially as the niche garment manufacturers and retailers in ACVC 1 demonstrated a wide consideration of the sustainability impacts of their products, from fibre choice to design, production and disposal. However, RE02 raised the point that the Australian cotton industry should be responsible for the end-of-life pathways of cotton products. There are many factors that dictate the appropriate end-of-life solution for a garment (such as, whether the textile is made from blended or mono-fibre). As such, RE02's point was arguably misdirected, as many onshore participants have clearly stated that because of the chain structure, the Australian cotton industry does not have control over the final product the cotton is turned into. Additionally, as previous research and this current study have found, retailers are the actors holding the decision-making power in the value chain, and the creation of durable, high quality and lasting designs that increase the lifespan of textile products are key factors which would generate the most significant returns on impact (Dissanayake & Weerasinghe, 2021; Heikkilä et al., 2018). Arguably, 'designing in' durability to lengthen a garment's lifespan is easier (in principle) than looking at material recycling.

However, this requires collaboration and coordination amongst actors within complex and globalised value chains. Noting the rising power of the rental retailer (and arguably the most prominent circular fashion model), further research into the impacts of materials (such as cotton and polyester) and their longevity needs to be considered (Johnson & Plepys, 2021; Levänen et al., 2021; Subramanian et al., 2021). Therefore, a recommendation would be for the Australian cotton industry to continue its

investment in this space (Cotton Research and Development Corporation, 2021a), but also look to partner with retailers to not only ‘pull’ Australian cotton through the chain, but to **create** circular chains. This would provide solutions to both the demand for sustainable fibres and reducing textile waste.

This section has explored the im/material and circularity dynamics identified by participants as having contributed to or constrained the transfer of Australian cotton’s sustainable value. Table 16 below outlines these factors.

Table 16: Im/material and circularity dynamics that contributed to or constrained the transfer of sustainable value

The factors that <i>contribute</i> to the transfer of sustainable value	The factors that <i>constrain</i> the transfer of sustainable value
<ul style="list-style-type: none"> • High quality fibre, yarn and products achieved higher economic value • End of life and recyclability are key future focus areas for retailers • Leveraging cotton’s biodegradability, compost-ability and ability to turn into bio-fuel 	<ul style="list-style-type: none"> • The market is saturated with middling fibre quality, making it difficult to differentiate Australian cotton • Australian cotton lacked cultural capital and immaterial value • Recycled cotton was perceived to be a threat to virgin cotton production, but the present volume of virgin cotton produced (globally) could not meet the rate, needs or requirements of global textile consumption

7.4 CONCLUSION

Both ACVC 1 and ACVC 2 presented alternative supply chain models to the commodity chain and focused on delivering other dimensions of value to the grower, retailer and consumer. This discussion has contributed to a greater understanding of sustainable value within Australian cotton value chains, such as what is expected, perceived and missing, to ultimately bring forward shared understandings and definitions. While the findings from my research support the assertion in extant literature that retailers are the dominant players in the chain, what is unique to this research is the deepened understanding of the role of middle chain actors. Prevalent

features that limited the transfer of Australian cotton's sustainable value were uncovered, including locked in, dominant, normalised and condoned practices such as blending to a quality specification at the spinning mill. These mechanisms are deeply embedded in the prevailing paradigms of **value creation** within the fashion industry. The study also asked whether stakeholders were willing to pay a premium for sustainability efforts, finding that if any **economic value** was generated, this went to the retailer, not the grower. The Literature Review (Chapter 2) highlighted a need for research to more precisely define sustainability within fashion, and this chapter examined definitions from participants' perspectives and contributed to filling this gap while bringing richer and more complete understandings to the field. Significantly, there were gaps in knowledge between the farmer and retailer, especially around how **environmental value** was **captured** on-farm. Solutions identified by participants involved co-creating marketing campaigns and drawing on symbolic (visual storytelling) and substantive (LCA data) sustainability strategies. Circularity received much attention and was applied in different ways across both chains. Although participants agreed that cotton was inherently circular (renewable and biodegradable), further whole of chain collaborations were required to push developments forward in this area.

Chapter 8: Conclusion

The aim of this research was to uncover where sustainable value is created in the Australian cotton industry and to identify opportunities to create sustainable value along its supply chain. Specifically, this study addressed the gap in knowledge surrounding sustainable value in the Australian cotton context by elucidating participants' perspectives and experiences, with a particular focus on exploring how sustainable value is transferred along the chain. A qualitative methodology informed by an interpretive phenomenological approach was employed in order to gain these insights. Participants were recruited from two connected Australian cotton value chains through snowball sampling. The research design involved the development of a tool to gather participants' perspectives around where sustainable value is created, captured and uncaptured, as well as opportunities and barriers to creating value. This methodology maximised the depth of data collection by utilising a tailored method and thematic analysis of data sources. In turn, this research has been responsive to gathering the various perspectives, understandings, and social constructions of how sustainability is valued within the Australian cotton value chain context. This is timely given the Australian cotton industry's focus on the sustainability agenda. The importance of conceptualising and studying value chains in a holistic, contextual sense is highlighted throughout the analysis and discussion. This chapter draws together the findings from the data within the context of the research aims, questions and contributions, and comments on further areas for research.

8.1 THE SOCIAL LANDSCAPE OF AUSTRALIAN COTTON'S SUSTAINABLE VALUE

This thesis has answered the main research question of: How is sustainable value understood, created and captured by the Australian cotton industry and its value chain stakeholders? This project has conceptualised that sustainable value creation occurs when economic, social, environmental and use values associated with Australian cotton production are able to be transferred to key stakeholders in the value chain, as well as consumers. The key contribution from the findings in this study stems from the

re-conceptualisation of sustainable value from being a set of linear, catalytic, causal relationships between a set of terms, indicators and practices, to a notion of value being social, dynamic and cultural. In other words, Australian cotton's sustainable value is socially constructed, and subjectively perceived and responded to. What emerges from this study are insights into how sustainability is valued from the perspective of different Australian cotton value chain actors. This section reviews the findings and insights of the study, and reveals the social landscape of Australian cotton's sustainable value.

This study confirmed that sustainability is brand-led and demonstrated the mechanisms through which this occurs. Broadly speaking, retailers across both chains relied on communicating sustainable value to consumers through attribute signalling with certifications, labelling and marketing, and drew on sources they trusted to make decisions (most notably the Higg MSI and Textile Exchange). For example, the mass-market retailer in ACVC 2 defined sustainable cotton through certifications and labels, which included BCI, recycled cotton and organic cotton. Participants perceived that actors in the middle of the value chain (such as merchants, agents, spinners, textile and garment manufacturers) were disengaged from the transfer of sustainable value, unless certifications were a key requirement. Certifications played a key role in communicating to upstream actors what sustainable materials to source. This is important because the globalised nature and complexity of the value chain makes it difficult for retailers to reach down to the farm level, and in turn, retailers have little knowledge and understanding of what sustainability 'on the ground' looks like.

While sustainability standards have a positive impact and are a key part of the necessary system change towards more sustainable practices, there were conflicting views amongst participants around whether certified myBMP/BCI supply chains transferred the sustainable value of Australian cotton, as well as which stakeholders received this value. Each grower described in detail their commitment and awareness around reducing environmental impacts, as well as their social impact within and beyond the farm, such as employment and regional economic growth. Growers in ACVC 1 saw that BCI played an important role in improving the sustainability of the cotton sector in developing countries, as well as promoting cotton as a sustainable fibre; but the program did not capture the 'full' extent of Australian cotton's myBMP

sustainability practices on-farm (**value uncaptured**). Additionally, farmers in ACVC 1 said that myBMP/BCI cost time and money to become fully accredited, and it was unclear if growers would receive a return on investment or a premium for cotton sold as ‘BCI’. This was affirmed by the trader in ACVC 2, who stated that a premium for BCI was not guaranteed, or it depended on market demand and supply. In contrast to the growers in ACVC 1, the grower in ACVC 2 saw that myBMP **captured sustainable value** on-farm, but BCI **captured market (transaction) value** and helped to get Australian cotton sold. In other words, BCI was a direct way to **capture transaction value** for the sustainable value of Australian cotton. GR03 argued that the benefit of BCI was that it ‘worked’ with the current dynamics of how cotton is bought and sold globally. The mass-market retailer in ACVC 2 affirmed this, and saw BCI as a scalable, cost-effective way to support global sustainable cotton production practices. This revealed that cotton sustainability programs, myBMP and BCI, simultaneously and asymmetrically **created and captured** Australian cotton’s sustainable value.

Financial aspects were critical in sustainable supply chain approaches. As stated in Chapter 7, this is not surprising given the neo-liberal economic and political context, highlighting the constraints on sustainability within a capitalist society. Chapter 7 established that participants’ approaches to sustainability fell on a spectrum; yet their approaches were exemplary in demonstrating how actors can co-create value chains which better incorporate Australian cotton’s sustainable value within the dominant paradigms of fashion production and consumption. For example, SP01 in ACVC 1 could be considered as aligning with the ‘strong sustainability’ paradigm, as they sought to omit materials that were unethical or not environmentally friendly. The niche garment manufacturers and retailers in ACVC 1 took a radical, whole of chain approach to sustainability (from raw materials to textile waste to disposal) when designing a garment, whereas in ACVC 2 the mass-market retailer’s ‘sustainability journey’ prioritised incremental change in line with budgets, which could be viewed as falling on the ‘weak’ side of sustainability. This framework can be interpreted as understanding where intervention is happening, where change is required and who is most motivated to change and why.

Insights into the dynamics of sustainable value creation revealed that many different value chain strategies, from certifications to partnerships with retailers, were

employed, and perhaps even prioritised, when it came to trading Australian cotton's sustainable value. The trader in ACVC 2 proposed that there was a spectrum of approaches that retailers considered, which depended on willingness to pay, from organic and full traceability, to mass balance with BCI, to cotton is cotton. For example, findings from ACVC 2 revealed that 'pulling' Australian cotton through the chain added (supplier and verification) costs for the mass-market retailer. What is interesting to note about the retailers in ACVCs 1 and 2 was that they used Australian cotton to differentiate their products, which simultaneously fed into their sustainable material offering. Yet, there was a strong perception that retailers and consumers were unwilling to pay a premium for Australian cotton's traceability or on-farm sustainability practices. Participants spoke about the benefits of traceability such as 'joining the dots' between the farm and the product, which was even more important because of the prevalent practices of cheating or substituting through blending cotton. This study revealed that traceability aspects (**use value captured**) were valued by retailers as a way to *verify* the fibre origin, understand supply chain risks and make credible product claims. However, findings from ACVC 2 demonstrated that a strong product *story* (which linked the product, brand and fibre origin) emotionally resonated with consumers and their willingness to buy (**transaction value captured**). This revealed that when the retailer took ownership of the Australian cotton product story and communicated its sustainable value to consumers (i.e. through their website, labelling and social media), consumers were more likely to pay; but if there was economic value to be captured around Australian cotton and sustainable value, this value went to the retailer.

Interviews with retailers across both chains revealed that in terms of constructing Australian cotton's sustainable value, the locally made, ethical cotton story was much stronger than the environmental sustainability credentials and efforts around Australian cotton. This was because the **environmental value** aspects were less clearly understood by retailers when it came to on-farm practices (**value uncaptured**). For example, participants from the mass-market retailer in ACVC 2 spoke about how Australian farmers used pesticides, but they were not clear in what way chemicals could be used to benefit the environment, adding that when they asked the industry questions about this, discussions got technical very quickly. This pointed to a lack of

understanding around how to measure environmental sustainability on-farm, but also tensions around shared definitions of sustainable cotton production practices amongst actors.

My research has demonstrated that through relationships between the farmer and the retailer, **sustainable value** is **created** through questioning, rationalising, discussing, challenging and ultimately bridging understandings around sustainability on-farm. A strength of the growers in ACVC 1 was their communication of environmental practices using LCA data alongside images of the farm, which created symbolic and substantive sustainable value. The value of symbolic sustainability was in indicating, signifying and representing the idea of sustainability and effectively bridging stakeholders' understandings of what sustainability looked like on-farm. The LCA data was used as a form of substantive sustainability and allowed for credible claims around impacts that were backed up with research and facts. While quantitative data may give objective results, the growers said they could be vague and out of context. Additionally, retailers in ACVC 1 positively commented on the power and impact of this approach in **communicating sustainable value** of Australian cotton to consumers. Furthermore, the value of the substantive information for retailers was in understanding their impacts and communicating credible product claims to consumers. The findings also demonstrated how Australian cotton's **sustainable value** was **constructed** in dialogue with the value chain stakeholders. For example, when actors in ACVC 1 described their values and concerns, the farmer could start to understand and contextualise their perspectives and responses. From a communication perspective, it is crucial to have a sound understanding of the context in which a message will be received in order to ensure that message will be effectively delivered. Arguably, this can only happen when the farmer is a partner, rather than a supplier.

All growers agreed that communicating sustainable value to the value chain was extremely important, hence their investment in supply chain partnerships and traceability capabilities, which sought to enhance their marketing benefits. Considering the importance of sustainability messaging, participants also stressed the need to pay attention to consumers' understanding of Australian cotton's sustainable value. Although post-farm gate participants across both chains were supportive of the Australian cotton industry, communicating how sustainability was implemented on-farm was not clear in ACVC 2. This is important to recognise as, according to

interviewees, retailers played a crucial role in communicating sustainability values between the farmer and the consumer. Retailers (particularly in ACVC 2) perceived that consumers had a simplistic level of understanding of sustainability and held dichotomous views around a fibre's sustainable value, seeing natural fibres as being more sustainable when compared to synthetic fibres. While this is positive for cotton, it also reveals a strong perception that certain materials command sustainability. However, there was confusion around terms and labels to the point where consumers did not distinguish easily between the different types of sustainable cotton programs. Retailers in ACVC 2 even found explaining BCI's mass balance system to consumers difficult. Participants across both chains said consumers' perception of organic cotton was largely connected to organic food, and they assumed the label of organic provided health or other altruistic benefits for the environment. It was in this way that organic cotton was viewed as being the opposite of conventional cotton. These findings are significant as they assist in further developing understandings around how sustainable value might be best communicated to key stakeholders.

The findings further emphasise the point that the ability to transfer sustainable value can only be achieved through connecting the farm to the retailer. Many participants in ACVC 1 argued that if the cotton was not connected to the farm, then the substantive sustainable value created on the farm would be lost in the chain (**uncaptured value**). For example, BCI was seen by participants in ACVC 1 as paying 'lip service' to sustainability because the program could not prove that the cotton was sustainable as there was no data to back up that claim. Here, participants questioned whether BCI helped or hindered the actual transfer of sustainable value for Australian cotton because it 'watered down' sustainability standards. The growers and converter in ACVC 1 demonstrated that the ability to communicate and incorporate meaningful sustainability messages was in large part due to the strength of relationships between actors along the value chain (**captured value**). A clear **opportunity** would be for the industry to take the learnings from ACVC 1 and invest in a symbolic/substantive sustainability communication strategy at an industry level. It is important to note that there is difficulty in collecting representative LCA data as the farm environment is complex and conditions change year on year. Relatedly, and as explored in the Discussion (Chapter 7), the retailers in ACVC 2 expressed a desire for independent sustainability information and assessments (rather than industry funded), but it was not

clear ‘who’ this information would come from (potentially a government body, as suggested in Chapter 7). Additionally, building knowledge related to sustainable value around cotton production was an equally important dimension.

What also emerged from the interview data around communicating and marketing Australian cotton’s sustainable value was that it did not exist in perfect form. Rather, the findings highlighted the commonalities and differences in perceptions of those involved in the Australian cotton value chain. As stated earlier, the ‘supporting locally made’ dimension of sustainable value was perceived to be the most important to consumers (**societal value captured**); however environmental issues such as water use related to cotton production in Australia were a chief concern (**environmental value uncaptured**). Thus, conflicting values were present: water use in a drought-prone country and a strong desire to support local farmers. This points to a conclusion, originally identified by RE04 in ACVC 2, that consumers care about issues in their “own backyard”. Therefore, when it came to sustainable value, consumers connect to the notion of localness, which could be explained because local issues (such as changes in the environment) are more easily observed and recognised compared to international ones. Nevertheless, positive emotional connections to sustainable value were present when consumers saw themselves as supporting issues that matter to them, such as purchasing Australian cotton to support local employment (**transaction and societal value captured**). However, the environmental aspects of Australian cotton’s water use during production were perceived negatively, and therefore need attention (**transaction and environmental value uncaptured**). Onshore Australian cotton participants spoke about the educational benefits of communicating what happens on-farm to the wider community, as well as the value of improving the image of cotton farming to the Australian public (social licence), in addition to retailers and consumers. Creating a strong linkage between product, brand and fibre origin, as well as co-creating substantive and symbolic sustainability messages, may assist in communicating and substantiating Australian cotton’s sustainable value to key stakeholders (**opportunity**).

The materiality of Australian cotton emerged as a central dimension regarding **use value captured**. Participants asserted that in the commodity market, Australian cotton was highly valued because of its use value qualities such as whiteness,

consistency, and lack of contamination. However, participants noted that because the market was saturated with middling fibre quality, it was difficult to differentiate Australian cotton in the commodity market (**uncaptured use value**). In addition to staple length, Australian cotton had technical material limitations, especially when compared to synthetic fibre characteristics such as non-iron fabric.

Building Australian cotton's immaterial value through storytelling and product collaborations with retailers was identified as an area of **opportunity**. As demonstrated by this study, the development of a product narrative that told the story of the fibre origin was an effective strategy for the mass-market retailer in ACVC 2. In turn, the growers knew more about the final product and the consumers knew more about where and how the product was made. This could also inform emotional attachments to clothing and keep them in use for longer (**use and environmental value**). Focusing on premium and niche markets, rather than focusing on commodity markets, is more likely to bring Australian cotton's sustainable value through the chain (**transaction value**). However, there are **challenges** to scaling Australian cotton collaborations based on the storytelling model. These **challenges** include market size and demand, risk of supply (i.e. ebbs and flows of drought), complex supply chain relationships, and barriers to traceability (i.e. cost, time, resources, system support). For instance, both Australian cotton value chains in this study were 'hollowed out' as the spinning stage was not in Australia, meaning that yarn production needed to occur offshore, which created complications. Therefore, the storytelling model may be only one tactic for Australian cotton's marketing.

End of life and recyclability was a current and future focus for retailers. The retailers took two different approaches – the mass-market value chain looked to increasing their sourcing of recycled fibres in the future, while the niche value chain looked at leveraging cotton's biodegradability. The grower and trader in ACVC 2 saw recycled cotton as a threat to virgin cotton production, but other participants across both chains saw **opportunities** in compostable cotton and bio-fuel, as well as an **opportunity** to twin virgin and recycled cotton spinning in Australia. However, noting the current limitations around textile recycling, this is a far-horizon issue. Nevertheless, there is an **opportunity** for the Australian cotton industry to collaborate with retailers and work towards circular fashion value chains.

This study has named the complexities that face the Australian cotton industry's transfer of sustainable value, such as market size and lack of onshore value adding activities, such as spinning and recycling capabilities, as well as end-of-life solutions. Furthermore, having comparable findings across two value chains highlights the importance and applicability of the themes pertaining to participants' experiences and understandings of Australian cotton's sustainable value. Moreover, the findings reveal that a need exists to evaluate how Australian cotton's sustainable value is communicated to key stakeholders in the fashion value chain: in a way that can be understood. Consequently, these findings may be used to inform the Australian cotton industry's future communication strategies and value chain consultation practices.

8.2 CONTRIBUTIONS

This research makes important theoretical and methodological contributions to knowledge around how sustainable value is conceptualised and understood within global fashion value chains. As this research was industry funded, practical contributions are also important and discussed below.

8.2.1 Theoretical and Methodological contributions

This thesis contributes to the scholarship of the social landscape of sustainability in three ways. First, it does so through the development of a tool that can be used to investigate sustainable value and its implications within global fashion value chains. This study demonstrated that value chain analysis, combined with value mapping techniques, enables critical insights through taking into account the multifaceted and dynamic nature of sustainable value. The tailored tool and methodology developed through this study could help inform sustainability approaches within value chains and may assist value chain and sustainable fashion researchers. Specifically, this study offers a methodological contribution through the development of a value chain analysis tool which enables a new way of qualitatively evaluating sustainable value. The second, interrelated, original contribution lies in bringing attention to the previously unexamined experience of sustainable value within Australian cotton value chains. This thesis has offered a rich understanding and characterisation of the

landscape of the Australian cotton industry and how its sustainable value is constructed. Third, the findings address a gap in knowledge around fashion value chain members' experience of sustainable value, and unearthed descriptions and contexts around how people perceived, interacted, and responded to them. In turn, theoretical contributions are made through the conceptualisation of sustainable value and its meanings for diverse groups of value chain stakeholders, and offers a framework that can be applied to other value chains.

8.2.2 Practical contributions

This research has identified a number of drivers that inform the transfer of sustainable value, which is of use to the CRDC's value chain competitiveness strategy. These included:

- Market differentiation
- Awareness and concern about sustainability issues facing the fashion industry
- Demand for sustainability information and quantifiable measurements
- Product-focus story (which links the fibre origin, product and brand)

Impediments to creating sustainable value included:

- Cost of traceability
- Lack of shared understandings around environmental measurements on-farm
- Insufficient size of Australian retailing market, meaning that 100% Australian cotton collaborations may be one strategy / a small target of Australian cotton

The tailored tool temperature-tested who values sustainability, and what value they place on it as evidenced, for example, by willingness to pay more. However, it was largely agreed that consumers and retailers did not want to pay a premium to Australian cotton farmers for sustainability or traceability attributes. Nevertheless, my

research identified that the partnership between the farmer and retailer (i.e. farmer as partner, rather than supplier) was an important factor that contributed to the transfer of Australian cotton's sustainable value. Other factors that could improve Australian cotton's sustainable value creation include:

- Expand a small amount of Australian cotton into premium and niche markets, as well as continue its focus on commodity markets.
- Co-create sustainable marketing strategies with stakeholders. This can be achieved through developing 'symbolic' and 'substantive' sustainability strategies to better communicate the industry's sustainable value to stakeholders, as well as building relationships that support the translation of sustainable practices (i.e. promote information exchange, building relationships with retailers through farm tours).
- As a garment's materiality (more specifically, its fibre composition and quality) plays a key role in determining its circularity (recycling or reuse processes), the Australian cotton industry could reach further up the chain and work with retailers to help enact more circular approaches.

Finally, my research created benefits for the participants involved through bringing awareness to the role they play in sustainable value creation within the value chain, as well as strengthening relationships between actors. For example, following the interviews, participants said that they thought about sustainable value in different ways and fresh perspectives were raised for them.

8.3 LIMITATIONS AND SCOPE FOR FURTHER RESEARCH

A significant strength of the research methodology was that it focused on two local value chains which are arguably the closest to local, circular models within the Australian context. A further strength was the sample breadth, which encompassed a range of stakeholders within the boundary of the value chain. Participants could report their understandings and experiences of Australian cotton and sustainable value (Denzin & Lincoln, 2011; Patton, 1987). Furthermore, using a qualitative methodology for this research allowed participants to explain their experiences and

perspectives from within their own context (Creswell & Creswell, 2018). Although the research did not set out to interview commodity chain members, elucidating participants' experiences and perspectives gave insights into the commodity chain, which allowed the research to extend beyond these two chains. This type of consultation allowed for in-depth information to be collected about participants' experiences of sustainable value, and also made it possible to understand the influence of dominant value chain dynamics on the construction of meaning that participants formed. Deriving themes from participants' experiences also allowed for the identification of commonalities around issues asserted by participants and, consequently, the findings are a reflection of their needs. In turn, this study contributed significant insights into the processes of meaning making around sustainability within the context of the Australian cotton value chain.

There is one main limitation to this study which could be addressed through further research. As this is a qualitative study that focuses in-depth on two diverse chains, the findings cannot be representative of the Australian cotton industry. Nonetheless what is important here is not the representativeness, but rather the depth of insights around how sustainability is understood. As such, this study can be used to inform future research on sustainability in the commodity chain or cotton grown in other regions. In addition to this, and although beyond the scope of this study, there is an opportunity for future research to include a quantitative component based on specific issues that participants identified. Other areas include:

1. Future research could extend the research sample to other cotton regions / fibre producers, which could also test the applicability of the findings from this study in other contexts.
2. To effectively promote sustainable value, consideration needs to be given to how knowledge around value can be better translated. Future research could test the proposed communication recommendations for the cotton industry through targeted sustainable marketing campaigns. For example, positive aspects about Australian cotton need to be more effectively communicated and promoted. More specifically, communications need to embrace the awareness of concerns (such as water and pesticide use) and shift the focus towards more positive and proactive actions and directions. With evidence of the farmers in ACVC

- 1 using substantive (data) and symbolic (visual storytelling) sustainability communication strategies that clearly resonated with participants, the development of similar industry-wide campaigns has the potential to positively influence stakeholders' perceptions about Australian cotton's sustainable value.
3. Noting that this study did not include consumers, there is scope for further research into the complexities of consumers' decision making with a specific focus on Australian cotton products and sustainable value.
4. Noting that textile waste is a growing area of concern and research, the Australian cotton industry could partner with retailers and charities to develop viable onshore recycling and reuse solutions, and amplify cotton's role within circular design and value chain strategies.

8.4 CONCLUDING REMARKS

An important motivation of this research was to consult with the fashion industry and add knowledge to current understandings and practices around sustainable fashion. The findings from this study make several contributions to understandings of sustainable value within the fashion value chain. More broadly, my research has demonstrated a tool and a method for gathering perspectives around sustainable value which can be taken up more broadly across the fashion industry as a strategy to move sustainability understandings forward. Second, the findings provide evidence on how Australian cotton's sustainable value is socially constructed, and how it is subjectively perceived and responded to by people throughout the chain. The findings from this study can be used to develop strategies that are more closely suited to transferring Australian cotton's sustainable value, as well as meeting the needs of value chain members. Third, the findings support a richer and more complete understanding of sustainable value within fashion value chains based on participants' experiences. This is important because there is no central person or institution governing sustainability; it is up to individual sectors and actors to work together. As cotton is a major industry in Australia and people like wearing cotton, its future requires actors to work together to the same end, which is making a world that can actually keep sustaining itself. This research is a vital step towards this. This study has integrated actors' diverse

perspectives and highlighted the value chain characteristics that are necessary for building a united narrative around sustainable value.

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Appendices

Appendix A

Description of value methods and tools

Tool	Authors	Description	Strength	Weakness
Sustainable Value Chain Analysis (SVCA)	Soosay, Fearn and Dent (2012)	<p>Purpose Align value chain activities with consumer value and environmental management.</p> <p>Process Evaluate the following themes: the flow of materials and information, and their environmental impacts using Life Cycle Assessment data; relationships within the chain and opportunities for co-innovation; and consumer values and perceptions on sustainability.</p> <p>Delivery Involved interviewing a total of 57 value chain participants, six consumer focus groups and surveying 1100 supermarket shoppers. Data collection took an estimated 6 months.</p>	Useful method for mapping value chain actors	Narrow focus on environmental value, operational processes and resource efficiency
Cambridge Value Mapping Tool (CVMT)	Bocken, Short, Rana and Evans (2013)	<p>Purpose The tool was designed as a qualitative approach to stimulating</p>	Easy to use; Explores purpose of each stakeholder;	Does not prioritise ideas or develop actions


Tool	Authors	Description	Strength	Weakness
		<p>‘system-perceptive’ idea generation around incorporating sustainable value.</p> <p>Process Discussion around three forms of value (captured, uncaptured, and opportunities) for multiple stakeholders. Suggested stakeholders include customers, investors, community and environment.</p> <p>Delivery Designed as a facilitated workshop, a representation of members across the value chain are required as participants.</p>	Structure for identifying and exploring value from a multi-stakeholder perspective; Stakeholders can be tailored	around outputs from the tool
Sustainable Value Analysis Tool (SVAT)	<p>Yang, Vladimirova and Evans (2017)</p> <p>Yang, Vladimirova, Rana and Evans (2014)</p>	<p>Purpose The SVAT draws from key ideas from the CVMT, such as multiple forms of sustainable value (captured, uncaptured and opportunities), designed to assist manufacturing companies in shifting their core business from products to services, called a product-service systems (PSS).</p> <p>Process SVAT takes a life cycle thinking</p>	Structured approach to shifting from a product to a service and reducing sustainability impact; Incorporates perspectives across the whole life cycle	Developed with products in mind rather than a whole of chain approach

Tool	Authors	Description	Strength	Weakness
		<p>approach to looking at how sustainable value is captured and uncaptured across three segments of a products entire life, including: 1) beginning of life (BOL), making of the product, to 2) middle of life (MOL), when the produce is made and in use, and 3) End of Life (EOL) of the product. Also assesses feasibility of value opportunities.</p> <p>Delivery Designed as a facilitated workshop, a representation of members across the value chain are required as participants.</p>		
Triple Layered Business Model Canvas (TLBMC)	Joyce, Paquin and Pigneur (2016)	<p>Purpose Developed from The Business Model Canvas (BMC) tool, by Osterwalder and Pigneur (2010), used to help businesses visually understand the structure of their existing business model, as well as identify potential opportunities and interconnections for creating value.</p> <p>Process Following BMCs economic layer which looks at cost (negative) and</p>	Easy to use; Assists in identifying value creation, cost and revenue	Focus on lead firms and concrete processes; Significant effort and time required to complete the range of tool parameters

Tool	Authors	Description	Strength	Weakness
		<p>revenue (positive) impacts, the TLBMC asks participants about the social and environmental impacts (negative) and benefits (positive) of their business model.</p> <p>Delivery Designed as a facilitated workshop, a representation of members is required as participants.</p>		

Appendix B

Ethics

	University Human Research Ethics Committee (UHREC)
	APPLICATION FOR REVIEW OF NEGLIGIBLE / LOW RISK RESEARCH INVOLVING HUMAN PARTICIPANTS
	Aug 2018

NOTE *All answers should be written in simple and non-technical language that can be easily understood by the lay reader.*

You must provide an answer to each question – N/A is not acceptable.

Section A: RESEARCH PROPOSAL OVERVIEW

A1 Summary Information

A1.1 Project title (200 character limit including spaces)

A Sustainable Value Chain Analysis for the Australian Cotton Industry

A1.2 Brief project summary in LAY LANGUAGE

(i.e. in plain English and ensure when using acronyms you spell them out in the first instance)

The purpose of this project is to identify how the Australian cotton industry can create sustainable value along its supply chain. Sustainable value creation refers to the need for businesses and industries to create social and environmental value as well as economic value for their stakeholders, shareholders and the wider community (Hart, Milstein and Caggiano 2003, 56). The Australian cotton industry is an important agricultural industry with a commitment to on-farm sustainability. However, as the raw material travels through the ‘value adding’ stages in the globalised textile and apparel industries, it is uncertain how Australian cotton’s onshore sustainability efforts are valued in the chain. Therefore, the aim of this project is to identify the different kinds of value that can be captured from social and environmental sustainability at each point in the supply chain.

This project draws on value chain thinking and value mapping methods to identify how social, environmental and economic value is captured and uncaptured along a connected chain, and identify opportunities for future value creation. The research design involves conducting semi-structured interviews (either face-to-face or online, or through written responses such as email or online questionnaire) along the Australian cotton chain,

starting with growing cotton, ginning, and marketing, then moving offshore to spinning cotton into yarn, textile manufacturing, garment manufacturing, retailing and garment disposal. Questions will identify what sustainable value is, how it is and could be created, and who the most important stakeholders are. The outcome of this project will be a framework which identifies Australian cotton's sustainable value proposition, as well as key opportunities and challenges for future progress. This project is co-funded by the Cotton Research and Development Corporation (QUT1901).

References

Hart, Stuart, Mark Milstein and Joseph Caggiano. 2003. "Creating Sustainable Value." *The Academy of Management Executive* 17 (2): 56-69.

A1.3 Provide an overview of your research participants and their involvement (max 250 words)

The purpose of this question is to gain a sense of who the participants will be, and what you expect them to do within the research.

Following Soosay, Fearn and Dent (2012) value chain analysis (VCA) research methodology which focused on a single product (wine), research participants will be members of a connected cotton value chain from the following groups:

Input suppliers (ie. seed distributors)

Growers

Ginners

Merchants

Mills

Textile manufacturers

Garment manufacturers

Retailers

Waste Disposal

Cotton industry bodies

This study aims to engage with at least two Australian cotton value chains to enable comparisons and fine distinctions around value creation, as done in the organic cotton VCA study (Rieple & Singh, 2010). Potential chains include:

a niche small-market 'Australian cotton' value chain,

a mass-market 'Australian cotton collection' value chain,
and/or

Australian cotton sold in the commodity value chain.

Drawing on the Cambridge Value Mapping Tool (CVMT) (Bocken, Short, Rana and Evans 2013), I will conduct semi-structured interviews (either face-to-face or online, or through written responses such as email or online questionnaire) with value chain participants to identify where sustainable value is created, who it benefits both in and beyond the chain (such as wider society, the environment, local communities) and opportunities to create more value in the future. Indicative interview questions include:

What is your role in the cotton value chain?

What is the average gate price of cotton achieved at this stage? (optional)

How does this stage create and capture value, and to which stakeholders is it valuable to?

Where is value missed or not being captured?

How could uncaptured value be turned into opportunities for sustainable value creation, and who for?

Are there any challenges or barriers for future sustainable value creation?

Participants will be given the full list of indicative questions (see ETH_Questions_Mellick_190118) and a value mapping guide of potential Australian cotton stakeholders before the interview which they can write/draw on if they wish (see ETH_Map_Mellick_190118). Interviews will be conducted either face to face or via teleconferencing, audio-recorded and run for approximately 60 minutes. If participants are unable to attend an interview they can submit their responses to questions via email or through an online questionnaire.

References

Bocken, N., S. Short, P. Rana and S. Evans. 2013. "A value mapping tool for sustainable business modelling". *Corporate Governance: The International Journal of Business in Society* 13(5): 482–497.

Soosay, Claudine, Andrew Fearne and Benjamin Dent. 2012. "Sustainable value chain analysis – a case study of Oxford Landing from 'vine to dine'." *Supply Chain Management: An International Journal* 17 (1): 68-77.

Rieple, Alison and Rajbir Singh. 2010. "A value chain analysis of the organic cotton industry: The case of UK retailers

and Indian suppliers.” *Ecological Economics* 69 (2010): 2292-2302.

A1.4a Provide a summary of the merits of this proposed research (in LAY LANGUAGE) including the aims / hypotheses / research questions (refer to [Section 1 of the National Statement](#), NS1.1, when preparing your response).

Include potential contributions to the body of knowledge and methodological rigour (max **250** words). Briefly provide evidence that the proposed research is based on knowledge of the relevant literature, and provide a list of key references. You may also attach a research plan/methodology which does not substitute for the summary above – this attachment should be no longer than **6** pages. **NOTE:** Unless proposed research has merit (and the researchers who are to carry out the research have integrity) the involvement of human participants in the research cannot be ethically justified.

The cotton industry plays an important economic role in Australia, generating \$2 billion dollars in exports per annum (Cotton Australia and Cotton Research and Development Corporation, 2014). Australian cotton has a reputation for producing a high quality sustainable fibre, with notable sustainability achievements including highest average cotton yields than other cotton producing countries, 89% reduction in insecticide use over 15 years and 40% gain in water productivity over 10 years (Cotton Australia, 2016; Cotton Australia and Cotton Research and Development Corporation, 2014).

The main research question to investigate is:

How can the Australian cotton industry leverage its current onshore sustainability investments to create sustainable value along the supply chain?

To explore this question, this study adopts a qualitative methodology, informed by value chain thinking and value mapping methods. The concept of the value chain was first introduced by Michael Porter, and is defined as the stages in transformation from a raw commodity into a product, with each stage in the value chain adding economic value (Porter 1985). VCA has been “endorsed” as a strategic process and method for agri-food chains to “create further value” (Howieson, Hastings and Lawley 2016, 361). Value mapping is another approach to assessing chains, and The Cambridge Value Mapping Tool (CVMT) is designed as a workshop to assist companies in identifying opportunities for sustainable value creation (Bocken, Short, Rana and Evans 2013). In this approach, participants map how value is captured and uncaptured for a wide array of stakeholders to identify sustainable value propositions and opportunities for future progression.

The design of this study involves conducting interviews (either face-to-face or online via zoom, or through written responses such as email or online questionnaire) with the Australian cotton value chain to allow participants to

define sustainable value from their own perspective, identify where value is created, who it is valuable to and make connections between stakeholders that could reimagine the chain. This approach could also identify where in the Australian cotton value chain there is tangible economic value to be captured from sustainable practices, or whether it has other forms of value. For example, value could be in the form of chain customers (e.g. from merchants to retailers) willing to pay more for cotton that is ethically produced and traceable. Alternatively, being sustainable could be an expectation and essential for market access in the future, but attract no premium.

This approach will identify Australian cotton's sustainable value proposition, as well as key opportunities for future progress. Additionally, understanding sustainable value is significant in ensuring the future viability of the Australian cotton industry, encouraging its sustainable management of resources and maintaining Australian cotton's social licence-to-operate as it demonstrates the industry is responsible, sustainable and provides real benefits to its stakeholders and the wider community.

This project will draw on an existing body of data collected in 2017 across two category 1 Cotton Research and Development Corporation (CRDC) projects in which I was employed as a research assistant in the Institute for Future Environments (IFE): 1) [Agri-Intelligence in Cotton Production Systems – Stage 1](#) (QUT1701), and 2) (QUT1705). This data provides critical contextual data that will be used to inform the background of the study such as key issues, players, stakeholders and relationships through the cotton value chain on existing research.

Existing data and data collected in interviews (either face-to-face or online, or through written responses such as email or online questionnaire) will be analysed thematically using an inductive approach to create meaning and identify patterns and themes in response to areas in the value chain where Australian cotton can build sustainable value and with which stakeholders (Gioia et al., 2013; Lapadat, 2010; Leavy, 2017). The qualitative analysis software NVivo 11 will be used for the coding process. The interview or questionnaire data may also be converged or 'triangulated' with other data sources from QUT1705 and QUT1701, as well as academic literature, to test and confirm themes from the data.

References

- Bocken, N., S. Short, P. Rana and S. Evans. 2013. "A value mapping tool for sustainable business modelling". *Corporate Governance: The International Journal of Business in Society* 13(5): 482–497.
- Cotton Australia. 2016. "Economics of Cotton in Australia." Accessed August 2, 2017. <http://cottonaustralia.com.au/cotton-library/fact-sheets/cotton-fact-file-the-economics-of-cotton-in-australia>.
- Cotton Australia and Cotton Research and Development Corporation. 2014. *Australian Grown Cotton Sustainability Report*. Accessed January 12, 2017. http://crdc.com.au/sites/default/files/pdf/Cotton_Sustainability_Report_Exec_Summary.pdf.

Gioia, D.A., K.G. Corley and A.L. Hamilton. 2013. "Seeking qualitative rigor in inductive research: Notes on the Gioia methodology." *Organ. Res. Meth* 16 (1): 15-31. doi: DOI: 10.1177/1094428112452151

Howieson, Janet, Kathy Hastings and Meredith Lawley. 2013. "Creating Value in the Supply Chain for Australian Farmed Barramundi: Whole of Chain Perspective." *Journal of International Food and Agribusiness Marketing* 25 (4): 287-297.

Lapadat, Judith C. 2010. *Thematic Analysis*, edited by Albert J. Mills, Gabrielle Eurepos and Elden Wiebe. Vol. 1, *Encyclopedia of Case Study Research*. Thousand Oaks, CA: Sage Publications.

Leavy, P. 2017. *Research Design: Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches*. New York: Guilford Publications.

Porter, Michael E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York, NY: The Free Press.

A1 .4b Has the scientific or academic merit of the research project been evaluated?

Review of the scientific or academic merit of the research project should be robust, formal and independent of the researcher team (e.g. a peer review of the protocol/proposal/research plan may have occurred at confirmation of candidature, or the researcher may have sought peer review from an independent scientist). A template is in the kit for you to seek a peer review.

Yes, this is a CRDC industry co-funded PhD project and the research design has been approved by the funding body. Additionally, the researcher has passed Stage 2 with external reviewer as well as supervisory team approving the research design.

A1 .5 Why should this be considered a negligible OR low risk application?

Refer to [Section 2.1 of the National Statement](#) when preparing your response and note that:

'Negligible risk research' describes research in which there is no foreseeable risk of harm or discomfort; and any foreseeable risk is no more than inconvenience (e.g. filling in a form, participating in a street survey, or giving up time to participate in research).

'Low risk research' describes research in which the only foreseeable risk is one of discomfort (e.g. minor side-effects of medication, the discomforts related to measuring blood pressure, and anxiety induced by an interview). Research in which the risk for participants is more serious than discomfort (e.g. where a person's reactions include pain or becoming distressed) the research cannot be considered low risk.

This application should be considered as a low-risk application. The participants for the study will all be over the age of 18 and are not in any other high-risk category. As the cotton value chain is global, an indicative list of the countries of participants include: Australia, China, Indonesia, India, the United States (US) and the United Kingdom (UK). The semi-structured interview questions will be given to participants well before the interview and they will be aware of what will be asked and can give a considered answer or chose not to answer. If participants use the online questionnaire can give a considered answer and can chose not to answer questions. Questions will not ask participants to reveal sensitive or controversial information.

A2 Potential Risks and Benefits (refer to [Section 2.1 of the National Statement](#) when preparing your response)

A2 .1 Describe ALL the identified potential risks and who may be affected by these risks e.g. researchers, participants, participant community and/or the wider community. Ensure all risks mentioned at A2.1 are addressed, and that the risks and their management are consistent throughout the application and are addressed where applicable in the Participant Information Sheet and Consent Form.

When gauging the level of risk ensure you take into account:

The kinds of harm, discomfort or inconvenience that may occur.

The likelihood of these occurring.

The severity of any harm that may occur.

The choices, experience, perceptions, values and vulnerabilities of different populations of participants will also be relevant.

Below are six identified potential low-risks associated with the research project that may affect either the research participants, the wider Australian cotton industry or the Researcher conducting the study:

Risk of Researcher (Mellick) revealing confidential information. Mellick was a research assistant in previous CRDC projects QUT1701 and QUT1705 where she listened and transcribed the majority of interviews (primary data). Researcher may have acquired confidential knowledge of potential participants prior to engaging with them.

As participants will be part of a linked value chain, there is a small risk of participants revealing commercial, political or sensitive information which could either:

Identify the participants;

Expose or compromise relationships within the chain; or

Make participants feel uncomfortable.

There is a chance that the duration of face-to-face interviews (60 minutes) will inconvenience participants' time, as it may take them away from business as usual. Alternatively, participants can respond to questions via email or using the online questionnaire.

There is some risk of misunderstanding or cultural insensitivities occurring.

As this project seeks to engage with the global cotton value chain, language barriers maybe a risk with textile and garment manufacturing participants (in the middle of the chain) as facilities are predominantly located in the Asia Pacific region and researcher Mellick may not be familiar with local language or customs. The online questionnaire will be hosted through Microsoft Forms which has an inbuilt translating function, allowing greater for participants whom English is their second language.

There is a low risk that data collected during interviews, email responses or online questionnaires could taint or jeopardise the reputation of the Australian cotton industry.

Travelling overseas and interstate may present some low risks for the researcher.

A2 .2 How are the risks to be minimised? And how will they be managed if they were to occur during the study or arise after the completion of the study?

NOTE: The greater the risk to participants in any research for which ethical approval is given, the more certain it must be both that the risks will

be managed as well as possible, and that the participants clearly understand the risks they are taking on. Ensure all risks mentioned at A2.1 are addressed here, that the risks and their management are consistent throughout the application and relevant information is included in the Participant Information Sheets and Consent Forms.

Below are the proposed strategies in place to overcome identified potential low-risks associated with the research method to be deployed in the research: Researcher Mellick signed a confidentiality agreement to not share information or data collected during the CRDC projects QUT1701 and QUT1705 outside of the Research Supervisory Team consisting of Payne, Peterson and Buys. In terms of using existing research, only data and information that has been aggregated and published in scientific journals or in CRDC reports will be used in this project. Researcher will not pass on any information that is anecdotal or hearsay in nature during interviews (either face-to-face or online, or through written responses such as email or online questionnaire).

Following Robson's (2011, 209) good practice, participants will be anonymous through code names so participants can speak candidly but also avoid revealing anything of commercial sensitivity. Participants will be engaged in the following manner and consent will also be attained prior to the interview (either face-to-face or online via zoom or written responses such as email or online questionnaire):

Potential participants will be recruited via email which will contain information about the research project QUT1901 and seek initial consent to be engaged in the process of being a participant.

Participants will be given an 'Information Sheet' containing relevant information regarding the research design. This will include a consent form and a list of questions. If a participant chooses to be interviewed face-to-face, consent will be attained for participant's time (approximately 60 minutes), for their interview to be recorded, as well as their information to be noted and used in scientific, journalistic and CRDC publications. If a participant chooses to participate using the online questionnaire, consent will be attained through a 'consent question' where participants must select that they give their consent for the researcher to use their responses.

During the interview (either face-to-face or online via zoom, or through written responses such as email or online questionnaire) participants are not obligated to answer all questions and where the interview is conducted face-to-face or online via zoom, the interview will stop at any time the participant feels uncomfortable.

After the interview, the researcher will either send the interview recording file to a QUT-provided transcription service or extract the participants written responses from email or online questionnaire. After interviews have been transcribed and the written responses have been extracted, the researcher will 'clean' transcripts and code information/names with to minimise the risk of individuals' or companies' privacy being breached and preserve participant confidentiality. The researcher will send participants their transcript (via email), and participants will have 10 business days to edit, revise or amend transcript before it is then aggregated (for example, taking out identifying information such as location or update/correct information such as statistics).

Researcher will inform the participant and/or the participants company of the benefits (see A2.3) to the cotton value chain by participating in the research project. The research method is designed to be flexible and considerate of participants' time so that they can engage at their convenience either face-to-face (location of their choice), or via phone through teleconference, skype, zoom.

Non-English participants will not be approached as participants, although participants who speak English as a second language will be included in the study. All engagement with participants will be in English and any relevant information will be given in advance (i.e. Participant Information Sheet and Consent Forms). Although it is anticipated that participants might be accustomed to engaging in business relationships in which English is a dominant language. Additionally, Mellick brings understanding and knowledge of contextual cotton related terminology which will be used in interviews and written responses (via email or online questionnaire) to avoid any misunderstandings.

CRDC will approve any material that is intended to be published and circulated before it is released as outlined in QUT1901 Schedule 3 (see QUT1901 SCHEDULE 3 – Acknowledgement). As stated in Minimising Risk 1, the Researcher (Mellick) will not pass on any information that is anecdotal or hearsay in nature outside of the Research Supervisory Team. Appropriate health and safety measures will be considered and taken when arranging travel and participant site visits. QUT will cover insurance whilst travelling. A formal risk assessment will be lodged with the Creative Industries Faculty.

References

Robson, Colin. 2011. *Real World Research*. Third ed. United Kingdom: John Wiley & Sons.

A2 .3 What are the potential benefits of the research and who would benefit from these?

Benefits of research may include, e.g. gains in knowledge, insight and understanding, improved social welfare and individual wellbeing, and gains in skill or expertise for individual researchers, teams or institutions.

Some research may offer direct benefits to the research participants, their families, or particular group/s with whom they identify. Where this is the case, participants may be ready to assume a higher risk than otherwise.

This project has significant benefits to the Australian cotton value chain members, stakeholders and the wider community, such as:

Maintain Australian cottons competitive advantage in sustainability;
Deepen the industry's understanding of the different kinds of value that can be captured from social and environmental sustainability at each point in the supply chain;

Identify Australian cottons sustainable value proposition in the global value chain; and

Access to information that the industry can use to its strategic advantage and open-up new opportunities to achieve positive social, environmental and profitable impacts in its business in a global competitive market.

The project has direct benefits to participants, such as:

The opportunity to share perspectives on value chain issues that can lead to improvements such as chain alignment, resource management and minimising waste.

The project has underlying benefits to the Researcher, such as:
 Conducting transdisciplinary research across the fields of fashion, agri-food, economics and sustainability;
 Developing knowledge and skills in value chain analysis methods and applying research to the ‘real world’ through industry connection; and
 Intrinsic professional academic development including research and communication skills, liaising with industry and project management.

A2 How do the benefits justify the risks?

.4 Research is ethically acceptable only when its potential benefits justify any risks involved in the research.

The potential risks associated with the project as outlined above are low risk based on the management strategies in place. This study will benefit the Australian and global cotton industry, value chain stakeholders, as well as the wider community. The benefits of this study therefore outweigh the risks.

A3 Other General Information

A3 Where will the data be collected? (e.g. on site at QUT or other location)

.1 **NOTE:** If you would like to conduct your study at the premises of an external organisation/association please ensure you provide a copy of your intended approach letter which requests their support/permission for this, or provide evidence of this if already gained.

	QU T	X	Other – details:	Interviews will either be conducted through teleconferencing or face-to-face in workplaces in Australia or Asia. Email or online questionnaire responses can be done at a time that suits the participant.
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A3 Is the QUT Human Research Ethics Committee (UHREC) the primary or only ethics committee reviewing this proposal?

.2 If **NO**, provide details of any other institutional HREC involved and the role of each institution (including QUT) in the project. If the project involves more than one institution that also has a HREC, please provide details on the role of QUT UHREC; whether arrangements can be put in place for to minimise multiple review; arrangements for communication of the roles/responsibilities between the institutions HRECs, e.g. who will monitor etc.

Yes.

A3 What are the estimated timeframes for the project? (mm / yyyy)

.3 **NOTE:** Data collection cannot commence until you have received formal written UHREC approval.

Start of project	16/07/20 18	Start of data collection	01/02/1 9
End of project	16/11/20 21	End of data collection	28/02/2 1

A3 Describe the qualifications and relevant experience of the researcher team

NOTE: Include the training and experience student researchers have in the relevant research methodologies.

All team members bring to the project existing skills, capabilities, and relationships with stakeholders through the cotton value chain, including a body of data collected in 2017 across two category 1 Cotton Research and Development Corporation (CRDC) projects in which I was employed as a research assistant in the Institute for Future Environments (IFE): 1) [Agri-Intelligence in Cotton Production Systems – Stage 1](#) (QUT1701), and 2) (QUT1705). I worked closely with Associate Professor Alice Payne (Fashion), Associate Professor Robyn Mayes (Business) and Professor Laurie Buys (External – UQ) across these projects, and the proposed PhD project builds upon this work.

Section B: PARTICIPANT OVERVIEW

(refer to [Section 2.2 of the National Statement](#) when preparing your response)

B1 Who will be approached to participate? Clearly outline each participant group.

.1

Provide details of the potential participant pool. If you are accessing secondary data please provide full details, including whether permission has been sought. If you are accessing confidential health information e.g. Queensland Health data, the Public Health Act specifies the approvals required (see link below) and QUT requires a Hospital Access Agreement. Contact the Division of Research & Commercialisation for assistance.

http://www.health.qld.gov.au/ohmr/html/regu/aces_conf_hth_info.asp

Participants will be stakeholders along a connected Australian cotton value chain, which follows a product from start to finish. Specifically, participants will be English-speaking or English as a second language, and come from these key groups:

Stages in the value chain	Location	Examples
Input suppliers	Australia	Cotton Seed Distributors, Monsanto
Growers	Australia	Australian growers
Ginners	Australia	Australian ginners
Merchants / Brokers / Agents	Australia	Australian Cotton Shipping Association (ACSA) member
Mills	Asia	Chinese, Indonesia or Indian mills
Textile manufactures	Asia	Chinese, Indonesia or Indian factories
Garment manufactures	Asia	Chinese, Indonesia or Indian factories
Retailers	Australia, UK, US	Australian retailer
Waste Disposal	Australia	Textile recyclers
Cotton industry bodies	Australia	Cotton Australia (CA), CRDC, ACSA

B1 How many participants do you need for your study and approximately how many will you need to approach?

.2

The study will examine 2-3 value chains, requiring approximately 7-10 participants for each chain. Hence in total the study requires 20-30 participants:

No of participants	Stages in the value chain	Location	Examples
2–3	Input suppliers	Australia	Cotton Seed Distributors, Monsanto
2–3	Growers	Australia	Australian growers
2–3	Ginners	Australia	Australian ginners
2–3	Merchants / Brokers / Agents	Australia	ACSA member
2–3	Mills	Asia	Chinese, Indonesia or Indian mills
2–3	Textile manufactures	Asia	Chinese, Indonesia or Indian factories
2–3	Garment manufactures	Asia	Chinese, Indonesia or Indian factories
2–3	Retailers	Australia, UK, US	Australian retailer
2–3	Waste Disposal	Australia	Australian charities, Retailer with a used clothing recycling scheme
2–3	Cotton industry bodies	Australia	CA, CRDC, ACSA
20–30	Total		

This methodological approach is strictly related to the level of access granted by the Australian cotton value chain. If participants are unwilling to be involved, a different research methodology will be required.

B1 **How will potential participants be identified and approached?**

.3 NOTE: If you would like to recruit participants via an external organisation/association please ensure you provide a copy of your intended approach letter which requests their support/permission, or provide evidence of this if already gained.

Research participants will be selected based on their position in the chain, starting from a single grower, to cotton marketing and ginning firm/s, progressing to offshore agent and spinning mill, textile and garment manufacturer, through to an Australian retailer. Purposive snowballing sampling techniques will be used to identify which players to interview along a connected chain (Tongco, 2007), as well as through advice from the Australian cotton body CRDC, CA and ACSA to assist in approaching firms and/or individuals. However, CRDC, CA and ACSA will not be informed which firms or individuals agree to participate in the study. This method is feasible because physical tracking of Australian cotton through the value chain has already been undertaken by retailers such as Kmart, Target and the EDITION label (Cotton Australia, 2017a; Sutton, 2018; Wesfarmers, n.d.).

If participants are not within the research team’s existing network, other methods in approaching participants include emails or LinkedIn messages to individuals within companies. When approaching potential participants for

the first time, an email may first be sent to the company or organisation asking for assistance and permission in identifying individuals to participate, upon which a subsequent email will be sent to said individual with an invitation to participate.

References

Tongco, Maria DC. 2007. "Purposive sampling as a tool for informant selection." *Ethnobotany Research & Applications* 5: 147-158.

Cotton Australia. 2017. "Cotton Australia welcomes Kmart Australia's commitment sustainable fibre." Accessed 30 October 2017.

<http://cottonaustralia.com.au/news/article/cotton-australia-welcomes-kmart-australias-commitment-sustainable-fibre>.

Sutton, Alice. 2018. "Collections." Accessed August 29, 2018.

<http://www.editionalicesutton.com/collections.html>.

B1 .4 How will the participants provide their consent to participate?

Outline the consent process you will use, what type of consent will be requested (i.e. specific, extended or unspecified – see [NS2.2.14](#)), what material will be provided to participants, how long participants will have to consider their decision to participate and what discussion will occur with participants.

NOTE:

A person's decision to participate in research must be voluntary and informed i.e. not forced, coerced or obtained by improper inducements AND based on sufficient information and adequate understanding of both the proposed research and the implications of participation in it (the purpose, methods, demands, risks and potential benefits of the research).

The process of communicating information to participants and seeking their consent should not be merely a matter of satisfying a formal requirement.

The aim is mutual understanding between researchers and participants. This aim requires an opportunity for participants to ask questions and to discuss the information and their decision with others if they wish.

It is anticipated that participants' consent will be given across two phases of the processes.

Phase One: Initial contact with participants

It should be noted that a method for identifying participants is through snowball sampling, whereby the step prior to the consent process may first involve seeking advice on potential participants through channels such as the Australian cotton organisation such as CRDC or other value chain members. Potential participants may include individuals or organisations.

If an individual, initial engagement will be in the form of a recruitment email (see 01_C_ETH_Email-Recruit-Individual_V1_190118). Consent can be given in the form of oral or email agreement to participate.

If an organisation, initial engagement will seek consent with management to approach staff to participate through email (see 01_C_ETH_Email-Recruit-Company_V1_190118). Consent can be given either orally or via email and the act of consent will be recommending an employee within the company to contact.

Phase Two: Consent

Individuals who agree to be a participant will then be sent a follow up email which contains a Consent Form and Participant Information Forms which outlines how the interview (either face-to-face or online via zoom, or through written responses such as email or online questionnaire) will run, including estimated time and questions, as well as post-interview follow up including transcript approval. After reading the information, participants will sign the consent form and send back to the Researcher (via email or post) who will keep a physical and digital copy on file.

B1 .5 Will the project involve participants who are unable to give voluntary or informed consent?

If **YES**, what special arrangements will be put in place to protect your participants' interests/welfare?

These questions refer to research involving:

Children and young people whose particular level of maturity has implications for whether their consent is necessary and/or sufficient to authorise participation (see [Section 4.2 of the National Statement](#)).

Persons with a cognitive impairment, and intellectual disability, or a mental illness (permanent or temporary) which impacts upon their ability to supply voluntary and informed consent (see [Section 4.5 of the National Statement](#)).

Persons who are highly dependent on medical care, e.g. unconscious or unable to communicate their wishes (see [Section 4.4 of the National Statement](#)).

Covert observation of behaviour, particularly if this relates to sensitive, contentious or illegal activity consent (see [Section 2.3](#) and [Section 4.6 of the National Statement](#)).

NOTE: Where participants are unable to make their own decisions or have diminished capacity to do so, respect for them involves empowering them where possible and providing for their protection as necessary.

No, this study does not involve those participants.

B1 .6 Do you propose to screen or assess the suitability of the participants for the project?

If **YES**, clearly state and explain the criteria (inclusion and exclusion, as applicable) for selecting potential participants.

Yes, participants will be selected based on their position in the Australian cotton value chain.

B1 .7 Will participants be offered reimbursements, payments or incentives?

If **YES**, also provide the specific details (type and value), how and when it will be provided and whether its offer could compromise the voluntary nature of the consent obtained from participants. See [Guidance on prize draws](#).

NOTE:

Details of these should be provided on the Participant Information Sheet.

It is generally appropriate to reimburse the costs to participants of taking part in research, including costs such as travel, accommodation and parking.

Sometimes participants may also be paid for time involved. However, payment that is disproportionate to the time involved, or any other inducement that is likely to encourage participants to take risks, is ethically unacceptable (NS2.2.10)

Decisions about payment or reimbursement in kind, whether to participants or their community, should take into account the customs and practices of the community in which the research is to be conducted (NS2.2.11)

No, participants will not be reimbursed for this time or offered payments or incentives. Scientific publications and public reports will be shared with participants who will benefit from the analysis resulting from the study.

B1 .8 Do you, or others involved in facilitating or implementing the research, have a pre-existing relationship with the proposed participants? Could this result in the proposed participants feeling obliged or coerced into participation?

Refer to [Section 4.3 of the National Statement](#) and the QUT [Research Data Collection in Classrooms or Lecture Theatres](#) guidance when considering/preparing your response.

If **YES**, describe this relationship and how you will address the special ethical issues this raises (e.g. potential coercion in recruitment). Also outline what special arrangements will be put in place to protect the interests/welfare of potential participants.

NOTE:

Pre-existing relationships may compromise the voluntary nature of participants' decisions, as they typically involve unequal status, where one party has or has had a position of influence or authority over the other. Examples may include relationships between employers or supervisors and their employees; teachers and their students; carers and people with chronic conditions or disabilities or people in residential care or supported accommodation; etc. (see [Section 4.3 of the National Statement](#) for more examples).

While this influence does not necessarily invalidate the decision, it does mean that particular attention should be given to the process through which consent is negotiated.

Yes, the Research Supervisory Team has existing networks from which participants may be drawn, as well as Australian cotton advisory organisations CA, CRDC and ACSA. Participants will be selected based on their position along a connected chain. Relationships between these stakeholders are of a business nature and are not part of the risk groups identified in Chapter 4.3 of the National Statement and will not feel coerced into partaking in the study.

B1 .9 Will you conduct a debriefing session at the end of the research or at the end of each participant's involvement?

If **YES**, please provide the details of this session. **NOTE:** Such a session is required for research involving deception (see [Section 2.3 of the National Statement](#)), and may be appropriate if the research is likely to cause discomfort to participants.

Yes, CRDC require milestone and progress reports for research stages, and research participants will be sent a copy of research that is published in scientific journals or public reports.

B1 .10 Consider providing feedback to participants as this is encouraged by the National Statement.

Will feedback and/or the research results be reported to participants?

If **YES**, explain how this will be done and in what form this reporting will occur.

If **NO**, explain why the participants are not to be provided with such a report.

Yes, participants will be sent a copy of scientific and public reports where the data has been analysed.

Section C: DATA MANAGEMENT

C1 Future Use of Data

C1.1

Is it likely/possible that any of the data collected will be used by you, or others, for any research other than that outlined in this application? See [Section 2.2](#) and [Section 3](#) when preparing your response.

If YES, describe below and ensure this is outlined in all your participant information sheets and consent forms.

Participants should be fully informed of the possibility of any future use of data collected and their ‘extended’ or ‘unspecified’ consent gained. Failure to do this may restrict the future use of the data.

Any restrictions on the use of participants’ data should be recorded and the record kept with the collected data so that it is always accessible to researchers who want to access those data for research.

Please note that data sharing is increasingly being encouraged to gain maximum benefit from research, so a **YES** response is encouraged in most cases. If **YES**, describe below and ensure this is outlined in all your Participant Information Sheets and Consent Forms.

Yes, participants will be informed about the usage of data for possible research activities in the consent form.

C2 Procedures & Protection

C2.1

What data collection procedures will be utilised?

Place an ‘X’ in the relevant boxes below **AND** provide a copy (draft or finalised, labelled as such) of the relevant instrument, protocol or other written form used to guide (e.g. interview questions/guide) or collect data (e.g. survey) or include an explanation of the method by which the data will be collected. Clinical experimental measures/tools or creative works are considered “Other Instrument”.

<input checked="" type="checkbox"/>	Questionnaires/Surveys	<input type="checkbox"/>	Archival records
<input checked="" type="checkbox"/>	Interviews	<input type="checkbox"/>	Focus groups
<input type="checkbox"/>	Other instrument – provide details:		

(If there is insufficient space below, provide details in an additional separate document.)

C2.2

Describe the human data that will be collected, stored and used/reported in terms of the level of identifiability of the data? For example data may be being collected, stored and/or used in various forms throughout the lifecycle of a project; describe each phase. Data may be in identifiable form at the individual level i.e. data from which the identity of a specific

individual can be reasonably ascertained e.g. name, image, date of birth, and/or address. Data may be in a form that is readily or potentially re-identifiable i.e. data from which identifiers have been removed and replaced by codes, but it remains possible to re-identify individuals, e.g. by using the code or linking different data sets. Alternately, data that has **never been labelled** with individual identifiers OR from which **identifiers have been permanently removed** such that no specific individual can be identified by the researchers may be the form in which it is collected. (See [NS Section 3.1 Element 4](#)).

Interviews

Phase One:

Raw identifiable data will be collected through audio-recorded interviews and transcribed using a QUT-approved transcription service. Information that is identifiable at this phase could include the participant's name, value chain stage, location and/or business. Both identifiable audio recordings and original transcripts will be stored.

Phase Two:

Original transcripts will be 'cleaned' by Researcher to de-identify participants information. For example, their name will be changed to their corresponding participant code and business names will be changed to their appropriate generic value chain stages. 'Cleaned' transcripts will be sent to participants to approve and make sure they are satisfied that all identifiable data has been removed.

Phase Three:

Approved, de-identified data will be stored separately to original interview recordings and transcripts to safeguard data identifiability. The de-identified interviews will be analysed using NVivo, and then reported referencing the participants code. The Research Supervisory team will have access to approved de-identified data.

Questionnaire or Email responses

Phase One:

Participants will write their responses to the interview questions using the questionnaire or through email communication.

Phase Two:

Researcher will export participants responses into an excel or word file. Researcher will then 'clean' data and de-identify participants information, as well as de-identify other business names participants mentioned.

Phase Three:

‘Cleaned’ responses will then be stored separately to the original recording to safeguard data identifiability. The de-identified responses will be analysed using NVivo, and then reported referencing the participants codes. The Research Supervisory team will have access to approved de-identified data.

C2.3

How is this project funded?

Outline what rights the funder of the study will have to data obtained from the study, and in what format e.g. aggregate reports only, access to raw data or other. **NOTE:** Any access by the funder should be made clear to participants.

This project is co-funded by CRDC and QUT’s RTP scholarship. CRDC will only have access to aggregated reports only (see QUT1901 SCHEDULE 2 – IP Register).

C2.4

How will confidentiality of the study records be protected during the study and in the publication of results?

NOTE: If you intend to identify participants or organisations, this needs to be made clear on the Participant Information Sheet.

Given the complex nature of relationships and the close-knit nature of the Australian cotton value chain, there is a small chance that individuals or organisations can be recognised. Participants will be briefed on the following procedures which will ensure confidentiality:

Participant consent forms as well as contact information (metadata) will be kept separate to recordings, coding mechanism (metadata), original transcripts and coded transcripts;

Researcher will go through original transcript with care to ensure organisations and participants are de-identified through a coding mechanism. Participants and their organisations will assigned code names and identified only by their segment of the value chain, as listed above. As a number of participants will be located overseas, as advised by 4.8, s4.8.4 of the National Statement, the researcher has checked the ethics approval processes for research conducted in Europe, United States, India, Sri Lanka, and China, and will fully comply with the expectations of ethical research in each country.

Codes will be used to organise file names for recordings and transcripts. Codes will be used or reported to CRDC and any scientific or journalistic publications;

Participants will be sent a coded transcript and will have an opportunity to review information (i.e. locations, clients, etc.) to see what else needs to be de-identified through coding.

Participants will also have the opportunity to review transcripts and amend any information that could be identify them. De-identified transcripts will be stored separate to original recording and transcripts.

Only the Researcher, participant and external transcription service will have access to the original recordings and

transcripts. The Research Supervisory Team will have access to the participants' approved de-identified transcripts.

C2.5

Is this a collaborative project?

If **YES**, also provide brief detail on data-sharing arrangements e.g. open – all parties have access to each other's data; partial – data held by collaborator completing particular component.

Yes, as a PhD student I will be responsible for project management, methodology, data collection and data analysis, mentored by the Research Supervisory Team of Payne, Peterson and Buys. Original interview data, transcripts, email and online questionnaire responses will only be accessible by the Researcher, the participant and the external transcription service, the Research Supervisory Team will only review material that has been checked by participants and anonymised, and then analysed.

C2.6

Who will own the resulting research data and the created intellectual property?

Place an 'X' in the relevant box/es below – at least one box must be checked. If relevant you can check more than one box, ie QUT and an external organisation. Please refer to the [D/3.1 Intellectual property \(IP\) policy](#) for further information.

	QUT – QUT is the owner of IP created by staff members in the course of their employment.
X	STUDENT/S – The IP generated is personally owned by the student if not assigned to QUT or other organisation.
	BOTH QUT & STUDENT/S – If the IP for a student project has been assigned to QUT, ownership of data and IP is shared.

(see [Student IP protocol](#))

X	EXTERNAL ORGANISATION – Give details:	IP agreement in place with co-funding body CRDC (see QUT1901 SCHEDULE 2 – IP Register). CRDC will not own or have access to raw data, only data that is provided in reports.
----------	--	--

NOTE: QUT requires an IP agreement to be in place if IP ownership is to deviate from that described in [D/3.1 Intellectual property \(IP\) policy](#). If you require any further assistance, please contact the relevant section of the [Division of Research & Commercialisation](#).

C3 Storage & Security

Ensure you have completed your [QUT Data Management Plan](#) **BEFORE** completing this section.

Data should be stored in a **locked filing cabinet at QUT** and/or electronically on a **QUT mainframe drive**.

Data must not be stored solely at home.

C3.1

X	YES Confirm that your research data and other records will be stored for the required period. Refer to the Management research data .
----------	--

C3.2

HARD/PAPER COPIES...

(e.g. **Signed consent forms** are required to be kept securely for **15 years** as per the Qld State Archives Schedule)

Qld State Archives:

<http://www.archives.qld.gov.au/Recordkeeping/Governance/Pages/Default.aspx>

University Sector:

<http://www.archives.qld.gov.au/Recordkeeping/GRKDownloads/Documents/Universities.pdf>

C3.2.1

What is the location/s of storage?

This will be stored in a locked filing cabinet in QUT KG-Z3 103.

C3.2.2

How will access to the stored data be controlled?

Via key held by Zoe Mellick

C3.2.3

Who will have access to the stored data?

Zoe Mellick

C3.3

ELECTRONIC DATA...

C3.3.1

What is the location/s of storage and back-up?

Data will be stored across four devices including Synplicity, QUTs Research Data Storage cloud-based server, a laptop and an external hard-drive. Hard-drive in use has a time machine mechanism which, in a scenario of corrupt files previous versions of files are easily accessible. Documents on QUTs network is also backed up nightly in two physical locations.

C3.3.2

How will access to the stored data be controlled?

Through password protection. The laptop and external hard-drive will be stored in a locked filing cabinet in the KG-Z3 103 (Fashion Post-Grad room).

C3.3.3

Who will have access to the stored data?

Zoe Mellick, Alice Payne, Robyn Mayes, Laurie Buys

Sample approach email / LinkedIn message

Subject Title:

Participate in a research study 'A Sustainable Value Chain Analysis for the Australian Cotton Industry'

Dear colleagues

My name is Zoe Mellick from the Creative Industries Faculty, Queensland University of Technology (QUT) and I'm doing a PhD study on how the Australian cotton industry can create sustainable value along its value chain.

I'm looking for perspectives from a wide range of individuals and organisations connected to the Australian cotton value chain, for example input suppliers, cotton growers, ginners, textile and garment producers, fashion retailers through to waste disposal.

As your organisation is a key stakeholder in the cotton value chain, I would like to hear your perspective on what sustainable value is, as well as where value is created and missed along the chain, whom it might be valuable to and opportunities for future value creation. I would like to interview you or a member of your team for 60 minutes either face-to-face (location of your choice), or via phone through teleconference, skype or zoom. Alternatively, you can participate through an online questionnaire or give responses to questions via email.

This PhD study is co-funded by the Cotton Research and Development Corporation and QUT's Research Training Program (RTP) Scholarship.

I would be grateful if you could forward our request onto your organisation's management, who may wish to recommend a potential interviewee to speak on the organisation's behalf.

Please view the attached Participant Information Sheet and Consent Form for further details on the study.

If you are interested in participating or have any questions, please contact me via email.

Please note that this study has been approved by the QUT Human Research Ethics Committee (approval number 1900000034).

Many thanks for your consideration of this request.

Zoe Mellick
PhD Student
+61 419 090 191
zoe.mellick@hdr.qut.edu.au

Dr Alice Payne
Supervisor
+61 7 3138 0187
a1.payne@qut.edu.au
School of Design, Creative Industries Faculty
Queensland University of Technology

A Sustainable Value Chain Analysis for the Australian Cotton Industry

QUT Ethics Approval Number 1900000034

RESEARCH TEAM.

Zoe Mellick zoe.mellick@hdr.qut.edu.au 0419 090 191

Alice Payne a1.payne@qut.edu.au 07 3138 0187

Robyn Mayes robyn.mayes@qut.edu.au 07 3138 1010

Laurie Buys l.buys@uq.edu.au 07 3365 6420

STATEMENT OF CONSENT

By signing below, you are indicating that you:

Have read and understood the information document regarding this research project.

Have had any questions answered to your satisfaction.

Understand that if you have any additional questions you can contact the research team.

Understand that you are free to withdraw without comment or penalty.

Understand that if you have concerns about the ethical conduct of the research project you can contact the Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au.

Understand that the research project will include an audio recording if you participate via interview or if you participate via email or questionnaire your written responses will be recorded

Understand that non-identifiable data from this project may be used as comparative data in future research projects.

Agree to participate in the research project.

Name

Signature

Date

PLEASE RETURN THE SIGNED CONSENT FORM TO THE RESEARCHER.

A Sustainable Value Chain Analysis for the Australian Cotton Industry

QUT Ethics Approval Number 1900000034

RESEARCH TEAM

Principal Researcher: Ms Zoe Mellick PhD student
Associate Researchers: Dr Alice Payne Principal Supervisor
Dr Robyn Mayes Associate Supervisor
Dr Laurie Buys External Supervisor
Creative Industries Faculty
Queensland University of Technology (QUT)

DESCRIPTION

The purpose of this study is to gather perspectives from the Australian cotton value chain around where sustainable value is added and captured, who it is valuable to (both in and beyond the chain, such as wider society, the environment and local communities), where value is missed or not being captured, and opportunities to create more value in the future. Findings from this study will give a more nuanced understanding of sustainability, identify Australian cotton's sustainable value proposition, as well as future opportunities, challenges and barriers for creating sustainable value along the Australian cotton chain.

This research project is a PhD study, which has been co-funded by the Cotton Research and Development Corporation and QUT's Research Training Program (RTP) Scholarship.

You are invited to participate in this research project because you are a stakeholder in the cotton value chain.

PARTICIPATION

Your participation will involve an audio-recorded interview either via face-to-face at your workplace or other agreed location, or via phone through teleconference, skype or zoom, that may take up to 60 minutes of your time. Alternatively, you can participate through an online questionnaire or give responses to questions via email.

Questions will include:

What is your role in the cotton value chain?

What is the average price for cotton at this stage? (i.e. \$/bale, metre, kilogram, garment) (optional)

What does sustainability mean in relation to your business?

What types of sustainable value does Australian cotton add in the apparel supply chain?

Please discuss environmental, transaction, use and social values in your response.

Where is value not being captured for Australian cotton?

What are the opportunities for Australian cotton in creating sustainable value along the chain?

What are the greatest sustainability challenges that will affect your business in the future?

Is there anyone that you interact with along the Australian cotton value chain that should be included in the study?

Your participation in this research project is entirely voluntary. If you do agree to participate you can withdraw from the research project without comment or penalty. You can withdraw anytime during the interview. If you withdraw with 2 weeks after your interview, on request any identifiable information already obtained from you will be destroyed. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT or CRDC.

EXPECTED BENEFITS

It is expected that this research project may have minor but direct benefits to you as a stakeholder in the cotton industry. Participating in this study as a stakeholder in the cotton value chain will give you the opportunity to share perspectives on defining sustainable value, improve the flow of cotton along the value chain, and receive research findings in the form of reports and scientific journals that have a ‘shared benefit’ for the global value chain. The project will also directly benefit the Australian cotton industry and deepen the industry’s understanding of the different kinds of value that can be captured from social, environmental and economic sustainability at each point in the supply chain.

RISKS

There are minimal risks associated with your participation in this research project. These include:

During the interview you may inadvertently disclose commercially sensitive information to the researcher. To avoid this risk, all participants will be anonymous through code names so you can speak candidly. In addition to this we will give you a transcript of the interview so that you can check and remove any item that you feel confidential to you and your organisation.

There may be some questions you may not feel comfortable with answering. You are not obligated to answer all questions and the interview will stop at any time you feel uncomfortable. You will be given the list of questions ahead of time, and you will also have the opportunity after the interview to check and amend your responses in the transcript.

You may feel inconvenience in participating in the interview, but the interview session is flexible and can be scheduled at a time and venue convenient for you, or conducted via teleconferencing.

Language/communication barriers or misunderstandings may occur during the interviews. You may misunderstand some questions and avoid answering, or the researcher may misinterpret your answers. The researcher will provide the questions in English ahead of time, and also provide you with a transcript after the interview so that you may correct any misunderstandings.

PRIVACY AND CONFIDENTIALITY

All comments and responses will be treated confidentially unless required by law, or regulatory or monitoring bodies, such as the ethics committee. The names of individual persons are not required in any of the responses.

As the research project involves an audio recording:
You will have the opportunity to verify your comments and responses prior to final inclusion.

The audio recording will be destroyed 5 years after the last publication.

The audio recording will not be used for any other purpose.

Only the named researchers will have access to the recording.

Every effort will be made to ensure that the data you provide cannot be traced back to you in reports, publications and other forms of presentation. For example, we will only include the relevant part of a quote, we will not use any names, or names will be changed, and/or details such as dates and specific circumstances will be excluded. Nevertheless, while unlikely, it is possible that if you are quoted directly your identity may become known.

The research project is funded by CRDC and they will not have access to the data obtained during the research project.

Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy.

Please note that non-identifiable data from this research project may be used as comparative data in future research projects or stored on an open access database for secondary analysis.

CONSENT TO PARTICIPATE

We would like to ask you to sign a written consent form (enclosed) to confirm your agreement to participate.

QUESTIONS / FURTHER INFORMATION ABOUT THE RESEARCH PROJECT

If you have any questions or require further information please contact one of the listed researchers:

Zoe Mellick zoe.mellick@hdr.qut.edu.au 0419 090 191

Alice Payne a1.payne@qut.edu.au 07 3138 0187

Robyn Mayes robyn.mayes@qut.edu.au 07 3138 1010

Laurie Buys l.buys@uq.edu.au 07 3365 6420

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE RESEARCH PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the research project you may contact the QUT Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

**THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.
PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.**

Appendix C

Cotton types and characteristics adapted from Organization for Economic Cooperation and Development (OECD) (2008)

Scientific Name	Other names	Native	Market share	Length	Characteristics
<i>Gossypium hirsutum</i>	Upland Cotton	Mexico, Central America, the Caribbean and southern Florida	90%	22–36 mm	Shorter fibres suitable for everyday products
<i>Gossypium barbadense</i>	America Pima cotton; Egyptian cotton; Sea Island Cotton; Extra-Long Staple cotton	South American	5%	35 mm	Suitable for smooth, luxurious fabrics
<i>Gossypium herbaceum</i>		India and Eastern Asia			
<i>Gossypium arboretum</i>		Southern Africa and Arabian Peninsula	4%	less than 23 mm	

Appendix D

Cotton sustainability initiatives

Program	Details	Source	Access Date
Better Cotton Initiative	<p>The BCI standardises ‘best farming practices’ leading to reductions in water use, chemical use, and carbon footprint, as well as promoting fair and decent work.</p> <p>Principles and Criteria</p> <p>The Better Cotton Principles and Criteria lay out the global definition of Better Cotton, by upholding the following seven principles:</p> <p>BCI Farmers minimise the harmful impact of crop protection practices</p> <p>BCI Farmers promote water stewardship</p> <p>BCI Farmers care for the health of the soil</p> <p>BCI Farmers enhance biodiversity and use land responsibly</p> <p>BCI Farmers care for and preserve fibre quality</p> <p>BCI Farmers promote decent work</p> <p>BCI Farmers operate an effective management system</p>	https://bettercotton.org/better-cotton-standard-system/production-principles-and-criteria/	23/08/2021
Organic – Global Organic Textile Standard (GOTS)	<p>Key Criteria for Processing and Manufacturing for GOTS</p> <p>Environmental</p> <p>Separation from conventional fibre products and identification of organic fibre products</p> <p>Use of GOTS approved colourants and auxiliaries in wet-processing only</p>	https://global-standard.org/the-standard/gots-key-features/ecological-and-social-criteria	23/08/2021

Program	Details	Source	Access Date
	<p>Processing units must demonstrate environment management, including wastewater treatment</p> <p>Technical quality parameters for colour fastness and shrinkage for finished goods required</p> <p>Restrictions on accessories</p> <p>Restrictions on additional fibre materials</p> <p>Environmentally hazardous substances prohibited in chemical inputs</p> <p>Evaluation of toxicity and biodegradability for chemical inputs</p> <p>Social</p> <p>The Standard sets requirements concerning working and social conditions that are equivalent to those of leading social sustainability standards. GOTS social criteria, based on the key norms of the International Labour Organization (ILO), United Nations Guiding Principles on Business and Human Rights (UNGPs) and Organization for Economic Cooperation and Development (OECD), must be met by all processors, manufacturers and traders. They must have a social compliance management system, with defined elements in place to ensure that the social criteria are met.</p> <p>Employment is freely chosen</p> <p>Freedom of association and collective bargaining</p> <p>Child labour shall not be used</p> <p>No discrimination is practised</p>		

Program	Details	Source	Access Date
	<p>Occupational health and safety (OHS)</p> <p>No harassment and violence</p> <p>Remuneration and assessment of living wage gap</p> <p>Working time</p> <p>No precarious employment is provided</p> <p>Migrant workers</p>		
Organic – Organic Cotton Standard (OCS).	<p>The Organic Content Standard (OCS) is an international, voluntary standard that provides chain of custody verification for materials originating on a farm certified to recognised national organic standards. The standard is used to verify organically grown raw materials from the farm to the final product</p> <p>OCS certification applies to all supply chain sites of organically grown content: first processor, manufacturing, packaging and labelling, storage, handling, and shipping through the seller in the last business-to-business transaction.</p> <p>The OCS may be applied globally.</p> <p>The OCS applies to supply chain sites of products not intended for consumption as food for humans or animals.</p> <p>The OCS applies to products that contain at least 5% organically grown material, calculated as a percentage of the entire product excluding accessories and trims.</p>	<p>https://textileexchange.org/wp-content/uploads/2021/02/OCS-101-V3.0-Organic-Content-Standard.pdf</p>	23/08/2021
Fairtrade	<p>Fairtrade cotton is produced in a way that provides economic opportunity for farmers</p>	<p>https://fairtradeanz.org/sto</p>	23/08/2021

Program	Details	Source	Access Date
	<p>and workers on the ground while also promoting more sustainable growing practices. In exchange for cotton fibre and other raw materials, Fairtrade workers must be paid the Fairtrade Minimum Price for their goods. They also receive the Fairtrade Premium. This Premium is additional funding that local co-operatives can decide how to reinvest in the business or their communities. Premium payments may go towards water efficiency schemes, for instance.</p> <p>Fairtrade Standards prohibit the use of certain chemicals and encourage integrated pest management techniques instead of pesticides. Weed control, even done by hand, can also help Fairtrade co-operatives avoid the need for pesticides.</p> <p>To sum it up, Fairtrade cotton prioritises economic uplift for cotton-producing workers and businesses, as well as their communities, while mandating specific environmental standards during cultivation.</p>	<p>ries/the- whole-story- on-cotton</p>	

Appendix E

Australian cotton value chain stages and activities adapted from Payne, Mellick, Simpson et al. (2017)

Farming

Cotton is a summer crop that is usually planted from September to November and grown over November to February, harvested around March through April, ginned and classed in March to June and sold by merchants/brokers between April and October (Cotton Australia, 2018b). Domestic cotton production is volatile due to the rainfall patterns around the Murray-Darling Basin, where 90% of Australian cotton is grown (Youl, 2021). The main activities on-farm can be broken into four segments: pre-harvest, growing and irrigation, harvest, and post-harvest. Pre-harvest involves preparing the farm and soil for planting, as well as selecting cotton seeds (from Cotton Seed Distributors) and other inputs (chemicals). The growing season is approximately four months from planting the seed to cotton bolls ripening. During this time, the crop is watered (if an irrigated farm) between four to five times, and integrated pest management (IPM) strategies are employed to protect crops and improve yields. IPM is an “ecosystem approach” which uses beneficial insects and minimises the use to pesticides, which creates economic value by reducing costs, as well as minimise human health and environmental risks (CSIRO, 2021; Mullen et al., 1997). Farmers usually check in with agronomists throughout the growing season and when crops are ready to be harvested. To harvest the crop, defoliant is applied (to encourage the leaves to fall off plants) and cotton is picked with machines, covered in reusable tarpaulins (square modules) or yellow plastic (round modules), and then transported to gins. Post-harvest farmers usually carry out maintenance on the farm, and, as cotton is a summer crop, farmers usually grow alternative crops in the winter, graze livestock over winter or rotate crops with grains to promote soil health. This means that growers not only grow cotton, but also other crops.

Ginning

At the ginning stage, the modules of picked cotton are firstly weighed at the weighbridge, then unwrapped (either manually or mechanically), and then fed through

the feeder bay to be processed. The plastic wrap from round modules is then collected and sent for recycling off-site. Cotton is firstly sent through a dryer to reduce moisture or water is added to achieve the correct moisture level of 5% (Cotton Australia n.d., p. 2), after which the cotton lint is separated from seed and trash using a saw gin machine and then pressed into a bale (weighing 227 kg), and a sample from each bale is sent to classers (Cotton Australia, n.d.). The pressed bale is then wrapped in 100% cotton knit cloth and placed in the gin lot for collection by merchants or warehoused. If cotton has been forward sold, ownership passes to the merchant once the cotton is pressed into a bale. Gins can also offer growers a seed for ginning deal where the value of the cotton seed is credited against the cost of ginning the cotton. Competition in the industry is high (particularly when cotton prices are low) because cotton growers are not particular on which ginner or marketer they use. Factors that determine industry competition between ginner is largely based on price and access to export markets (i.e. the ability to sell all the cotton).

Classing

A sample of cotton from every bale (approximately 200 g) is sent from the gin to the classing house. Classers follow the Universal Upland Grade Standards (the USDA approved standard). There are two methods for classing: High Volume Instrument (HVI) machines and visual classing. HVI machines are calibrated using the tiles from the USDA and measures for all parameters including colour, leaf, length, strength, micronaire and uniformity. Visual classing (or manual classing) is where the classer compares colour and leaf grade only to cotton samples provided by the USDA.

Marketing

Merchants and growers enter into a contract using a Premium and Discount (P&D) sheet. Merchants use the P&D sheet to apply discounts (if below) or premiums (if higher) based on the agreed quality parameters. The classing data is used to determine the quality parameters and what growers are paid based on the P&D sheet, or the price of cotton on the spot market. The merchants also use the classing data to sell the cotton to mills, as well as to arrange storage and shipment of bales. The merchant typically pays the invoice for the cotton ginning, and is responsible for the

collection of cotton from the gin, as well as shipment to the mills (ACSA, 2017; Payne, Mellick, Simpson, et al., 2017). Typically, growers use two or more merchants, and some growers also hire brokers to negotiate “contracts between merchants and mills, or negotiate ginning contracts and seed sales” (Payne, Mellick, Simpson, et al., 2017, p. 25). Growers tend to have a logistical relationship with merchants to organise, store and transport cotton to ports.

Spinning and Textile Manufacturing

At the spinning stage, ex-ginned cotton is blended is then put through a carding machine that cleans and aligns the fibres into a continuous, loose rope called silver, which is then stretched through a drawing process (called a second stage yarn). A roving machine then stretches the second stage yarn to make it thinner and finer by twisting strands together (called third stage yarn). Combing is an optional process to create finer and more uniform yarn, and is usually done for high quality garments. There are three main spinning systems including ring, rotor and air-jet, and Australian cotton is most commonly used in ring spinning. The yarn is then woven or knitted into a fabric. As most fabrics will go through a finishing process, such as bleaching or dyeing, an important aspect which spinners consider when purchasing cotton is low contamination and dye-ability of the yarn (influenced by micronaire and neps).

Appendix F

Gate prices

Commodity Chain Source adapted from BBC World Service in World Wildlife Fund (2007)

Value Chain	Price/per kilo of product
Seed cotton	\$0.32
Fibre	\$0.76
Yarn	\$1.32
Finished product	\$3.80
Selling price	\$25.00+

Gate Prices in ACVC 1

Participant	Actor	Gate Price
GR01, GR02	Cotton Grower	Ex-ginned Upland cotton: Base \$500 per bale Ex-ginned Long Staple cotton: \$50 or 10% above base, around \$550 per bale Spun cotton yarn: \$13–16/kilogram for small quantities, \$8-9/ kilogram for large quantities
GI01	Cotton Ginner	Raw cotton: \$620 to \$540 per bale Gin: \$70 per bale to gin Storage: No fees for forward sold cotton, \$4-5 into/out shed fee + storage \$0.45 cent per bale per week
TE01	Converter	Didn't set a price, but instead said they "double the profit per kilo of fibre"
SP01	Spinner	Did not set a price, depended on specification
TE02	Dyer	\$4 to \$8 per kilo

Participant	Actor	Gate Price
RE01	Garment Manufacturer / Retailer	Australian cotton fabric: \$20-25 per metre Garments: \$279 retail price
RE02	Garment Manufacturer / Retailer	Australian cotton fabric: \$8 per metre Garments: \$99-109 retail price
RE03	Garment Manufacturer / Retailer	Organic cotton fabric, knitted in Australia: \$7.50 per metre Garments: \$85-55 retail price
EN01	Second-hand Clothing Retailer / Charity	Second-hand cotton t-shirt: resale for between \$1 to \$5 Rag cotton: "A couple of dollars a kilo of clothing"
EN02	Designer using waste	Did not purchase the textile waste, but pays for the shipping and the mills' time No recycled cotton products available to purchase at time of interview

Gate Prices in ACVC 2

Participant	Actor	Gate Price
GR04	Cotton Trader / Marketer	\$490 to \$520 Australian dollars per bale
GR03	Cotton Grower	Underlying price is determined by the world market

Participant	Actor	Gate Price
TR01	Verification Provider	Did not indicate, typically a three-year subscription model with a retailer
AG01	Agent	Did not disclose
GM01	Garment Manufacturer	Did not disclose
RE07, RE05, RE06	Mass-market Retailer	Garments: \$29.95-99.95 retail price Australian cotton: \$2 or \$3 more expensive as a raw fibre compared to conventional cotton, and adds between 40 and 60 cents per garment at the Free on Board (FOB) level (the amount paid to the factory for that product) Verification: adds 80 cents per garment
RE07	Rental Retailer	One-off rental fee or monthly membership access: \$99–149