Behavioural determinants of consumers intention to recycle and reuse end-of-life garments in Australia

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CANDIDATE DECLARATION

I, Esther Oluwadamilola Olufemi Rotimi, declare that this thesis is my own original work and does not contain material that has been accepted for the award of any other degree or diploma.

To the best of my knowledge, this thesis contains no material previously published or written by another person except where due reference is made in the text. Where the work is based on joint research or publications, I have disclosed the relative contributions of the respective authors using the Authorship Declaration Form.

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Esther Oluwadamilola Olufemi Rotimi (18/0502023)

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ABSTRACT

Consumers' behaviour towards fashion consumption is changing. Australian consumers are adopting fast fashion principles and consuming fashion products at a ridiculous rate. This growth in fashion consumption has led to an increased waste issue known as post-consumer textile waste (PCTW). Most of these PCTW are disposed in landfills which has a negative impact on the environment. Therefore, there is a need to find sustainable approaches to managing these waste products.

Two possible solutions for the PCTW issue that consumers can engage in are recycling and reuse of their end-of-life garments. Within this study, the theory of planned behaviour was applied and extended to understand what factors predict consumers' intentions and subsequent behaviour to recycle and reuse end-of-life garments in Australia. Attitude, subjective norms, perceived behavioural control (PBC), general recycling behaviour, self-identity, and quality consciousness (for reuse only) were observed as direct influences on recycling and reuse intentions. Indirect relationships involving eco-literacy and self-efficacy were also explored.

A total of 500 questionnaires were disseminated using purposive sampling via Purespectrum (a market research and insight organisation) over a one-week period from 16th to 22nd March 2022. After cleaning the data, 481 and 428 responses were deemed appropriate for analysis within this study to understand recycling and reuse behaviours, respectively. The data were collected through an online questionnaire across all eight recognised states and territories in Australia. Structural equation modelling was used to investigate which of the aforementioned factors significantly predict the intentions and behaviour to recycle and reuse end-of-life garments in Australia.

In exploring recycling behaviour, the findings validate that all observed factors significantly predict Australian consumers' recycling intentions and behaviour. Recommendations are made to the Australian and broader fashion industry to improve communication messages targeted toward consumers. Also, there is a heightened call for government policy reform to encourage consumers to recycle and reuse their end-of-life garments.

However, findings reveal that attitude, perceived behavioural control, subjective norms, eco-literacy, and self-efficacy significantly affect behavioural intentions and further end-of-life garment reuse behaviour. This study adds to the body of work by focusing on reuse and expands the understanding of Australian consumers' garment disposal behaviour. There is emphasis on the need for a collaborative process amongst all the fashion supply chain agents.

This thesis contributes to knowledge and offers contributions and implications for practice. The research contributes to the literature by extending the theory of planned behaviour and exploring an extensive list of predictors in the recycling and reuse of end-of-life garments. Also, gaps were

established and addressed around the limited research focused on end-of-life garments and within the Australian context. Recommendations were made to Australian consumers, the fashion industry, the broader supply chain, the Australian government, and non-government agencies. Suggestions are made to educate and raise awareness on recycling and reuse of end-of-life garments with consumers. Also, that engagement activities be established to get consumers involved with recycling and reusing their end-of-life garments. Further, there are lessons to be learned from European countries that are leading in sustainable disposal and closing the supply chain loop. Ultimately, achieving a circular economy requires a collaborative effort amongst all the fashion supply chain agents the Government are called to drive the shift towards circularity by providing initiatives such as funding and policy changes. These contributions have implications for improving the sustainable disposal of garments end-of-life cycle, reducing the post-consumer textile waste sent to landfill and closing the supply chain loop in the drive towards a circular economy.

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LIST OF ACRONYMS

ABDC	Australian Business Deans Council
AMOS	Analysis of a moment structures
AVE	Average variance extracted
CE	Circular economy
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CLSC	Closed-loop supply chain
CR	Composite reliability
df	Degrees of freedom
DTPB	Decomposed theory of planned behaviour
EFA	Exploratory factor analysis
GFI	Goodness of fit
IFI	Incremental fit index
N	Number of cases
NAT	Norm activation theory
NRBV	Natural resource-based view
PBC	Perceived behavioural control
PCTW	Post-consumer textile waste
RBV	Resource based view
RMSEA	Root mean square of approximation

SC	Supply chain
SDG	Sustainable development goals
SEM	Structural equation modelling
SLR	Systematic literature review
SPSS	Statistical package for social sciences
SRMR	Standardised root mean-square residual
SUHREC	Swinburne's Human Research Ethics Committee
TLI	Tucker-Lewis index
TPB	Theory of planned behavioural
TRA	Theory of reasoned action
UN	United Nations
VBN	Value belief norm theory
WoS	Web of science

PART ONE: RESEARCH DESIGN SECTION

CHAPTER ONE: INTRODUCTION

1.1. FASHION INDUSTRY: THE GLOBAL CONTEXT

The term fashion is generally understood to mean a system of bodily display. It encompasses 'everyday' clothing, shoes, jewellery, luggage, perfume, and luxury goods (Pratt et al., 2012). From another perspective, fashion can be explained as an everchanging value system whereby items are deemed in or out of fashion, which changes their cultural and economic value (Pratt et al., 2012). Therefore, fashion is an industry that advocates trends. Extending on these definitions and in line with Choi and Shen (2016), this study considers the fashion industry to include sub-industries of apparel, footwear, and fashion accessories where these items can be in and out of fashion; and the fashion industry has a two-way relationship with the cultural and economic constructs at a given time.

The boundaries of the industry have expanded considerably over the past 20 years, from the industrial revolution to the modern era (Bhardwaj & Fairhurst, 2010). More recent years have seen a shift in the fashion industry whereby there is an increase in the number of fashion seasons, and retailers desire low cost and speed to market based on the modified structural characteristics of the supply chain (Bhardwaj & Fairhurst, 2010; Doyle et al., 2006). In addition, Bhardwaj & Fairhurst (2010) have identified marketing and capital investment as reasons for competitiveness within the fashion apparel industry. Choi and Shen (2016) state that the fashion supply chain is dynamic as it constantly evolves and functions globally across multiple countries, with many supply chain agents operating independently. These numerous agents include parties upstream of production—such as suppliers of raw materials including fabrics; textile and clothing manufacturers; clothing construction; and distributors, transporters and logistics partners—and downstream parties including retailers and consumers (Choi & Shen, 2016; Yang et al., 2017a).

The changes in the industry have brought about the era of fast fashion: when the latest runway trends are made at high speed, in large volumes, and at affordable prices (Duggan, 2019; Liu, 2019; Presley & Meade, 2018; Štefko & Steffek, 2018). This encourages consumers to frequent fashion stores with the idea of 'Here Today, Gone Tomorrow' (Bhardwaj & Fairhurst, 2010). Unquestionably, the waste generated throughout the fashion industry supply and value chains is a result of fast fashion. These wastes are manifested through *wasteful* consumer behaviour where garments are not necessarily discarded because they are old, damaged or worn out, but rather because they are no longer on trend or desirable (Binotto & Payne, 2017).

1.1.1. FASHION WASTE

"Waste is permanent and unavoidable, for there is no biological, technical, social, or historical system that does not produce remnants, remains, scraps, leftovers, that does not leave certain parts to decay, that does not secrete or reject. Anything in a system can become waste" (Moser, 2002, p. 102).

Waste is inevitable. Simply put, wastes are discarded, expelled, surplus items, or merely remnants of things we no longer want or need (Binotto & Payne, 2017). The question becomes, what is the purpose for the waste or leftover, and what effect does it have. Hawkins (2006) and Binotto and Payne (2017) refer to waste as an environmental and social problem that calls people to do the right thing—often bringing about guilt and self-regulation practices. Essentially, this denotes waste as a liability that needs to be managed, decreased, and eradicated. However, Binotto and Payne (2017) argue that waste is a notion connected to value, and as such, what is deemed waste can be re-categorised and reclaimed with a different value ascribed to it. Waste can bring new life, inspiration, and actions (Binotto & Payne, 2017; Hawkins, 2006).

Producing garments is a process that undeniably and unavoidably creates waste. Waste in fashion is produced throughout the entire value chain, from the waste of tangible resources such as water and fuel in growing fibre and in producing, dyeing, and cutting textiles, and the intangible waste of labour and creative energy expended to produce the garments, through to abandoned garments by end-users (retailers and consumers). Fashion waste has had a tremendous environmental impact: Baptist World Aid Australia (2019) affirms that the apparel sector alone accounts for 10% of all global emissions. Also, apparel firms are known to pursue low production costs and fast lead times by exploiting lower environmental and social aspects of the supply chain (Shen, 2014). The fashion supply chain also has recorded issues around social injustice, such as abuse relating to underpayment, poor health and safety standards, long and unhealthy working hours, extensive overtime hours, harassment and depression, physical and verbal abuse, time pressure, and child labour (Pedersen & Gwozdz, 2014; Štefko & Steffek, 2018).

There are two types of fashion waste: post-industrial and post-consumer wastes (Choi et al., 2012). Different approaches are required to manage both types of waste (Tomovska et al., 2017). Post-industrial waste is mainly generated during the design and manufacturing processes. Such waste often contains entirely new materials and is usually easier to manage because its material content and composition are known, and can be recycled (Choi et al., 2012; Dissanayake et al., 2021).

According to Tomovska et al. (2017), there is a divide in the fashion industry's supply chain based on developed and developing markets. They argue that post-consumer waste is often present in more developed economies where fashion consumption is high, as opposed to developing nations where garments are manufactured, which generates post-industrial waste. Post-consumer textile waste includes all garments and household textiles that the consumer no longer needs and chooses to discard (Büyükaslan et al., 2015; Koch & Domina, 1999; Steinbring & Rucker, 2003). My research focuses on these forms of waste and how they can be managed.

1.1.2. END-OF-LIFE GARMENT DISPOSAL

As previously discussed, fashion waste, especially post-consumer fashion waste, is a significant issue in developed economies like Australia. There are different sustainable practices for managing these post-consumer wastes. Birtwistle and Moore (2007) proposed the 3Rs (reduce, reuse, and recycle); Choi et al. (2012) suggested the 5Rs (reduce, reuse, recycle, redesign, and reimagine); and Bianchi and Birtwistle (2010) looked at selling, giving away, and donating of the garments. According to Nayak et al. (2020), despite the different practices available to manage end-of-life garments, consumers continue to view sending their end-of-life garments to landfills and incineration as their preferred option. Rotimi et al. (2021), in their recent article, provide an in-depth review of sustainable practices available for managing end-of-life garments and categorise their findings into four practices—reuse, recycling, recovery, and redistribution—and education and engagement.

According to Shirvanimoghaddam et al. (2020), textile reuse and recycling can be a potentially sustainable solution to reducing the high volume of waste caused by the industry. Reuse and recycling are well aligned with the circular economy concept as materials are recirculated by extending the product lifecycle beyond one life (Dissanayake & Weerasinghe, 2021). One significant advantage of reuse and recycling is that it reduces the need for virgin materials and associated resources like water and energy consumption and land use; it diverts waste from landfills; and it decreases the industry's environmental footprint (Dissanayake & Weerasinghe, 2021; Shirvanimoghaddam et al., 2020). Thus, the current study examines these two practices—reuse and recycling—as sustainable practices in managing post-consumer waste caused by end-of-life garments.

1.1.3. SUSTAINABLE FASHION INDUSTRY

A landmark report by Brundtland (1987) conceived one of the most globally understood definitions of sustainability: the ability to satisfy present needs without compromising the possibility to satisfy the needs of future generations. Seidman (2007) elaborates on this, stating that sustainability should extend beyond relationships with the environment to include relationships with each other, communities, and institutions. More recently, scholars and practitioners have argued for the integration of environmental, social, and economic criteria (Choi et al., 2012), highlighting a positive relationship between sustainability and financial performance and competitiveness (Ciasullo et al., 2017; Kim et al., 2015a).

The absence of sustainability within the fashion industry has been a growing global concern. Jacometti (2019) explains that consumers, non-governmental organisations (NGOs), and the media have pressured the fashion industry to adopt sustainable behaviour. However, while Jacometti (2019) claims that the general public's awareness of the environmental impact of fashion is low, the public is

increasingly interested in the issue of sustainability. While sustainability principles strive to conserve resources and generate zero waste, high consumption practices in fashion come at the expense of mass resources and considerable waste (De Brito et al., 2008; Dissanayake & Sinha, 2015). Incorporating sustainability within the industry is critical for managing these wastes.

The United Nations (UN) echoes the message that we need to think sustainably. In 2015, 17 Sustainable Development Goals (SDGs) were established and adopted by the member states of the UN (Stanton, 2020), including Australia. The goals were created as a "universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030" (Stanton, 2020). A sustainable fashion industry will meet all the UN's sustainable development goals. Still, my study is particularly aligned with the UN's 12th goal of responsible consumption and production, and the 13th goal of climate action.

1.1.4. THE AUSTRALIAN CONTEXT

Shirvanimoghaddam et al. (2020) reported that 501,000 tonnes of textiles and leather were sent to landfill in Australia between 2009 to 2010 alone, an average of 22.7 kg per person, which is twice the global rate. In 2017, Nayak et al. (2020) stated that an estimated 0.5 million tonnes of fashion and textile waste were sent to landfill in Australia. It is estimated that Australia currently disposes of 6,000 kilograms of fashion and textile waste every ten minutes. This accounts for 2.25 million tonnes of residual fashion waste per year at an estimated clothing value of $500 million (Baptist World Aid Australia, 2019; Liu, 2019). After the US, Australia is the second largest consumer of new textiles averaging 27 kilograms per person, per year (Moazzem et al., 2018).

Cramer (2022). According to Nayak et al. (2020), several Australian NGOs and textile manufacturers are interested in applying sustainable practises such as reducing, reusing, and recycling as potential solutions to fashion waste, However, while such practices are accessible to consumers, they are not being adopted. In Australia, there are two primary outcomes for end-of-life garments; the consumer either donates the apparel to charity stores or the garment is discarded in landfills. Liu (2019) shows that charity stores in Australia, like consumers, ultimately discard the high volume of unusable fast fashion garments they receive. The article mentions that in 2018, "Australian charities paid $13 million a year to dispose of 60,000 tonnes of unusable donations" (Liu, 2019). Thus, the majority of garments at the end of their life end up in landfill.

1.2. CHOSEN THEORY

The theory of planned behaviour (TPB) is chosen to underpin this research. According to Ajzen (1991), the theory of planned behaviour states that three factors determine a person's behavioural intention, leading to the actualisation of the observed behaviour. These include a person's attitude or disposition

towards a behaviour, the subjective norm that is shaped by the influence of friends and family, and the perceived behavioural control that determines the level of control they have over carrying out the said behaviour.

Several consumer behavioural theories were considered for this research. These include the Theory of Reasoned Action (TRA), Norm Activation Theory (NAT), Value Belief Norm Theory (VBN), and the decomposed theory of planned behaviour. The TPB was selected for this study because it is a commonly adopted and widely tested theory with proven applicability and appropriateness for studies looking at environmental behaviours (Ogiemwonyi, 2022)(Ogiemwonyi, 2022; Sheoran & Kumar, 2022). Thus, TPB is a good fit for this study, as it seeks to address waste issues and reduce its effect on landfills through understanding consumers' recycling and reuse behaviour.

1.3. RESEARCH RATIONALE

The rationale for undertaking the current study has been summarised under four key areas. Firstly, few articles have focused on sustainability endeavours post-consumption process, (Cervellon et al., 2012; Shen, 2014; Taghikhah et al., 2019; Thorisdottir and Johannsdottir, 2019). To date, research has predominantly focused on sustainability during earlier stages of fashion design (Goldsworthy & Ellams, 2019; James & Kent, 2019; Karell & Niinimäki, 2019). Consequently, it is essential to investigate post-purchase processes relating to garment disposal and sustainable practices that can limit the waste produced from disposing end-of-life garments. From a review of literature, the four main sustainable practices available to manage post-consumer waste at garment end-of-lifecycle are reuse, recycle, education and engagement, as well as recovery and redistribution.

The second point relates the significance of consumers in achieving circularity and closing the fashion supply chain loop, an area in which research remains inadequate (Gazzola et al., 2020; Ki and Ha-Brookshire, 2021; Palomo-Lovinski, 2020; Ta et al. 2022). Previous student have highlighted the role of consumers in recycling and reuse as sustainable approaches to managing fashion waste and in the move toward a circular economy (Ekström & Salomonson, 2014; Burton, 2018; Sandvik & Stubbs, 2019). Consequently, this research focuses on reuse and recycling as sustainable practices that could lead to circularity. This study explores the factors impacting consumers' intentions and behaviour to participate in reusing and recycling end-of-life garments. According to Rotimi et al. (2021), reuse is the extension of the clothing lifecycle beyond one cycle or use and, in doing so, could address sustainability issues within the fashion industry. Reuse acknowledges that consumers do not necessarily need to abstain totally from consumption but can achieve satisfaction by obtaining and wearing clothing that has been previously used (Freudenreich & Schaltegger, 2020). In this study, reuse encompasses repairing or repurposing of unwanted garments or donating, handing down,

swapping or selling of unwanted garments to family, friends, or in garage sales. Recycling, on the other hand, can be described as providing clothes for its material to be processed to other reusable forms and/or later transformed into raw materials or fibres to create new products (Bukhari et al., 2018; Choi et al., 2012; Gręboszk-Krawczyk & Siuda, 2019). Research has shown that almost all forms of textiles can be recycled or, in some way, repurposed to avoid landfill (Bertram & Chi, 2018). Within this study, recycling pertains to the act of placing end-of-life garments in recycling bins or giving them to recycling companies such as Textile Recyclers Australia, Australian Clothing Recyclers, and SCR Group, which have the capability to break down the garments into fibres. Reuse and recycling are similar because it calls for consumers to relinquish control over their garments. However, these terms differ in terms of time required for participation, available compensation or incentives (Weber et al., 2017), awareness campaigns, and marketing strategies. As a result, there is a need to explore consumers' intentions and behaviour to reuse and/or recycle their end-of-life garments.

Thirdly, a knowledge gap appears to exist between consumers understanding and attitude towards sustainability and their engagement with sustainable disposal of their fashion waste. Therefore, there is a need to explore factors that influence intentions and eventual behaviour to sustainably dispose of end-of-life garments. Thus, TPB is adopted within this study to explore intentions and recycling and reuse behaviours. While the TPB is one of the most applied theories to study consumer behaviour, within the fashion industry, its application has mainly been geared towards fashion consumption and purchase behaviour. Few studies have focused on applying the TPB to understand garment disposal behaviour. In order to gain an in-depth understanding of the determinants of consumers' recycling and reuse behaviours, TPB was extended in this study to include factors such as general recycling behaviour, quality consciousness, self-efficacy, self-identity and eco-literacy.

The final rationale that justifies the need for this study is the large volume of waste produced by Australian consumers, with much of it ending up in landfills and causing environmental problems. Therefore, there is a need to address this post-consumer waste issue within the Australian context. However, there is scarcity of studies within the Australian fashion industry. This presents a gap in the literature and heightens the need to explore the issue of fashion waste within Australia. Thus, data was collected from Australian consumers to understand their recycling and reuse behaviour of end-of-life garments.

With all the afore mentioned factors considered, the principal aim of this study is to explore potential sustainable disposal practices available at garment end-of-life with a focus on reuse and recycling. Also, the study aims to apply the TPB to understand consumers' reuse and recycling behaviour. The research explores the factors that influence said behaviours amongst Australian consumers.

1.4. RESEARCH OBJECTIVES

This research aims to provide recommendations regarding consumers' intentions to reuse and recycle end-of-life garments and improve sustainability within the Australian fashion industry and broader supply chain. To achieve this, the below objectives were developed:

1. To review the extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage post-consumer textile waste (PCTW) at the end of the lifecycle.
2. To establish the factors influencing consumers' intentions to recycle end-of-life garments in Australia.
3. To explore factors that predict consumers' intentions to reuse end-of-life garments in Australia.

The research objectives listed have been established based on understanding the research problems around the topic area. These objectives were developed to address the overall research aim formulated.

1.5. SIGNIFICANCE OF THE STUDY

As earlier stated, the study focuses on reducing post-consumer waste sent to landfill through an understanding of consumers' perspectives of end-of-lifecycle garments with a focus on reuse and recycling. This research will have practical and theoretical implications for current practices within the fashion industry. A key practical implication is that the national and global fashion industry as well as the Australian government would gain a clearer insight into factors that drive consumers to recycle and reuse their end-of-life garments. Subsequently, these factors would reduce waste sent to landfills and improve sustainability outcomes, especially with SDG13. At a theoretical level, this research would add to existing knowledge on bridging consumer intention and behaviour gap with consideration of the theory of planned behaviour. The study also seeks to address the imminent research gap on sustainability within the fashion industry by focusing on the role of consumers in managing post-consumer waste through reuse and recycling. It is anticipated that findings from the proposed research will provide insights into the sustainability of reuse and recycling of end-of-life garments in Australia. It is hoped that results from this study will improve how garment reuse and recycling can be marketed to consumers to increase their participation in the practices. Consequently, these could decrease the amount of PCTW and reduce the amount of fashion waste sent to landfills.

1.6. METHODOLOGY

The research methodology was progressively developed in line with the research questions, aims, and objectives. Based on the research problem, a quantitative approach was adopted.

Survey was used to collect data to understand consumers reuse and recycling behaviour in Australia. The data was collected from Australian consumers over the age of eighteen who reside in a recognised Australian state or territory. The survey is self-administered and provided online. The survey questionnaire was used to collect a large dataset within two months. The questionnaire is ideal for the current research as it allowed data to be collected beyond the state in which the study was conducted.

The survey questionnaires were sent out to a list of potential participants purchased from Purespectrum. Quantitative data used for this study were then derived from the survey responses. The data was analysed using structural equation modelling (SEM) to determine the significant predictors of intentions to recycle and reuse end-of life garments in Australia. SPSS and SPSS AMOS software packages were used to carry out this analysis.

1.7. RESEARCH ETHICS

Since the research seeks opinions from human participants, ethics approval was sought and subsequently obtained from the Swinburne's Human Research Ethics Committee (SUHREC) to ensure the privacy and confidentiality of all research participants before commencing the investigation.

1.8. RESEARCH SCOPE

The research focused on the Australian fashion industry because Australia is the second largest consumer of fashion waste globally (Moazzem et al., 2018). Thus, responses were gathered from Australian consumers only. Information was collected from all recognised states and territories: Victoria, New South Wales, South Australia, Northern Territory, Queensland, Western Australia, Australian Capital Territory, and Tasmania. It was essential to include all states for the generalisability of the result findings.

The participants for this study included consumers aged 18 years and over. That age range was chosen for the study because these consumers usually control their garments purchases; hence, it was assumed they also control their choice of garment disposal.

Data was collected between February 2022 to March 2022. Although the data collection occurred during the COVID-19 pandemic, the focus of the study was on the pre- and post-COVID era. The aim was to understand consumers' behaviour to reuse and recycle their unwanted garments under normal conditions without the pandemic.

1.9. RESEARCH DESIGN

The overall research design, including the research objectives, research approach, method, and data analysis used within this study, are presented in Figure 1.1.

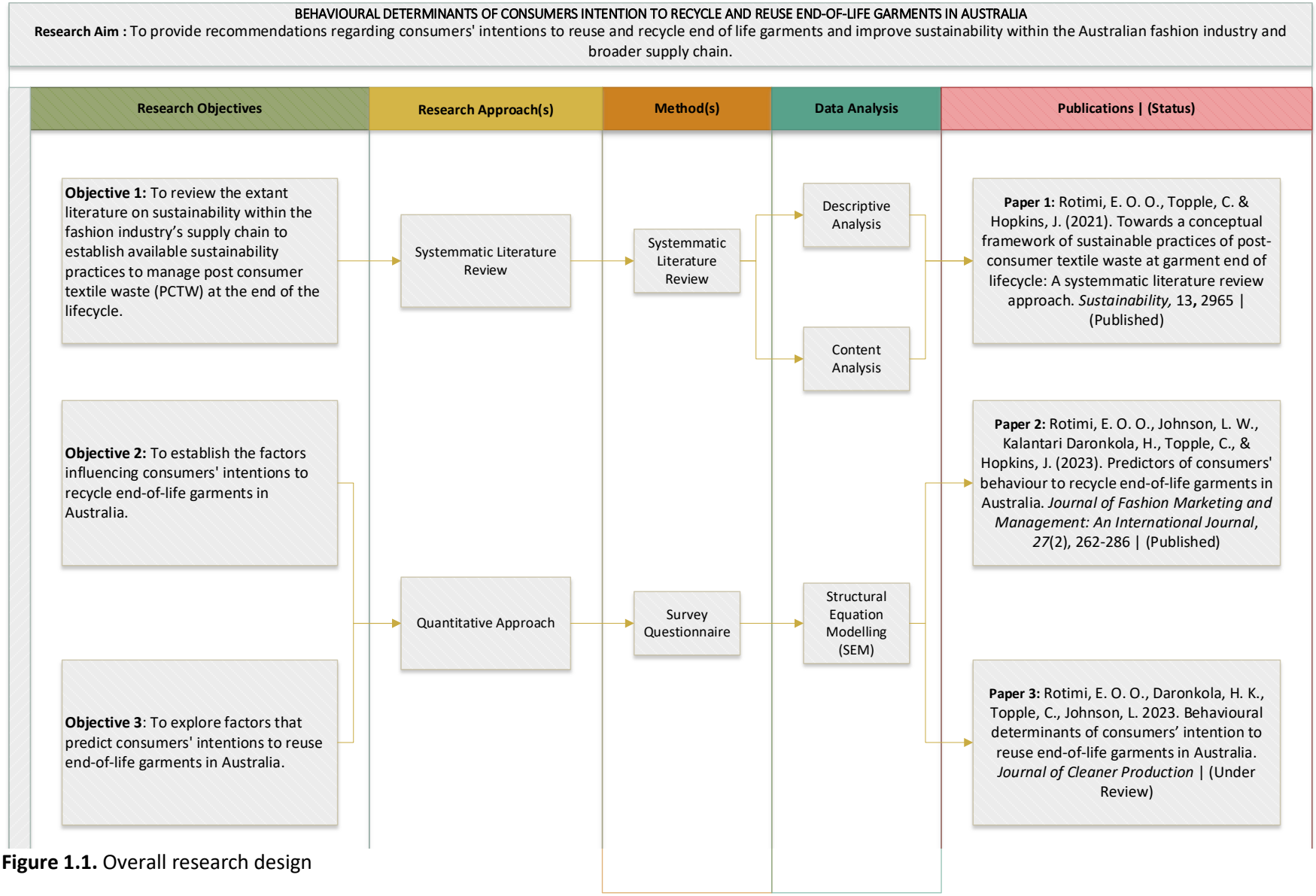

Figure 1.1. Overall research design

1.10. THESIS STRUCTURE

This thesis is divided into three parts: the research design, the findings, and the conclusion. The research design section includes chapters one to four, the findings section includes chapters five and six, and the conclusion section is chapters seven and eight.

Chapter one provides a general introduction to the research project and the context of the research problem. The chapter further justifies the rationale and significance of the study with a brief explanation of previous studies around the topic area. The study's research questions are presented, and the research aims and objectives are consequently developed.

Chapter two forms the first paper within the research which is a review of extant literature. This chapter (study 1) provides an in-depth and critical analysis of previous studies within the topic area by employing a systematic literature review approach. Gaps are identified within the area of garment end-of-lifecycle in the fashion industry. Further, an explanation is given of the research focus and direction.

Chapter three offers a discussion of the potential theories considered within this research. Further justification is provided for the selection of the theory of planned behaviour. Explanation of how the theory of planned behaviour is extended within this study is also provided.

Chapter four describes the research process from beginning to completion. Further, it explains the research paradigm, including the epistemology and ontology adopted within the study, as well as the overall research approach and methodology. The methods for data collection are discussed and the processes for analysing the data are explained. The chapter concludes with information on the ethical consideration made during the research process and an explanation of how reliability and validity were attained during the study.

Chapter five presents the second paper that looks to establish the factors that influence consumers behaviour to recycle end-of-life garments in Australia. This is an empirical study, and its results are based on the analysis of 481 questionnaire responses.

Chapter six presents the third paper and explores the predictors of intentions and behaviour to reuse end-of-life garments in Australia. This empirical study is based on the analysis of 428 questionnaire responses amongst Australian consumers.

Chapter seven states the contributions of the research to knowledge and industry. Recommendations are provided for the Australian and broader fashion industry, not-for-profit organisations, and the government based on the key findings from the studies conducted within this thesis.

Chapter eight concludes the research by summarising the key findings across the three studies conducted. Limitations to the study are presented. Finally, the chapter concludes with a discussion of potential areas for future studies.

1.11. CHAPTER CONCLUSION

This chapter provided the background information on the study. The research problem was explained along with the outlined research questions, aim, and objectives. Lastly, the structure of the thesis was presented, with a brief explanation of the contents of each chapter.

CHAPTER TWO: LITERATURE REVIEW (PAPER ONE)

2.1. CHAPTER INTRODUCTION

The objective of this chapter is to review relevant topical and contemporary literature within the areas of sustainability, supply chain, and the fashion industry to identify gaps in research and knowledge and consequently improvement opportunities in current practice. Within this chapter an in-depth review of literature is undertaken by employing a systematic literature review approach. The findings of the review are presented as Paper 1 which was published in *Sustainability* journal in March 2021. To date, this publication has twenty-two citations. This chapter guides the ongoing research direction.

2.2. PAPER 1: TOWARDS A CONCEPTUAL FRAMEWORK OF SUSTAINABLE PRACTICES OF POST-CONSUMER TEXTILE WASTE AT GARMENT END-OF-LIFECYCLE: A SYSTEMATIC LITERATURE REVIEW APPROACH

2.3. ABSTRACT

Fashion is characterised by rapidly changing trends and consumption patterns which have led to complexities and dynamism of the fashion supply chain (SC). Excessive generation of waste highlights the need for innovative ways to address unsustainable practices by feeding the waste back into the supply chain system. This paper reviews the extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage post-consumer textile waste (PCTW) at garment end-of-lifecycle. Four sustainable practices emerged from the review—education and engagement, recovery and redistribution, reuse, and recycling—and are central to a framework that shows the interaction of garment end-of-lifecycle practices and could the achievement of strategic competitive advantage. Our findings emphasise the importance for interaction and collaboration between consumers and retailers and further involvement of the entire supply chain. In addition, sustainability paradoxes were evident across the sustainable practices. To avoid this, for retailers are urged to shift towards cradle to cradle (closed loop) lifecycle supply chains. Furthermore, retailers should evaluate the practices they adopt by questioning their aim in the achievement of sustainability. We suggest that firms should consider the entire supply chain when adopting a sustainable practice and each agent's role in achieving the overall outcome of sustained competitive advantage.

Keywords: supply chain; sustainability; fashion industry; literature review; end-of-lifecycle

2.4. INTRODUCTION

At its core, the fashion industry's supply chain (SC) is "based on the notion of continual consumption of the 'new' and the discard of the 'old'" (Kozlowski et al., 2012, p. 17). The disposal mindset of consumers and shortened lifecycle of garments simply does not equate to the pursuit of sustainability,

making the afterlife of a product more significant, particularly with reducing and recycling waste within the supply chain (Choi et al., 2012). Kang et al. (2013) discussed consumer knowledge as a key factor in attaining environmental sustainability.

Traditional garment production before the late 1980s concentrated on basic items with occasional changes to design elements (Bhardwaj & Fairhurst, 2010). However, the end of the twentieth century brought about many changes including the decline of traditional apparel production and the growth of fast fashion where, for consumers to fit in socially, they must stay current with the ever-changing trends (Bertram & Chi, 2018). In more recent times, the COVID-19 pandemic has caused the pivot of fashion manufacturers to making face masks and other creative designs to keep their businesses open (Bhattacharjya, 2020).

Prior to COVID-19, the industry had an expected growth of approximately five percent by 2030, and the demand for clothing was set to increase by 63 percent at the current trajectory, it is estimated that the fashion industry will use two Earth's worth of resources exerting an unprecedented strain on the planet's resources (Liu, 2019; Paton, 2019). It is no wonder the fashion industry is considered to have one of the largest environmental footprints (Choi & Shen, 2016; Pedersen & Gwozdz, 2014), second only to the oil and coal industries (Duggan, 2019). Globally, the industry generates 10 percent of all greenhouse gas emissions and 20 percent of all wastewater (Baptist World Aid Australia, 2019; Paton, 2019). Recently, the COVID-19 pandemic has highlighted the social detriments of the industry, looking at fashion workers' health care, welfare, and payment rights in developing countries (Bhattacharjya, 2020; Russell, 2020). These articles highlight modern day slavery that are unsustainable.

To gain success in this generation, supply chain agents need to view sustainability as a central business strategy by committing to sustainability targets (Friedman, 2008). As the supply chain shifts away from the cradle to grave approach, firms within the fashion industry must be proactive and strive toward a closed-loop strategy (Choi et al., 2012). Closed-loops, or circular economy principles, highlight the significance of a lifecycle approach towards products and how their by-products are managed (Aakko & Koskennurmi-Sivonen, 2013; Azevedo et al., 2016). The cost implications of the depletion of resources and the associated by-products created, that are not captured or used (pollutants and waste), are a key consideration within the supply chain (Azevedo et al., 2016). Moreover, sustainability should be considered in relation to the resilience of supply chains and their productivity (D'Adamo & Rosa, 2020; Obrenovic et al., 2020). Experiences during the COVID-19 pandemic demonstrate how situations can change rapidly and sustainable policies may need to be adjusted to accommodate those changes (D'Adamo & Rosa, 2020; Obrenovic et al., 2020). D'Adamo and Rosa (2020) put this into perspective in their editorial paper. They talk about having an infrastructure in place to address

sustainability issues within the economy (D'Adamo & Rosa, 2020). In the same light, Obrenovic et al. (2020) suggested that organisations that are able to experience sustained operations during and post COVID-19 should have distributed leadership, workforce and an adaptive culture.

Within the context of the current paper, the role of supply chain agents is crucial in moving towards sustainability. James and Montgomery (2017), Belz (1996), and Yang et al. (2017a) argued that retailers have a significant role to play through their power and control, and capacity to connect consumers and suppliers, acting as "ecological gatekeepers" (Yang et al., 2017a, p. 1). However, Taghikhah et al. (2019), Shen (2014), Thorisdottir and Johannsdottir (2019), and Cervellon et al. (2012) all suggested that sustainability activities should not stop with retailers but should also extend to cover the post-consumption period. This puts the spotlight on consumers as a key part of the supply chain with their behaviour vital in the transition towards sustainability (Taghikhah et al., 2019). Moreover, collaboration between all supply chain agents is important to the implementation of sustainability practices (Oelze, 2017).

Yang et al. (2017b) argued that, within the fashion industry, more and more firms are adopting various sustainable strategies and practices, such as considering the use of eco-friendly materials that can be reused and recycled, green products and green certifications to achieve more sustainable supply chains. However, on the consumer side, the shortened lifecycle of clothing, and disposal mindset of consumers, contribute to post-consumer textile-waste (PCTW) and challenges have been noted with retrieving and sorting these waste products (Choi et al., 2012). Similarly, Shedroff (2009) discussed issues relating to recycling as these PCTW are composed of various blends during manufacture which may be unknown at the post-manufacture stage.

Consequently, the garment end-of-lifecycle has never been more important, particularly with managing waste within the supply chain (Choi et al., 2012). Several researchers have explored the need for transparency between consumers and retailers (Di Benedetto, 2017; James & Montgomery, 2017); however, little is known in the context of the garment end-of-lifecycle. Within the literature, papers analyse sustainability within the fashion supply chain (Ciasullo et al., 2017; Ciasullo et al., 2018; Nayak et al., 2019) and alternative power structures (suppliers and retailers) (Niu et al., 2017), whilst others discuss the circular economy and the role of consumers in fashion reuse (Machado et al., 2019). Upcycling (James & Kent, 2019) and recycling (Karell & Niinimäki, 2019) have also been examined but focus tends to be on the design phase (Goldsworthy & Ellams, 2019; James & Kent, 2019; Karell & Niinimäki, 2019) and not on garment end-of-lifecycle. Thus, this paper reviews extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage PCTW at garment end-of-lifecycle with the aim for firms to attain sustained competitive advantage.

To address how firms can attain sustained competitive advantage, this paper builds on the work of Jia et al. (2020), that the natural resource-based view (NRBV) is an appropriate theory for understanding closed-loop supply chain (CLSC) practices. NRBV stems from resource-based view (RBV) where competitive advantage for a firm is achieved through utilisation of resources that are scarce (rare) and unique (valuable) and therefore not easily replicated by competitors (Barney, 1991; Hart, 1995). Thus, resources (such as physical, financial assets, social processes and employees' skills) are basic units of analysis which in bundles results in a firm's capabilities and has an effect particularly on value-added tasks (Hart, 1995). Therefore, Hart (1995) stated that competitive advantage is achieved by firms who are not just focused on the conventional approaches to strategic planning but also where they understand, nurture and leverage on their core competencies. Further, Hart (1995) and Shi et al. (2012) argued that challenges and limitations caused by natural (biophysical) and social environments are in fact the key drivers of new resources and capability development. In more recent discussions, Jia et al. (2020) affirmed that a firm's competitive advantage is not only attained through the utilisation of rare, valuable, inimitable resources or resources that are internal to the firm but also those that consider the external environment.

The NRBV posits that the natural environment could constrain a firm's sustainable advantage (Hart & Dowell, 2011). Hence, sustained competitive advantage is "rooted in capabilities that facilitate environmentally sustainable economic activity— a natural-resource-based view of the firm" (Hart, 1995, p. 991). Hart (1995) suggested three interconnected strategic capabilities: pollution prevention, product stewardship, and sustainable development which Yunus and Michalisin (2016) believe could aid a firm in achieving its business and environmental sustainability.

According to Yunus and Michalisin (2016), the pollution prevention capability involves the prevention of emissions, effluents and wastes at the production and operation processes rather than 'at the end-of-pipe'. One of the limitations with this explanation, however, is that it does not explain the notion of 'end-of-pipe' in relation to CLSC, where there is no clear start or end point in the supply and value chain. This concept of pollution prevention as it pertains to the end-of-pipe stage has been challenged by Miemczyk et al. (2016), whose study demonstrated that pollution prevention and innovation orientation are needed in a CLSC. They elaborated on the NRBV theory and argue that there are issues beyond the control of a firm which may lead to end-of-pipe controls such as sorting and testing (Miemczyk et al., 2016).

Product stewardship extends on pollution prevention to include the entire value chain and lifecycle of a firm's product system (Hart & Dowell, 2011). It attempts to integrate the 'voice of the environment' with perspectives of various stakeholders into the product design and development processes (Hart & Dowell, 2011; Yunus & Michalisin, 2016). Miemczyk et al. (2016) suggested that when considering

product stewardship and pollution prevention as strategies, managers need to look beyond the entirety of their organisation, thereby highlighting the role of leadership within the supply chain.

The third capability is sustainable development which goes beyond environmental integrity to consider economic prosperity and social equity (Hart & Dowell, 2011; Yunus & Michalisin, 2016). Therefore, sustainable development presents a higher level capability strategy to pollution prevention and product stewardship as it looks at how competitive advantage could be maintained and sustained indefinitely (Hart & Dowell, 2011).

In understanding these capabilities, there is increasing concern with the limited study of the PCTW at garment end-of-lifecycle and how it could point firms towards sustained competitive advantage within the fashion CLSC. Thus, this paper builds on findings from the reviews of Jia et al. (2020) and Ki et al. (2020) to explore sustainable practices beyond the 6Rs (redesign, reduce, reuse, recycle, remanufacturer, repair) and the post-consumption stage. With consideration, this paper uniquely focuses on sustainable practices at garment end-of-lifecycle and how these could result in sustained competitive advantage through the application of the NRBV theory. Hence, this paper reviews extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage PCTW at garment end-of-lifecycle. Therefore, this paper develops a conceptual framework that explains the combination of these practices from a NRBV lens towards sustained competitive advantage.

To achieve the aim of the paper, we conduct a systematic literature review (SLR) to map, assess and synthesise literature to reach a clear conclusion as to what is known and unknown (Koberg & Longoni, 2019; Thomé et al., 2016; Tranfield et al., 2003). Abstracts for 274 papers are evaluated with 81 selected for in-depth full-text review. The method adopted for material collection and selection within the SLR is presented in Section 2. Section 3 provides descriptive analysis of the reviewed papers. Section 4 presents the results of the content analysis with the four major practices for garment end-of-lifecycle that emerged from the SLR, explained. The paper concludes in section 5 with a proposed framework along with discussion of findings from the review and future research directions.

2.5. METHODOLOGY

This paper employs the systematic literature review (SLR) method to establish a set of possible practices for managing PCTW generated from garment's end-of-lifecycle within the fashion supply chain. This method was selected as it provides the researcher with an objective, and less biased method, for selecting existing literature sources, and evaluating and analysing published works (Thomé et al., 2016). It documents the researchers' decisions and procedures, enabling clear conclusions to be drawn (Thomé et al., 2016; Tranfield et al., 2003). By minimising selection bias, the

study benefits from the recursive and iterative process of defining, clarifying, and refining keywords from searched academic resources (Saunders, Lewis, and Thornhill 2009).

A four-step process was adopted in line with Seuring and Gold (2012). The research material was collected, descriptively analysed, cogent categories were identified from the research material, and then evaluated. These four steps are described in more detail in subsequent sections.

2.5.1. MATERIAL COLLECTION AND SELECTION

SCOPUS and ISI Web of Science (WoS) were selected as the most appropriate databases for this study, as they are major databases that provide access to high-quality peer-reviewed journals. To frame the search, 'title, abstract and keywords' were used for the Scopus search, while the 'all fields category' was used for WoS. The searches were conducted in February 2020 and involved the keyword equations listed in step 4 in Table 1. The search returned 746 document results from SCOPUS and 910 using WoS. To refine the search results and obtain relevant documents, the scope of the study was delimited by the following:

1. Research Question	What are the available practices that exist for garment end-of-lifecycle?			
2. Databases	Scopus and Web of Science			
3. Delimiters	Inclusion Articles Journal (Scopus only) English Language All years of publication	Exclusion Conference papers, working papers, technical reports, reviews, books, editorial, conference review, and book chapters		
4. Search Terms	Keyword Equations	Scopus	WoS	Total
	Sustain* AND "Supply chain*" AND (Fashion OR Garment)	146	225	371
	Eco* AND "Supply chain*" AND (Fashion OR Garment)	190	341	531
	Green* AND "Supply chain*" AND (Fashion OR Garment)	26	59	85
	"Supply chain*" AND Reuse AND Recyc* AND Upcyc*	1	1	2
	"Circular Economy" AND (Fashion OR Garment)	34	49	83
	Total	397	675	1072
5. Remove Duplicates	Remove duplicates across the different keyword equations			320
6. Selection Criteria	Inclusion The articles focus on the fashion/garment/apparel industry	Exclusion Articles that only focus on value chain		

	The articles focus on downstream supply chain agents Address any of the sustainability criteria (economic, social, environmental) Some coverage on the garment end-of-lifecycle.	
7.Search Results	From keyword search (with removal of duplicates)	320
	From title and abstract review	81
	From full-text article review (with removal of unobtainable articles)	32
8 Reverse Snowballing	Steps 4 and 6 implemented	3
9 Final articles for content analysis		n = 35

* Asterisk used as a wildcard symbol to broaden search for keywords

Table 2.1. Research process.

2.5.2. DELIMITERS

- Only articles published in English language.
- Journals are limited to article document type and journal source type.
- With few publications in these research areas, all years of publication are considered and included.
- 'Articles in press' (publications that have been accepted but not assigned to a journal issue yet) are included.
- Conference papers, working papers, technical reports, reviews, books, editorials, conference review, and book chapters are not considered in this review to maintain the quality of content.

One thousand and seventy-two articles resulted from the keyword search using the delimiters stated in Section 2.5.2.

After removing the duplicates within and between the keyword equations, 320 articles remained for the evaluation.

Articles were selected in two stages. The first selection was based on the review of abstracts. In line with Seuring and Müller (2008), abstracts of these 320 articles were read by two researchers independently, to increase the rigour and reliability of the process. The abstracts were manually assessed based on their fit with the research question and alignment with the research aim. Researchers one and two (independent of one another) prepared individual excel spreadsheets assessing each paper based on its relevance to the research question and aim. Using a 'traffic light' coding system, articles deemed as definitely relevant to the review were assigned a green code, an

orange code was used for articles that might be relevant, and a red code applied to articles deemed non-relevant for the review. The two researchers then discussed their assessment with any discrepancies discussed until ultimately agreed upon. After this process, a total of 81 articles were selected for the second stage which involved a review of the full text.

The selected 81 articles were filtered further by reviewing the full article. Accordingly, inclusion and exclusion criteria were established to set the boundaries of the study (refer to Sections 2.5.3 and 2.5.4). These criteria are reflected in step 6 of Table 1. Four articles were not available for analysis; thus, the total sample was reduced from 81 to 77. To ensure accurate and consistent implementation of the inclusion and exclusion criteria, a sample of 20 randomly selected articles (approximately 25 percent of the total collected material) was reviewed by two authors. Divergences were again discussed until eventually agreed upon and shaped the selection process for the remaining articles. At the end of this stage, a total of 32 articles were identified and deemed relevant for the analysis contained in this review.

2.5.3. INCLUSION CRITERIA

- Only articles with a focus on the fashion/garment/apparel industry were considered for the review
- Articles with inclusion of supply chain management activities, especially looking at the downstream supply chain agents such as retailers and consumers were deemed appropriate for the research
- The articles needed to address at least one of the sustainability dimensions (economic, social, or environmental)
- Articles needed some coverage on the garment end-of-lifecycle.

2.5.4. EXCLUSION CRITERIA

- Articles were excluded if they focussed on value chain.

To strengthen the comprehensiveness of the review, a backward snowballing process was used to identify additional relevant articles from the reference list of the selected articles. This process, as adopted by Koberg and Longoni (2019) and Martins and Pato (2019), secured the identification of 11 new articles for consideration. To illustrate how the backward snowballing process was used, we take the article by Freudenreich and Schaltegger (2020b) as an example. As one of the 32 articles deemed relevant for analysis, after reading the full article, we identified Morana and Seuring (2007) and Morana and Seuring (2011) as potentially relevant articles that were not captured by our keyword search. We acquired both articles to assess their fit with our research question and aim. In this

manner, we identified 11 articles that were obtained through steps 3 to 6 of Table 1. Based on the delimiters identified in steps 3, two of the eleven articles were eliminated. Furthermore, after applying the selection criteria in step 6 to the abstract and full-text review, only three of the remaining eight articles were deemed relevant from the backward snowballing process. The total number of articles suitable for review was 35. The analysis of these articles is explained in more depth in the following sections.

2.6. DESCRIPTIVE ANALYSIS

This section provides a descriptive analysis of the selected 35 articles along with various elements.

2.6.1. ANALYSIS OF ARTICLES BY YEAR OF PUBLICATION

The most important criterion of descriptive analysis is to examine the sample of literature based on its distribution over time and across various journals (Seuring and Gold 2012). A descriptive analysis was conducted which shows that the publication frequency was distributed between 2007 and 2020; 2007 (n = 1), 2011 (n = 1), 2012 (n = 2), 2013 (n = 1), 2014 (n = 3), 2015 (n = 3), 2016 (n = 2), 2017 (n = 5), 2018 (n = 8), 2019 (n = 8) and 2020 (n = 1). As is shown in Figure 1, an increasing trend over the past decade is evident, particularly since 2013, of a steady rise in interest of the research areas. As the 2020 data are from an incomplete year, these results are excluded from Figure 1.

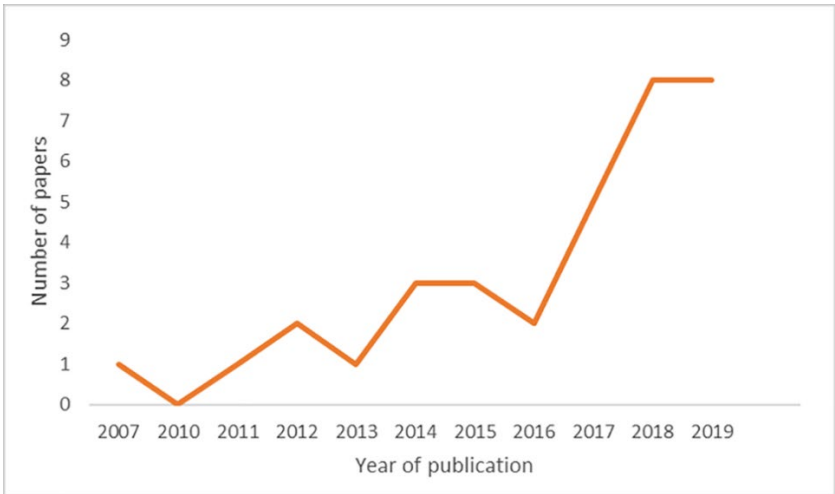

Figure 2.1. Spread of reviewed articles according to the year of publication.

2.6.2. ANALYSIS OF ARTICLES DISTRIBUTED ACROSS VARIOUS JOURNALS

The selected 35 articles are distributed across 22 different journal titles. Seventeen of these journals only account for one article each. Furthermore, more than 50 percent of the analysed articles (n = 18) are concentrated in the remaining five journals, which infers research priority and expertise of this research area (Table 2.2). The *Journal of Fashion Marketing and Management* and *Sustainability* journals contained the highest number of publications, with six publications each. The spread of

selected articles across various journals validates different journals' willingness to publish in the areas of sustainability, supply chain, and the fashion industry.

Journal Title	Number of Papers (n = 35)
Journal of Fashion Marketing and Management	6
Sustainability	6
International Journal of Fashion Design, Technology and Education	2
Journal of Cleaner Production	2
Sustainable Development	2
Supply Chain Management	1
Clothing Cultures	1
Resources, Conservation and Recycling	1
International Review of Retail, Distribution and Consumer Research	1
International Journal of Productivity and Performance Management	1
Design Journal	1
Journal of Interdisciplinary and Multidisciplinary Research	1
International Journal of Logistics Management	1
Fashion and Textiles	1
Waste Management and Research	1
AUTEX Research Journal	1
Fashion Practice	1
Journal of Strategy and Management	1
International Journal of Electronic Marketing and Retailing	1
Production Planning and Control	1
Journal of Macromarketing	1
International Journal of Production Research	1

Table 2.2 Spread of reviewed articles by journals.

3.3. Analysis of Journal by Scimago Rating

The quality and rigour of the articles forming the review can be traced to the journals in which they were published. Twenty of the articles analysed were published in Scimago-rated Q1 journals (Beh et al., 2016; Bertram & Chi, 2018; Camacho-Otero et al., 2020; Choi et al., 2012; Dissanayake & Sinha, 2015; Freudenreich & Schaltegger, 2020; Fulton & Lee, 2013; Han et al., 2017; Henninger et al., 2019; Hvass & Pedersen, 2019; Kozlowski et al., 2015; Lewis et al., 2017; Macchion et al., 2018; Morana & Seuring, 2007; O'Reilly & Kumar, 2016; Pal & Gander, 2018; Sandvik & Stubbs, 2019; Shim et al., 2018; Stål & Jansson, 2017; Vehmas et al., 2018); 12 articles were included in Q2-rated journals (Bukhari et al., 2018; Diddi & Yan, 2019; Ekström & Salomonson, 2014; Gręboszc-Krawczyk & Siuda, 2019; Hedegård et al., 2019; Holtström et al., 2019; Hu et al., 2014; Moorhouse & Moorhouse, 2017; Morana & Seuring, 2011; Norum, 2017; Paras et al., 2018; Shen, 2014); with two articles rated Q3 (Fulton & Lee, 2012) and Q4 (Mukherjee, 2015), and the last journal was not available on Scimago (Burton, 2018).

2.6.3. ANALYSIS OF ARTICLES DISTRIBUTED BY REGION

Information about the region of study of the selected articles is shown in Figure 2.2. Analysis of the data reveals that Europe dominates the garment end-of-lifecycle literature with just under half of the research (49 percent) originating from the region. The geographical region of the analysed articles is spread over 15 countries. It is important to note that the European countries cover sub-regions of Scandinavia with several research studies stemming from Sweden. This is followed by the UK, France, Finland, Spain, Poland, Germany, and Italy. Whilst 32 percent of the articles did not disclose the region of study, Europe is followed by North America, occupying 10 percent, Asia contributing to 7 percent, and South America with 2 percent. Neither the African nor Australasian region were represented in the study.

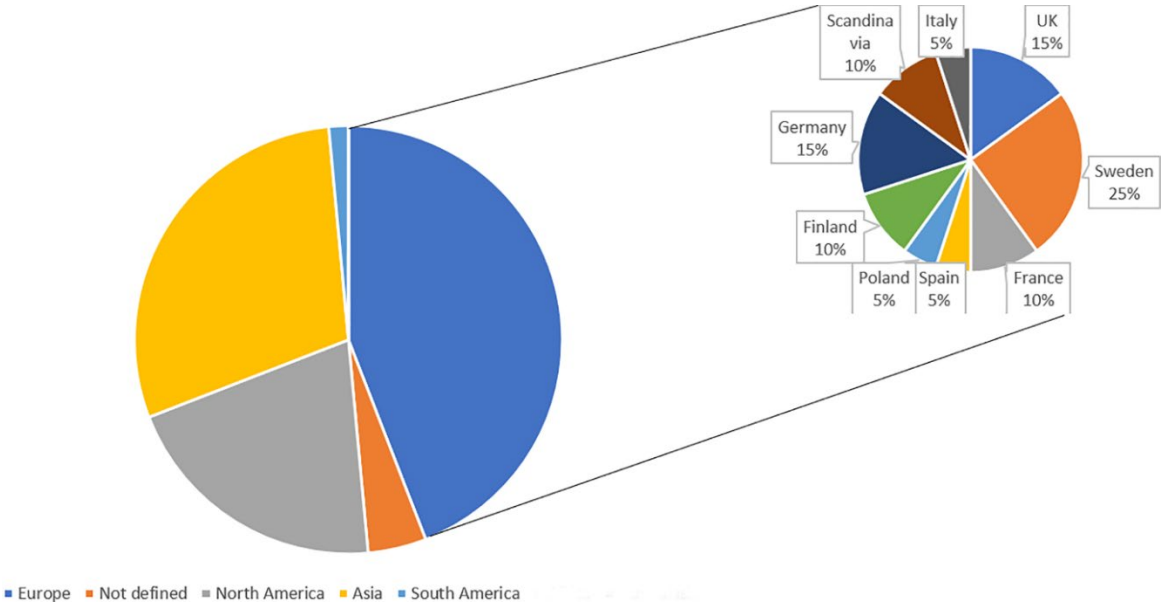

Figure 2.2. Reviewed articles distributed by region.

2.6.4. ANALYSIS OF ARTICLES DISTRIBUTED BY SUSTAINABILITY DIMENSIONS

Figure 2.3. presents the distribution of the reviewed papers concerning the three dimensions of sustainability. It is observed that the environmental dimension is the most studied within the analysed texts, as it was covered in all the papers. The environmental criterion included the diversion of waste materials from landfills, reduction in carbon dioxide emissions, and energy and water preservation. Social dimensions were addressed by 17 of the 35 articles studied. Issues such as job provision and health and safety measures were discussed within this dimension. The economic dimension was the least discussed, covered in only 10 of the 35 articles. Whilst most papers did not specifically mention this criterion, it seemed to be implied, as most objectives for the organisation addressed profitability and sustained economic development.

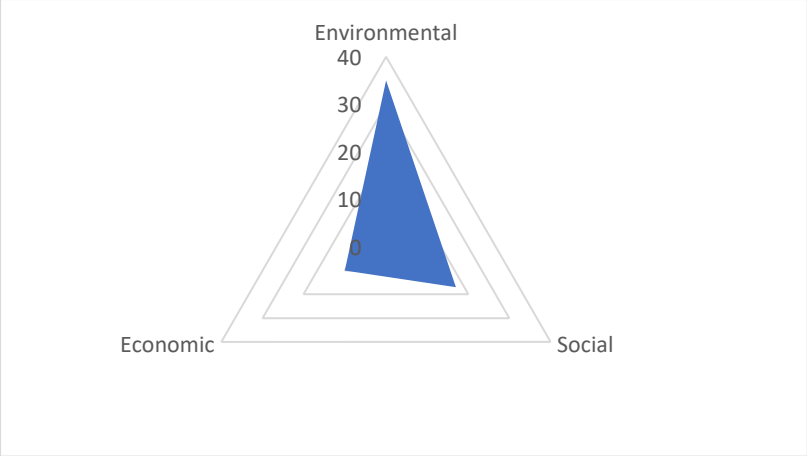

Figure 2.3. Reviewed articles based on the dimensions of sustainability.

2.6.5. RESULT: CATEGORY DEVELOPMENT

This paper conducts a review of literature using structured content analysis, a common approach for enhancing the rigour of review processes (Seuring et al., 2012). Structured content analysis objectively and systematically evaluates themes of recorded information, to provide clarity to the purpose of the written text in a rule-governed and theory-driven way, enhancing its replicability (Koberg & Longoni, 2019; Seuring et al., 2012). We conclude from the review/analysis of literature that there are four significant themes that emerge, viz., education and engagement, reuse, recovery and redistribution, and recycling. These practices are discussed in the next section within the context of the current study's aim to develop a conceptual framework that could explain the combination of these sustainable practices from a NRBV lens.

2.7. CONTENT ANALYSIS

This section provides an analysis of the four sustainability practices that arose from the review of literature. This includes education and engagement, reuse, recovery and redistribution, and recycling.

2.7.1. EDUCATION AND ENGAGEMENT

The first of the themes that emerge strongly from literature is 'Education and Engagement'. It relates to the education of consumers, creating community engagement programmes, and forming recycling campaigns that will engage consumers and inform them of activities they could partake towards sustainable management of PCTW at garment end-of-lifecycle. Community engagement projects help to facilitate public understanding (Han et al., 2017) and raise consumer awareness, through multiple communication channels (Vehmas et al., 2018), of sustainability issues in the industry.

One such channel of communication is retailers, with responsibilities to educate and engage consumers in sustainable practices to achieve waste reduction. For instance, Macchion et al. (2018), suggested 'structured awareness programmes' as a means by which retail staff could increase

customers' awareness of companies sustainability efforts. Retailers could educate consumers on laundry care requirements to reduce waste. Education on laundry care requirements was considered an important role for retailers, in the sustainability education process (through extending garment lifecycle), although studies have shown that this was an underexplored area (Fulton & Lee, 2012; Fulton & Lee, 2013). Stål and Jansson (2017) are of the view that providing washing advice is nothing new, but more recent advice is being framed in environmental terms. Stål and Jansson (2017) explained further that firms can provide environmentally conscious suggestions to their consumers, thereby addressing the post-consumer phase, when retailers do not have direct control over how consumers wash their garments.

Retailers' responsibilities could be in the form of the implementation of waste reduction policies-extended producer responsibility (EPR). In this situation, retailers are responsible (both physically and economically) for the collection, treatment, and disposal of their products at the post-consumption lifecycle stage (Bukhari et al., 2018; Burton, 2018). This responsibility can also be extended to the broader supply chain agents (government agencies/policy makers, manufacturers, suppliers, transport agents, charities), to provide environmentally conscious suggestions of laundry care on each garment made. Through it all, emphasis is placed on the need to re-educate consumers on resale, donation, reuse, and recycling opportunities for all garments (Burton, 2018).

In summary, education and engagement is significant to managing PCTW at garment end-of-lifecycle. Several authors agree that information sharing and dissemination is crucial to attaining sustainability within the fashion industry (Ekström & Salomonson, 2014; Gręboszc-Krawczyk & Siuda, 2019). The provision of sustainability information to consumers could decrease the volume of textile waste sent to landfills and increase the volume of waste that is collected for reuse and recycling (Ekström & Salomonson, 2014).

2.7.2. REUSE

Our review found that the extension of garment life was explored through the notion of reuse. Reuse is defined as acquiring and wearing clothing, that is of good condition, beyond the use of one consumer (Morana & Seuring, 2011; Norum, 2017; Sanders, 2019). The reuse practice extends the lifecycle of products and provides an alternative to discarding items (Choi et al., 2012). As the reuse practice deals with already existing goods (Gręboszc-Krawczyk & Siuda, 2019), there is reduction in the number of new clothing that consumers buy (Freudenreich & Schaltegger, 2020).

Reuse acknowledges that consumers do not necessarily need to abstain totally from consumption but can achieve satisfaction by obtaining and wearing clothing that has been previously used (Freudenreich & Schaltegger, 2020). This process of redistributing ownership from one owner to

another could be achieved through giving or handing down clothing between family, friends and domestic staff, donation to charity, repair, swapping, or selling of clothing in garage sales (Holtström et al., 2019; Kozlowski et al., 2015; Paras et al., 2018; Sandvik & Stubbs, 2019). Diddi and Yan (2019) argued that by extending the garment lifecycle, consumers could develop some emotional attachment to their clothes, which in turn may help to change their consumption behaviours (Diddi & Yan, 2019). We contend that reuse practices, could compel retailers, producers, and upstream supply chain agents to adjust their product lines, by creating higher quality clothes that last longer, to provide opportunities for amendments when necessary, and/or organise reuse events.

Across the various practices discussed under the reuse umbrella is the need for consumers to relinquish the benefits of ownership and assume the position of a user (Stål & Jansson, 2017). In contrast to Diddi and Yan (2019), becoming users rather than owners, reduces emotional attachment, so consumers can willingly pass their clothing on to others. Hu et al. (2014) and Holtström et al. (2019) indicated that when consumers participate in gifting, swapping, rental, or repair instead of buying, they safeguard the return of garments for use again or for recycling.

2.7.3. RECOVERY AND REDISTRIBUTION

Recovery and redistribution are another theme that resonates in the literature. The theme encompasses the efforts made by retailers to recover clothing from consumers, such as providing return boxes/areas within retail stores, street and container collection, delivery to superstores, and the take-back scheme (Ekström & Salomonson, 2014; O'Reilly & Kumar, 2016). Literature highlighted several challenges within this practice with implications for consumers, retailers, and the broader supply chain. Some of these challenges are described in the next paragraphs.

The first challenge is that the volume of clothing recovered is extremely low compared to the volume of clothing sold each year. This is in spite of the interest shown by consumers to recycle (Hvass & Pedersen, 2019; Morana & Seuring, 2007). An increasingly popular recovery option are take-back schemes, which involve retailers providing return areas and boxes in their stores for consumers. The consumers are then incentivised to recover and recycle their end-of-lifecycle garments in exchange for vouchers for future purchases (Macchion et al., 2018). Stål and Jansson (2017) argued that this practice contributes to the issues around the increased disposal mindset of consumers as the incentives provided, encourage consumption. Thus, one question that needs to be asked, is the validity of the take-back scheme as a sustainable practice for managing end-of-lifecycle PCTW.

The second challenge is associated with sorting the recovered clothing for redistribution (Beh et al., 2016). Mostly, recovered items are manually sorted in terms of quality. Those considered of high quality are sold in second-hand stores (Ekström & Salomonson, 2014) or sold as second-hand products

by the brand's themselves. Most of what is leftover is sold in secondary markets, in nations across Africa, Asia, and Eastern Europe (Ekström & Salomonson, 2014; Mukherjee, 2015). Other low-quality clothing acquired, or textile waste collected can be utilised in other industries, such as insulation for automotive or construction industries, industrial cleaning cloths (Burton, 2018; Gręboszk-Krawczyk & Siuda, 2019), or converted to energy for heating or electricity in municipalities (Ekström & Salomonson, 2014). We conclude that this manual sorting process for recovered wastes, are time consuming and require logistics for coordination and planning. Therefore, retailers would need to establish guidelines for when and how (and in what conditions) products are to be returned. Beh et al. (2016) suggested that such guidelines may improve retailer's knowledge of items returned and provide better evaluation of returned goods for redistribution purposes.

2.7.4. RECYCLING

Recycling is the collection of materials to be processed into reusable forms and later used as raw materials for new products (Choi et al., 2012). Recycling involves efforts by retailers and the upstream supply chain agents in sorting and transforming unusable old products into raw materials or new goods (Bukhari et al., 2018; Gręboszk-Krawczyk & Siuda, 2019). After sorting recovered garments, the garments are redirected to garment regeneration (Burton, 2018). This includes practices of upcycling; altering recovered garment to improve its value and quality either through redesign and/or remanufacturing (Shim et al., 2018), or downcycling; turning the recovered garment into less valuable end uses (Lewis et al., 2017).

Recycling is a practice that underlines the other practices identified within this study. Whether it is education and engagement, reuse, or recovery and redistribution, their end point is mostly recycling. As a result, recycling can be achieved at scale. However, there are degrees of complexity and challenges related to the recycling practice. There are often issues with raw material shortages, as the volume of textile waste cannot be guaranteed and retailers cannot ensure they will receive the same and/or similar items (Henninger et al., 2019). Similar to the issues highlighted in the recovery and redistribution practice, there are problems in the separation process of collected PCTW (Pal & Gander, 2018). As textiles are often composed of various natural and artificial fibre blends, such as cotton and rayon, this brings about a challenge as some fibres cannot be recycled (Choi et al., 2012). Additionally, there is a current lack of technology to assist in the separation of the blended fibres (Pal & Gander, 2018). Consequently, the recycling process tends to be expensive as it requires considerable resources such as finances and human labour (Choi et al., 2012; Stål & Jansson, 2017). This calls for a joint effort amongst consumers, retailers, and the entire supply chain in achieving this practice.

2.8. DISCUSSION

This SLR has discovered and synthesised the current findings in the literature on sustainable practices available to manage PCTW at garment end-of-lifecycle. Emerging from the content analysis, are four key sustainable practices: education and engagement, reuse, recovery and redistribution, and recycling. These sustainable practices and their subset are defined in their respective boxes in Figure 2.4. As discussed in the content analysis section, the education and engagement, reuse, recovery and redistribution, and recycling practices are driven to a large extent by efforts made by consumers and retailers but to some extent by the wider SC. This study suggests that if implemented together, the practices will lead to sustainable outcomes. Thus, a conceptual framework is developed (Figure 2.4) that explains the combination of these practices from a NRBV lens towards sustained competitive advantage.

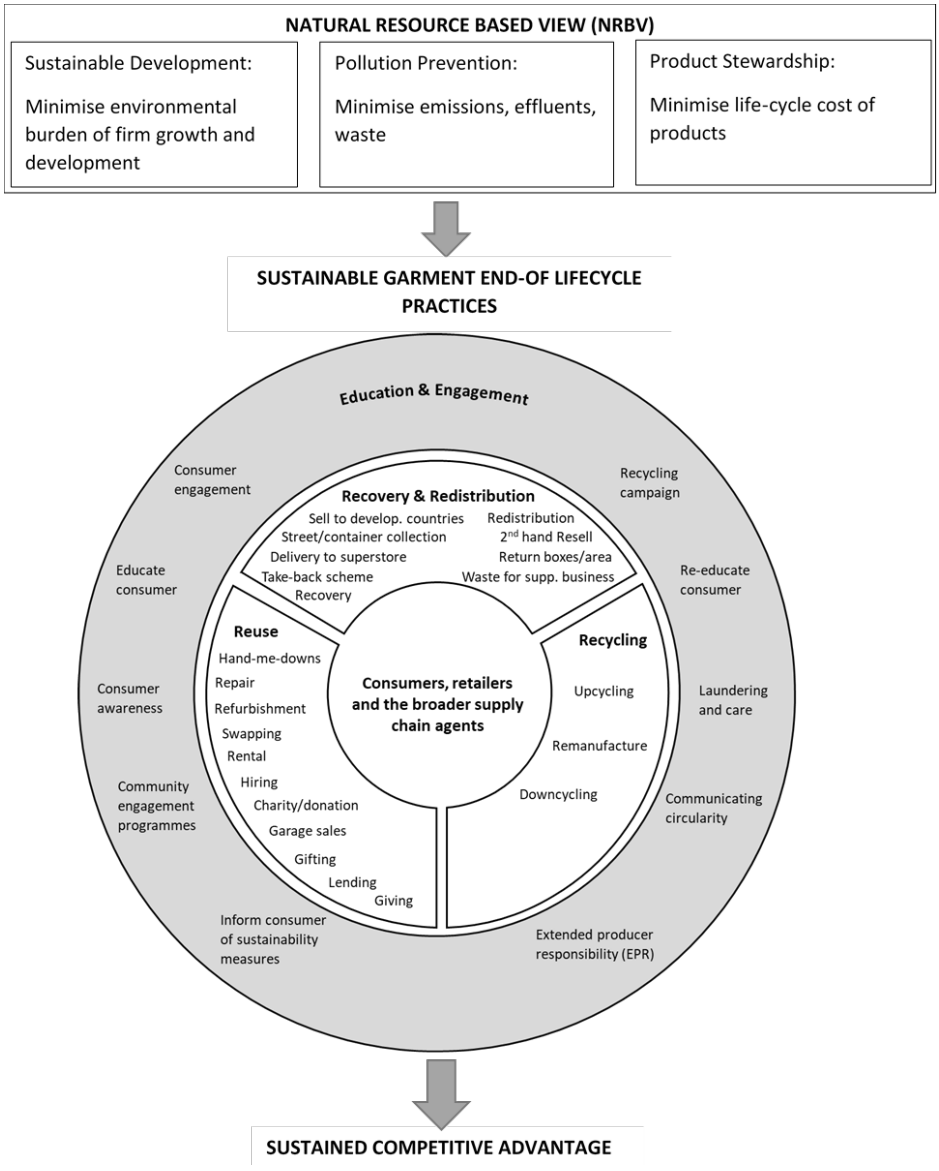

Figure 2.4. Conceptual framework showing sustainable garment end-of-lifecycle practices in the achievement of strategic competitive advantage.

As indicated in the conceptual framework, the NRBV ascribes sustainable garment end-of-lifecycle practices with aims for achieving sustained competitive advantage. The NRBV suggests that for a firm to sustain competitive advantage it must consider the external environment, that is, limitations caused by natural (biophysical) and social environments (Hart, 1995; Hart & Dowell, 2011; Jia et al., 2020). In applying NRBV to the practices of reuse, recovery and redistribution, and recycling, these practices re-purpose the collected waste when fed back into the supply chain system. Product stewardship expands the scope of pollution prevention by considering the entire lifecycle, in the case of this research, the garment end-of-lifecycle. The practices associated with both pollution prevention and product stewardship creates potential for competitive advantage through reducing the raw material inputs required and the impact on the environment and finding innovative ways to re-use the PCTW. As stated earlier, sustainable development looks beyond the environmental impact to also include social and economic issues, which is true for all the practices especially education and engagement. Education and engagement play an essential role in the adoption of the other three practices, reuse, recovery and redistribution, and recycling. Further, education and engagement, reuse, recovery and redistribution, and recycling, highlights roles for consumers, retailers and the broader supply chain agents. Implementation of these practices contributes to safeguarding the environment and subsequently, impacts on the social and economic dimensions of sustainability.

The roles of consumers, retailers, and the supply chain are highlighted in the findings from the SLR with varying responsibilities and implications for each practice. For consumers to capitalise on the systems that are in place for diverting garment waste from landfills, garments needs to be placed back within the system (Burton, 2018). Educating consumers that end-of-lifecycle garments still have a useful life and can be recycled despite their state is a key success factor for recycling (Norum, 2017). Almost all textiles can be recycled or in some way repurposed to avoid landfills (Bertram & Chi, 2018). Even soiled, worn, ragged, or ripped cloth are recycled into fibres that can be used as fillings in automotive, audio, and mattress industries (Ekström & Salomonson, 2014; Mukherjee, 2015). It is, therefore, necessary to engage with consumers to recover textiles and clothes for the recycling process (Sandvik & Stubbs, 2019) and increase their knowledge on the value of reuse and recycling (Ekström & Salomonson, 2014). Thus, there is a role for retailers in the textile and apparel supply chain, to retrieve and help alongside other supply chain agents to recycle used clothing and look for alternatives for used fibres (Norum, 2017).

Overall, this conceptual model shows that to attain sustained competitive advantage within the fashion industry there needs to be a consideration of strategic capabilities for garment end-of-lifecycle. This includes viewing the practices; education and engagement, reuse, recovery and

redistribution, and recycling, as sources for achieving sustainable outcomes. The practices enable the fashion industry to overcome hurdles associated with retrieving waste, turning these into resources, reducing waste sent to landfill, and achieving sustained competitive advantage.

This SLR offers some implications to research and practice within the fashion industry.

A striking result to emerge from the review is the power that the downstream agents (consumers and retailers) have in improving sustainability within the fashion industry. Retailers are called to extend their definition of sustainability to address the use and disposal of products. In doing so, the importance of consumers is apparent. This finding corroborates the ideas of Stål and Jansson (2017), who suggested elements of reciprocal responsibility between retailers and consumers are crucial to achieving sustainability. This is also in line with the assertions by James and Montgomery (2017), Belz (1996), and Yang et al. (2017a) that retailers have the power to connect consumers and suppliers to incorporate sustainability across the supply chain (Yang et al., 2017a). However, whilst the roles of consumers and retailers are crucial in managing end-of-lifecycle garments for sustained competitive advantage, our findings reveal the need for collaboration across all supply chain agents, from upstream to downstream. This is in line with Friedman (2008) and Choi et al. (2012) findings that suggested the inclusion of supply chain agents such as second-hand shops, charities, government, etc.

As for implications for the industry, our research provides various end-of-lifecycle practices in which retailers could partake that have a key impact on their competitive advantage and overall sustainability.

Retailers should look beyond mere garment end-of-lifecycle to consider shifts towards cradle to cradle (closed loop) lifecycle supply chains. This ensures that retailers evaluate the practice they adopt by questioning its true aim in achieving sustainability. Our findings show paradoxes in the pursuit of a sustainability agenda within this context. We suggest that these paradoxes are avoidable if the practices adopted within a firm are selected with consideration of the entire supply chain and the role that each agent can play in achieving overall outcome of sustained competitive advantage.

2.8.1. FUTURE RESEARCH DIRECTIONS

According to the SLR and proposed conceptual framework, several gaps were identified for future examination. Some areas for future research are proposed to further improve understanding of practices at garment end-of-lifecycle and move towards more sustainable outcomes for the planet, people and profit.

Emerging from the review of literature are the paradoxes of sustainability within the fashion industry. Studies reveal that not all practices utilised and encouraged by retailers lead to more sustainable

outcomes and beg questions of how sustainable these practices are at managing PCTW (Diddi & Yan, 2019; Fulton & Lee, 2013; Morana & Seuring, 2011). Extending the use of PCTW by reuse or recycling does not necessarily lead to sustainable outcomes, as it cannot guarantee that the recycled or reused items will not be thrown into landfill by the next user. Comparably, re-distributing retrieved second-hand clothing to other countries for resale requires transportation, which contributes to the overall environmental footprint, emphasising the point for retailers to look at shorter, more localised supply chains (Freudenreich & Schaltegger, 2020). Donated clothing of low quality collected during swapping events, are kept aside for donation to charities and vulnerable communities, implying that these groups are not deserving of quality clothes and therefore, contradicts the aim of swapping which is to promote sustainability, solidarity and community values (Camacho-Otero et al., 2020). While Shen (2014) argued that a win-win-win outcome between consumers, H&M, and the environment is realised by using the take-back scheme, Stål and Jansson (2017) counter-argued that take-back schemes are deceptive, with vouchers offered to consumers on disposal of their PCTW in collection boxes. This encourages increased consumption and subsequent increase in textile waste (Stål & Jansson, 2017).

Our findings show that considerations of garment end-of-lifecycle practices should involve all supply chain agents from upstream to downstream agents. Thus, collaboration should extend beyond retailers and consumers to other supply chain agents. Further, while it is beyond the scope of this paper, Ferrari (2020) discussed the role that policy makers could have in building resilient and sustainable infrastructures especially post-COVID. The findings from this study could be extended to developing a resilient sustainable supply chain. Future empirical research could look at applying stakeholder theory and conducting studies into the roles of various stakeholders from a system of systems perspective.

Resonating across the different practices is the need for retailers to encourage consumers to hand-in used clothing to be put back into the system. This is key to closing the supply chain loop and diverting PCTW from landfill by acquiring enough clothes for the reuse, recovery and redistribution, and recycle practices. Engaging and educating consumers on their role in textile recovery and its significance for the aforementioned practices is paramount in striving to attain sustainability within the fashion industry (Ekström & Salomonson, 2014; Sandvik & Stubbs, 2019). To amply and sustainably engage in the practices available for their end-of-lifecycle garment, it is fundamental that consumers forgo ownership over products by instead becoming users (Holtström et al., 2019). Thus, the role of consumers is highlighted—therefore, research into the awareness of consumers about these practices is needed, including an understanding of how retailers can better engage consumers in these practices.

Thirdly, the review of literature revealed challenges associated with sorting returned clothes, which is in line with findings by Shedroff (2009). This issue is still prevalent as PCTW are composed of various material blends, that are difficult to distinguish at the end of garment's lifecycle stage (Choi et al., 2012; Pal & Gander, 2018), and a current lack of technology to assist in the separation of blended fibres other than the two-dimensional barcode mentioned by (Bertram and Chi 2018). Although a separate focus to the essence of this research, the efficiency of the sorting process for reuse, recycling, or redistribution and innovative technologies to aid in the process of identifying the various blends would be useful for informing consumers with the sorting of garments or textiles for return.

Lastly, the results from the descriptive analysis indicate that most of the existing research focusses on Europe and America, underlining an opportunity for further research into managing waste generation within the fashion supply chains of other regions. Conducting a comparative study between these regions and analysing how their practices differ to findings within this review is noteworthy. Moreover, the impact of the recent worldwide pandemic on the global fashion industry presents new opportunities for research regarding fashion consumption, sustainable extension of garment end-of-lifecycle and waste generation across the global regions. More broadly, what is the feasibility of sustainability within the fashion industry and its associated challenges in the current and post global COVID-19 context? It will be interesting to see the effect of consumption patterns within the COVID context and the impact it will have on fashion waste generated. Nonetheless, whatever happens, it is important that sustainability remains part of the conversation post COVID.

This study is not without its limitations. Firstly, the review included only academic journals, whereas future research may benefit from also considering other published works, such as commercial journals, industry reports, books, book chapters, and reviews. Secondly, future studies benefit from using only highly ranked journals in its reviews. However, despite these limitations, we believe that this review is rigorous, insightful, and contributes towards enhancing knowledge on available sustainability practices to manage PCTW at garment end-of-lifecycle in achieving sustained competitive advantage and consequently, a more sustainable, fashion supply chain for all.

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2.9. UPDATED REVIEW

Since the review paper was published in *Sustainability* in March 2021, there has been a considerable shift in the focus of literature towards circular economy as a production and consumption model. Several authors view circular economy/business model as a means of addressing the sustainability issues within the fashion industry (Avadanei et al., 2021; Brydges, 2021; Giordano et al., 2020; Kalambura et al., 2020; Marques et al., 2020; Shirvanimoghaddam et al., 2020; Thatta & Polisetty, 2022; Zhao et al., 2021). Circular economy is also being engaged as a means to reduce consumer waste and make sustainable fibres by recycling garments that are at their end-of-life (Lloyd, 2021).

However, several issues have been discussed around the complexity of attaining a circular economy. The study by Li et al. (2021) evaluates factories in China and their results show that the recovery of post-consumer waste is low as they are mainly mixed with food/human waste, making it difficult for textile recycling. Further, Navone et al. (2020) suggests that the limited amount of fashion products collected for reuse and recycling is worsened by the varied material blends in which the items are composed. Albu et al. (2021) agree with these challenges, focusing on the challenge around the fragility and complexities of the garments associated with recycling old garments to develop new fibre. By applying institutional logics, the study by Hedegård et al. (2019) explores the complexities of organising reuse fashion retail. Similarly, the article by Piippo et al. (2022) explored the relationship between garment quality and garment durability within the circular economy context. According to Aronsson and Persson (2020), the length of a fibre determines its durability and strength, hence it is important to consider fibre length during the disintegration phase when mechanically recycling post-consumer cotton waste. The study observe two types of garment construction; denim and single jersey (Aronsson & Persson, 2020). Similarly, the study by Cooper and Claxton (2022) discusses that garment failure at its end-of-life is often as a result of pilling and fading. The barriers to implementing circular economy within Taiwan's textile sector are examined within Chen and Lin (2021). Therefore, while there are several advantages noted with various circular economy practices, there are still complexities that are associated with it, in the context of sustainable fashion industry.

Noting these challenges with attaining circularity, different authors have suggested varied solutions. Albu et al. (2021) propose a technological approach to resolve these issues. Similarly, Huynh (2021)

proposes three ways of applying technologies within a circular economy system including blockchain-based, service-based and pull demand driven model. Other articles have looked at Blockchain to improve traceability across the fashion supply chain (Agrawal et al., 2021) and across various value chain (Wang et al., 2020) or to improve sustainability within the fashion supply chain (Guo et al., 2020b). Other non-technological solutions have also been recommended. The article by Bal and Badurdeen (2022) suggests that to enhance circularity, a new model incorporating lease and sell, and product-service-system should be considered. Other practices that could enhance circular economy objectives can be observed through cloth swap (Camacho-Otero et al., 2020), implementation of slow fashion model (Castro-López et al., 2021), and fashion rental (Bodenheimer et al., 2022; Gyde & McNeill, 2021). Lastly, D'Adamo and Lupi (2021) propose a multi-loop system incorporating recycled and reused materials from previous-life cycle into the market as new products and values as another means of achieving circularity. These solutions would likely dominate future research endeavours in the quest for sustainable garment reuse and recycle.

The implementation of the circular economy model as a sustainable approach within the fashion industry has been heavily critiqued. D'Adamo et al. (2022) argue that garment collection and recycling are not necessarily good practices for a circular economy. D'Adamo et al. suggest that for recycling to be considered best practice for circular economy, there needs to be improved collaboration between fashion manufacturers and retailers. Similarly, Freudenreich and Schaltegger (2020b) state that current solutions including eco-efficient production, sustainable materials and recycling used to address social and environmental issues within the industry are not effective. Freudenreich and Schaltegger (2020b) propose a more consumer focused approach, utilising the sufficiency approach concept and slow-fashion principles to develop recommendations for businesses within the fashion industry to manage social and environmental issues.

Further criticisms of the circular concept within the fashion field, are posed by Ki and Ha-Brookshire (2021) and Ta et al. (2022) who argue that the industry has not sufficiently considered consumers perception of the model. Also, Gazzola et al. (2020) and Palomo-Lovinski (2020) highlight the need to pay attention to the role of consumers beyond the point of sale and in consideration to the growing sustainability issues relating to fashion products. According to Ki et al. (2021) consumers play a vital role in attaining true circular economy within the fashion industry. Studies examining consumer perceptions have focused either on consumer attitudes (Colasante & D'Adamo, 2021) or on their intention to purchase circular apparel (Gomes et al., 2022). Some others have also compared consumer's attitude amongst different (e.g. Polish and Canadian) consumers (Koszewska et al., 2020) or discussed differences between fashion companies and consumers perception on circular fashion (Ki & Ha-Brookshire, 2021). Some studies have placed greater emphasis on the influence of young

consumers, particularly Generation Z, on their intention to either consume sustainable products or adopt circular economy practices (Gazzola et al., 2020; Kovacs, 2021). The article by Petreca et al. (2022) states that while consumers are becoming more environmentally conscious, they have a lack of understanding on how they can become agents in sustainable consumption. Thus, extending the debate on the circular economy and the fashion industry.

Paço et al. (2021) observe that there is a disparity between consumers clothing use and disposal behaviour. The authors recommend that more awareness of sustainable-related initiatives is required around clothing use (Paço et al., 2021). Similarly, Pretner et al. (2021) states that more information needs to be provided about the environmental aspects of the product to improve consumers' willingness to pay for circular fashion products. Likewise, fashion companies should create grand messaging targeted towards consumers to create a greater attachment to their clothing as a means of addressing the increasing fashion consumption trend (Powell, 2021). Furthermore, Guo et al. (2020a) suggest that fashion companies need to look to implementing the competition game as a means of improving the management of consumers' return. Interestingly, the study by Musova et al. (2021) found that fashion businesses that consider consumers' attitude towards circular products tend to be more competitive. Hence, Musova et al. reinforce the circular economy model and its applicability to the fashion industry.

What is evident from the discussion provided so far is that little research to date has focused on the role of consumers especially with a focus on garment end-of-life. One of the main findings to come from this study's systematic review of literature, is the importance of consumers in managing post-consumer waste. That early phase review clearly calls for (empirical) research into the awareness of consumers about the various reuse, recycle, recovery and redistribution and education and engagement practices. Hence the focus of the current study on the role of consumers in managing end-of-life garments. I attempt to bridge the gap that exists between consumers' consumption and disposal behaviour within the fashion industry by exploring factors that influence the intentions and behaviour of reuse and recycling of end-of-life garments. The emphasis of the study is on consumers' reuse and recycling behaviour, two practices that emerged from the literature as imperative for a circular economy.

Lastly, a key finding from the descriptive analysis of extant literature, is the gap in knowledge within the Australian context. While Australia is the second largest consumer of new textiles (Moazzem et al., 2018), little research has been conducted with a focus on the Australian context. Hence, to address this issue the current research collects data from Australian consumers. It is hoped that an understanding of Australian consumers reuse and recycle behaviour will provide insights and

recommendations to the Australian and broader fashion industry, for non-for-profit organisations, and for government.

2.10. CHAPTER CONCLUSION

This chapter provided a thorough review of literature around sustainability, supply chain and the fashion industry, and forms the first phase of investigation conducted within this research. It was found that there are present gaps in knowledge around the downstream fashion supply chain especially regarding consumers attitude and behaviour. Also, the study identifies a huge movement, searching for sustainable approaches that could address fashion wastes. Based on these findings, the current study seeks to explore predictors of consumer behaviour that could sustainably manage end-of-life post-consumer fashion waste through recycling and reuse. In pursuance of this objective, the next chapter, describes the theoretical lens from which I explore the factors that influence consumers' intentions and behaviours to recycle and reuse end- of -life garments in Australia.

CHAPTER THREE: UNDERPINNING THEORY

3.1. CHAPTER INTRODUCTION

In the previous chapters, an overview and background of this study is provided by outlining the problems and questions to be studied. Chapter 1 specified the contributions and implications of the study to existing literature. In Chapter 2, the literature was reviewed on the research area, mainly focusing on sustainability within the fashion industry. Within this current chapter, the theory that will underpin the overall research: the theory of planned behaviour is discussed. First, other theories that have been used in previous studies and their limitations are discussed. Next, an explanation is provided for the theory of planned behaviour and how it has been applied within extant literature. The chapter is finalised by providing the rationale for adopting the theory of planned behaviour as an appropriate theory to ground the study.

3.2. THEORIES DISCUSSED IN PREVIOUS STUDIES

The following section discusses some prominent consumer behaviour theories that have been explored within sustainable fashion publications.

3.2.1. NORM ACTIVATION MODEL (NAM)

The Norm Activation Model (NAM) is concerned with a person's ability to sacrifice their interest for the benefit of others (Schwartz, 1977). The NAM is founded on altruistic behaviour (Park & Ha, 2014), which leads to a person feeling morally obliged to perform a helpful behaviour (Schwartz, 1977). In other words, an individual is more inclined to help others when their personal/internal values are activated (Schwartz & Howard, 1980). Therefore, altruistic behaviour can be defined as 'selfless behaviour' related to protecting the environment (Chan et al., 2022).

Three factors predict prosocial or altruistic behaviours within the NAM; these are personal norms, ascription of responsibility and awareness of consequence (De Groot & Steg, 2009). Personal norms are used to predict individual behaviour and form the core part of the NAM. According to Van der Werff & Steg (2015) a strong personal norm indicates that a person might be motivated to perform a pro-environmental behaviour as it makes them feel good, however, if the behaviour proves costly or difficult, the individual is less likely to carry out the behaviour. Ascription of responsibility means "feelings of responsibility for the negative consequences of not acting pro-socially" (De Groot & Steg, 2009, p. 426). In the study by De Groot and Steg (2009), their result suggests that for an individual to feel responsible to engage in a behaviour, they must be aware of its consequences.

Originally, the NAM was used to understand pro-social behaviours, however, more studies have seen the benefit of extending the model to pro-environmental behaviours as well (Steg & De Groot, 2010). Based on the (De Groot & Steg, 2009) article, using the NAM to understand pro-environmental

behaviours is unusual as the individual participating in the behaviour may not receive direct benefits from their actions. According to (Park & Ha, 2014), recycling is one such altruistic behaviour because it demands that a consumer makes extra effort and time without an immediate gratification for the act. Also, the theory has been used to some extent in understanding consumers' behaviour in engaging with second-hand products (Borusiak et al., 2020).

Using a combination of the NAM and the TPB, the study by (Sonnenberg et al., 2022) explores female consumers' intentions to dispose of their end-of-life apparel sustainably within South Africa- an emerging economy. Similarly, the article by (Kim & Seock, 2019) expanded the NAM to include some constructs from the TPB to determine consumers purchasing behaviour of pro-environmental apparel. The NAM was also used in combination with the TPB, the Model of Behaviour Change System (KAP model) and the Model of Predictors of Environmental Behaviour in the article by (Bedor et al., 2021) to explore issues in sustainable fashion education and develop initiatives that could be adopted with the sustainable development education pertaining to fashion education. Lastly, the article by (Joanes, 2019) also extend the NAM with the concept of identification with and care for all humanity to investigate and better understand how consumers can reduce their clothing consumption.

3.2.1.1. Limitations

According to Thøgersen (2006), one of the flaws of the NAM is that researchers have been unable to substantiate the assumptions of the motivational content of personal norms. A limitation of the NAM is that is it often applied as a mediator or moderator (Onwezen et al., 2013), meaning that it often needs to be used in combination with other theories or models to adequately predict behaviour. For example, several studies have been conducted by combining NAM with the TPB (Onwezen et al., 2013; Park & Ha, 2014; Shin et al., 2018; Zhang et al., 2017). Another limitation as highlighted in the article by Han (2014) is that there is ambiguity in the relationships between the key predictors specified with the NAM. The authors believe the ambiguity can be attributed to the inconsistency in the interpretations of the variables within previous literature (Han, 2014). This therefore limits the applicability of this model to the current study where I seek to explore what factors clearly predict and relate to consumers' recycle and reuse intention and behaviour of end-of-life garments.

3.2.2. VALUE BELIEF NORM THEORY (VBN)

Value-belief-norm theory (VBN) is a model proposed by Stern et al. (1999) as an extension of NAM (Van Riper & Kyle, 2014) that indicates an individual's held values or principles (López-Mosquera & Sánchez, 2012). The model tests and understands an individual's altruistic attitudes and behaviour (Oreg & Katz-Gerro, 2006). According to Lind et al. (2015) and López-Mosquera and Sánchez (2012),

the VBN theory is a combination of (Schwartz, 1992) value theory, (Dunlap et al., 2000) new environmental paradigm perspective, and (Schwartz, 1977) norm-activation theory. The theory suggests that three main factors drive pro-environmental behaviour; 1) an individual's values and environmental concern, 2) an individual's beliefs that things vital to their values and overall environmental concern are under threat, and 3) an individual's belief that they have the responsibility and ability to help alleviate said threat and in turn activate personal values for behaviour (Lind et al., 2015; Stern et al., 1999). López-Mosquera and Sánchez (2012) state that the VBN theory assumes a hierarchical model such that individual value orientations directly influence beliefs, attitudes, and behaviour by filtering the information to be evaluated.

The VBN has been applied extensively within the sustainable tourism sector (Denley et al., 2020; Gupta & Sharma, 2019; Han, 2015; Kiatkawsin & Han, 2017; Le et al., 2021; Megeirhi et al., 2020; Park et al., 2022; Sharma & Gupta, 2020), while, its application within the fashion industry is limited but growing. (Dabas & Whang, 2022) in their review of literature show that in the past 25 years, the VBN theory is one of the most applied theories within the sustainable fashion consumption articles after the TRA and TPB. The VBN theory to determine various predictors of consumers' purchase intentions, for example the purchase of eco-friendly outdoor wear (Kim et al., 2015), circular apparel (Gomes et al., 2022), and recycled products (Hein, 2022). The VBN theory has also been used in combination with the TPB to develop a theoretical framework to investigates drivers and blockers on collaborative consumption of luxury fashion products (Jain, 2022).

3.2.2.1. Limitations

Kaiser et al. (2005), in their study comparing the TPB and VBN, found that VBN was underspecified, especially in explaining people's environmental worldview. According to Liobikienė and Poškus (2019), VBN is also not informative when dealing with environmental policies as values are constant and rarely change. As the current study observes two sustainable behaviours- recycling and reuse- I believe the VBN theory is not fitting for the study.

3.2.3. THE THEORY OF REASONED ACTION (TRA)

The Theory of Reasoned Action (TRA) was first proposed by (Fishbein et al., 1975). The primary purpose of the TRA is to predict human behaviour (George & Nair, 2022), more specifically volitional behaviour (Hale et al., 2002). With TRA, the proximal predictor of behaviour is intention (Hale et al., 2002). The model posits that a person's attitude and subjective norm toward a behaviour will affect their intention to perform the behaviour, resulting in said behaviour (Jain et al., 2017). Attitude is defined as the degree to which an individual has or does not have a positive evaluation of a behaviour

(Becker et al., 1995). Subjective norm reflects the social component, that is, the perceived pressure on an individual's performance of a behaviour from their social setting (Becker et al., 1995).

The article by Sheppard et al. (1988) states that TRA is an adequate predictor of intentions and behaviour and helpful for finding strategies relating to where and how a behaviour can be changed (Madden et al., 1992). Several researchers agree with this sentiment, with the TRA applied within various context within the fashion industry. More recent publications have employed the TRA to understand fashion consumption behaviour in Nigeria (Anyanwu & Chiana, 2022) and amongst generation Y consumers in the United States (Belleau et al., 2007). A study by Kim and Kim (2022) investigates the impact of the COVID-19 pandemic towards second-hand fashion consumption. Another article by Sung and Yan (2016) uses the TRA to explore men's body satisfaction and its effect on trendy fashion involvement and purchase intents. Consumers' arrogance to purchase luxury fashion products was also examined amongst Turkish consumers in the study by (Aksoy & Çikmaz, 2022). Negara et al. (2020) also applied the TRA to consumers' intention to purchase counterfeit fashion products. Vo et al. (2022) explored the TRA along with brand equity to understand consumer ethnocentrism amongst Vietnamese Generation Z. In summary, while the TRA is apt for predicting consumer behaviours within the fashion industry, no research to our knowledge has adopted the theory for sustainability related behaviour.

3.2.3.1. Limitations

TRA is only limited to volitional behaviours (Hale et al., 2002). Thus, behaviours "that are spontaneous, impulsive, habitual, the result of cravings, or simply scripted or mindless" or behaviours that require specific resources or skills are often excluded from the explanatory nature of the TRA (Hale et al., 2002, p. 259). However, most researchers are interested in exploring relationships that do not fit within or extend the assumptions of the model developed by (Fishbein et al., 1975). While the TRA has been applied in various studies and shown as an appropriate theory to understand consumer behaviour, the TRA does not take into consideration behaviours that; 1) are not within an individual's complete or 'volitional' control, 2) involve choice, and, 3) situations when an individual does not have the required information to have a completely confident intention (George & Nair, 2022; Jain et al., 2017; Park & Ha, 2014; Sheppard et al., 1988). Hence, a key weakness of TRA is the inability to determine behaviour by considering a person's perceived behavioural control (Ogiemwonyi, 2022). Thus, as the current study explores recycling and reuse behaviours, that often require an individual to make a choice based on their ability, skill set, and resources, TRA is deemed inappropriate to ground the research.

3.2.4. THEORY OF PLANNED BEHAVIOUR (TPB)

The theory of planned behaviour (TPB) stems from TRA (Jain et al., 2017). TPB looks at the relationship between beliefs and behaviour (Mohiuddin et al., 2018). TPB contends that attitude, subjective norm, and perceived behavioural control influence a person's intention to act (Ajzen, 1991). The theory states that three factors predict an individual's behavioural intentions to partake or refuse a behaviour, attitude, subjective norm, and perceived behavioural control (PBC). These factors are based on three beliefs: attitudinal, normative, and control (Jain & Khan, 2017). However, the key argument of the TPB is that a person's intention predicts their behaviour (Maichum, Parichatnon and Peng, 2016; Sheoran and Kumar, 2021).

The first and perhaps the main predictor of intention within the TPB is attitude (Akbari et al., 2019). Attitude is the degree to which an individual has a positive or negative disposition towards a behaviour (Ajzen, 1991). The second predictor, subjective norm, determines the effect that other peoples' behaviour has on an individual (Park & Ha, 2014). Lastly, the third predictor of the TPB is perceived behavioural control. This is an individual's perception that they have the opportunities and resources needed to perform a specific behaviour (Reysen et al., 2018).

There are several positives to adopting the TPB within a study. For instance, Ogiemwonyi (2022) suggests that the TPB is considered amongst the most robust theories in explaining human behaviour. Indeed, Sheoran and Kumar (2022) states that a search of the Scopus database as at March 2021 revealed that the TPB had been cited about 68,152 times which is evidence of its popularity and adequacy in explaining human behaviour. One of the positives of using the TPB is that its measurement attributes can be applied at a specific or generic level (Ajzen, 1991; Ogiemwonyi, 2022). Another positive of the TPB is its generalisability with many articles applying the theory to various types of behaviours (Reysen et al., 2018). Also, according to Madden et al. (1992), the TPB is better than the TRA is explaining the behaviour that is not within a person's volitional control and the TPB accounts for more variation in behavioural intentions.

Within the fashion field, the TPB has been applied in various articles addressing different consumer behaviour. Some of the recent articles that have used the TPB to look at predictors of sustainable consumption of fashion products (Brandão & da Costa, 2021; de Lira & da Costa, 2022; Mason et al., 2022), collaborative fashion consumption (Becker-Leifhold, 2018), and purchase intentions (Martinho, 2021; Riptiono, 2019). The article by Widyarini and Gunawan (2017) combined the TPB with self-determination theory to understand the role of self-determination and social cognition in the purchase of fashion products via online retailers. (Arvidsson & Kling, 2018) in their qualitative study explored factors that influence intention to recycle in store within the Swedish fashion industry.

3.2.4.1. Limitations

While the predictive nature of the TPB has been successfully applied within various consumer behaviour studies, it is not without its criticism. The fundamental assumption that unpins the TPB is that attitudes are based on cognitive beliefs, and subjective norms and attitudes mediate the moral and normative effects on behaviour (Maichum et al., 2016). There is, however, a criticism that the influence of the affective and moral influences on behaviour has not been adequately considered (Maichum et al., 2016). Additionally, the TPB has been criticised for not considering normative or moral influences on behaviour (Maichum et al., 2016). This highlights another TPB flaw: a weak link between subjective norm and behavioural intention (George & Nair, 2022; Mason et al., 2022). Moreover, some researchers (George & Nair, 2022; Povey et al., 2000) have questioned the clarity of perceived behavioural control as a construct. They argue that the construct is multidimensional and encompasses self-efficacy and perceived control (George & Nair, 2022; Povey et al., 2000). Another criticism of the TPB is its validity, especially regarding the variability between the factors, intentions and behaviour (Chan et al., 2022). Lastly, the TPB has been criticised for its limited predictive abilities (Mason et al., 2022). Therefore, due to the various limitations of applying the TPB on its own, it is regarded has being unsuitable for the current study.

3.2.5. THE DECOMPOSED THEORY OF PLANNED BEHAVIOUR

Taylor and Todd (1995b) proposed the decomposed theory of planned behaviour (DTPB) as an alternative model to the TPB. One approach to adopting the TPB is to study the belief structures that underpins each of the three original TPB predictors; attitude, social norms and perceived behavioural control (Garay et al., 2019). The DTPB posits that the attitudinal, normative, and control beliefs established in the TPB can be further broken down into multiple constructs (Ali et al., 2021). Deconstructing the attitude construct involves, 1) ease of use, also called complexity which refers to the degree to which an innovation is perceived as either easy or difficult to understand and use (Garay et al., 2019; Shih & Fang, 2004); 2) Compatibility is “the degree to which an innovation is perceived as being in line with existing values, past experiences, and needs of potential adopters” (Garay et al., 2019, p. 624); and, 3) Perceived usefulness or related advantage is defined as the degree to which an individual believes that the innovation is beneficial for job performance (Kazemi et al., 2013; Shih & Fang, 2004). In terms of subjective norm, It can remain a normative belief not further broken down (Shih & Fang, 2004). However, some break it down into family influences, and mass media influences (Al-Majali & Mat, 1970). Also, Garay et al. (2019) decomposed subjective norm into two reference groups, peers and superiors. According to Shih and Fang (2004), there are two components encompassed within the perceived behavioural control, 1) facilitating conditions refers to the resources available to an individual to carry out a behaviour (Shih & Fang, 2004), and 2) self-efficacy,

which is an individual's confidence in their ability to perform a behaviour (Bandura, 1977, 1982; Shih & Fang, 2004).

Decomposing the TPB into multidimensional constructs offers several advantages. Firstly, the model ensures transparency and clarity of the relationships between the constructs (Ali et al., 2021). Therefore, the theory is deemed more suitable for considering beliefs that may influence adoption and usage (Ali et al., 2021). Secondly, it offers a stable set of beliefs that can be adopted across various settings (Taylor & Todd, 1995b). Thirdly, DTPB provides a stronger predictive power and understanding of behavioural intentions than TPB and TRA (Shih & Fang, 2004; Shiue, 2007). Lastly, by decomposing the TPB, the focus is placed on specific beliefs that may influence adoption and usage, and consequently, this leads to the provision of more relevant managerial recommendations (Taylor & Todd, 1995b).

3.2.5.1. Limitations

While there are several positives about employing the DTPB, what is clear from the review of literature is that it is mainly applied within studies that explore predictors of intentions to use or adapt technological innovations. This is also true when the DTPB has been employed within the fashion industry. For example, the article by Ilham and Simorangkir (2020) combined the DTPB with the technology acceptance model to understand young Indonesian generations' intention to partake in online fashion retailing through the use of augmented reality. Another article employed the DTPB to understand consumers' intention to use Apple watch (Lin et al., 2019). Also, DTPB is not usually used by itself but in combination with other theories, especially the technology acceptance model and TRA (Gangwal & Bansal, 2016; Ilham & Simorangkir, 2020). Consequently, as the current study does not involve the adoption or use of technology, I conclude that the DTPB will be irrelevant for this study.

3.3. UNDERLYING THEORY: EXTENDING THE THEORY OF PLANNED BEHAVIOUR

The chosen theory used to ground this research is the TPB. In the following paragraphs, I address the limitations discussed in section 3.2.4.1 and explain the reasons for selecting the TPB. Further justification for extending the TPB relating to the different research objectives is provided in chapters 5 and 6.

Firstly, the TPB highlights how various consumer behaviours, such as sustainable and pro-environmental behaviours are shaped by psychological factors (Joshi et al., 2021). According to Jain et al. (2017) TPB can be used to explain individual and social values. More specifically, the article by Sheoran and Kumar (2022) claims that researchers and scholars widely use the TPB to explore factors that impact environmental behaviour to understand and further modify the behaviour. Ogiemwonyi (2022) also confirms that several environmental studies have adopted the TPB due to its predictive

nature. Thus, the TPB is adopted and extended within this study to understand two consumer pro-environmental behaviours, recycling, and reuse, from an individualistic level as well as with consideration of the social impact on each consumer.

To improve the predictive power of TPB, many authors have extended the TPB to include more variables. For example, Hosta and Zabkar (2021), Shaw et al. (2000), and Mason et al. (2022) state that extending the TPB is essential in studies that address social and ethical issues as the traditional TPB is more appropriate in predicting behaviours of self-interest. In line with Joshi et al. (2021), I believe the TPB is a suitable initial framework as it captures key determinants of behavioural intentions and can be adapted to include additional factors. Thus, the TPB is extended by adding self-identity, eco-literacy, self-efficacy, quality consciousness, and general recycling behaviour as possible variables that could predict behavioural intention and reuse and recycling behaviour. In-depth explanation for the selection of these constructs is provided in chapters 5 and 6.

In line with the recommendation by George and Nair (2022) and based on the questions of authors around the clarity of self-efficacy and perceived behavioural control, both constructs are added separately to predict behavioural intention within the study.

Lastly, within this study, similar predictors for reuse and recycling are observed as this will allow me to provide a more comprehensive comparison of consumers' intentions to reuse and recycle end-of-life garments in Australia. As such, this study explores attitude, perceived behavioural control, subjective norms, self-identity, eco-literacy, self-efficacy, quality consciousness, and general recycling behaviour as predictors of behavioural intentions and, subsequently, recycling and reuse behaviours.

3.4 CONCEPTUAL FRAMEWORKS

The conceptual frameworks for this study are developed from the review of literature and with an understanding of the theories. Each conceptual framework as it pertains to this study will be explained in chapters four and five. The predictors, attitude, subjective norms, PBC, general recycling behaviour, self-identity, eco-literacy, self-efficacy and quality consciousness (for reuse only) are explored to understand consumers recycle and reuse intentions and eventual behaviour. Figures 3.1 and 3.2 illustrates the conceptual model for the study.

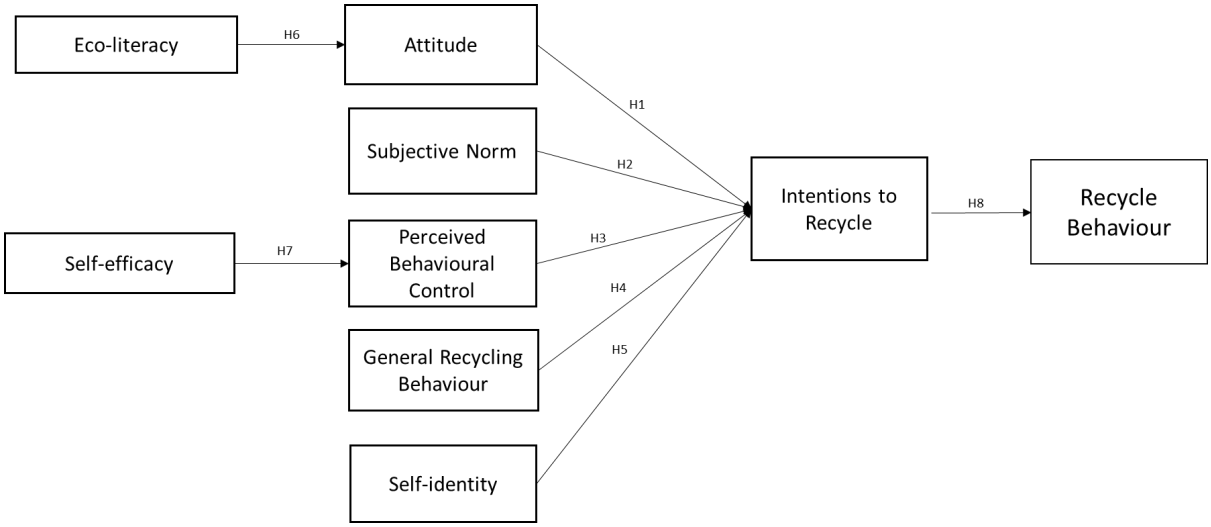

Figure 3.1. Extended TPB showing factors influencing intentions to recycle

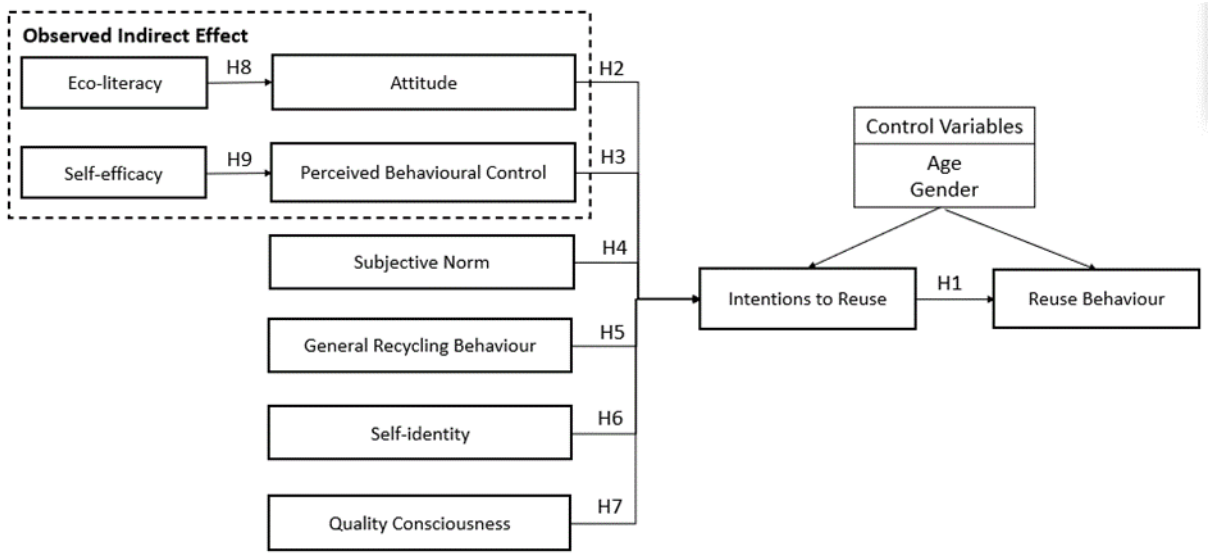

Figure 3.2. Extended TPB showing factors influencing intentions to reuse

3.5. CHAPTER CONCLUSION

This chapter began with a review of various potential theories considered relevant for this study. The justification was then provided for the selected theory, extended TPB. Following this, the conceptual framework, that will be explained in subsequent chapters, is provided. The next chapter will provide the study's methodology and overall study design.

CHAPTER FOUR: METHODOLOGY

4.1. CHAPTER INTRODUCTION

The overall aim of this research is to provide recommendations that could help reduce post-consumer waste sent to landfills through an understanding of consumers' perspectives of end-of-lifecycle garments, particularly through reuse and recycling. The previous chapters provided a review of literature and explained the theory of planned behaviour as the theory that grounds the present research. Following on from this, this chapter explains the research process. It presents the research paradigm, including ontology and epistemology from which this study is rooted. This chapter also provides an overview of the method adopted within the study, strategies for data collection, and information on the ethical issues, and quality of the study. More details on the research process are presented in the below sections.

4.2. RESEARCH TYPE

There are four main types of research. These include descriptive, exploratory, explanatory and emancipatory studies (Collis & Hussey, 2013; Robson, 2002). Based on the reading of Robson (2002) and Al-Ababneh (2020), the present study can be classified as an explanatory study. Explanatory studies investigate relationships that may exist between factors and often involves testing established hypotheses (Al-Ababneh, 2020; Robson, 2002; Saunders et al., 2009). Within this study, the hypotheses developed are grounded on a modified version of the TPB and tested to understand what factors predict consumers' behaviour intention and subsequent action to recycle and reuse their end-of-life garments in Australia.

4.3. PHILOSOPHICAL STANCE

As defined by Crotty (1998), theoretical perspective is a way of looking and making sense of the world. It entails both knowing and understanding what it is to know, "that is, how we know what we know" (Crotty, 1998, p. 8). The theoretical perspective is thus the philosophical stance that grounds the logic and criteria for the research process and informs the choice of methodology for the study (Crotty, 1998). The theoretical perspective of a researcher is determined by their ontological and epistemological stance. Below sections will explain the ontology and epistemology that shaped this study and finally the resulting research paradigm.

4.3.1. ONTOLOGICAL BACKGROUND

Within this study, ontology is understood as the researcher's beliefs of reality and the social world as it exists. Thus, the ontological assumption within this study as held by the researcher is a realist view (Easterby-Smith et al., 2012). According to Dieronitou (2014) a realist view is centred on the assumption that science is about exploring causal relationships which parallels to the notion of

internal validity. This makes research objective, measurable, predictable and controllable (Dieronitou, 2014). This assumption is based on the belief that there is one single reality and truth. That is, the world is made up of concrete, tangible, and somewhat unchanging constructs which exist independently of each individual (Burell & Morgan, 1979). Consistent with the aim of this research, the researcher objectively investigates factors that influence consumers intentions to reuse and recycle end-of-life garments in Australia in order to provide recommendations that could help reduce post-consumer waste sent to landfill.

4.3.2. EPISTEMOLOGICAL BACKGROUND

A realist view of reality promotes an epistemological stance that is objective and stresses the significance of studying and measuring knowledge (Bahari, 2010; Lee, 1992). The researcher's view of knowledge is that science develops successful theories that are as close to the description of reality as possible (Bahari, 2010). In this study, the theory of planned behaviour is observed as a theory that closely defines the reality of consumer's behaviour to reuse and recycle end-of-life garments within Australia. Further, the epistemological assumption within this study is that the researcher and the respondents are distant and neither one influences the other. Smith (1983) names this relationship of the knower and the known as a 'subject-object' relationship to the subject matter. The study draws this distinction in order to highlight the value neutrality of the positivist school of thought (Dieronitou, 2014). The assumption is built on the researcher's attempt to minimise bias before and during data collection (Olson, 1995). As such, the data for this study was collected by an independent marketing company that allowed for distance between the researcher and the participants.

4.3.3. RESEARCH PARADIGM: POSITIVISM

Research paradigms are founded on ontological and epistemological assumptions (Scotland, 2012). That is, there is a need to consider the construction of meaning and meaningful reality(-ies) together (Crotty, 1998). The resulting worldview on which this study is founded is positivism. Thus, a positivist paradigm shaped the researcher's thoughts and understanding of knowledge in the world, and subsequently, informed the methodology and methods adopted within this study.

According to Saunders et al. (2007), a positivist researcher may use an existing theory to develop an hypothesis. Within this study, the theory of planned behaviour was used and extended to test varied predictors of intentions to reuse and recycle end-of life garments amongst Australian consumers. These hypotheses were tested and were either confirmed (in part or full) or refuted leading to an improvement of the theory.

The main assumption that shapes positivism is the idea that the social world exists externally and research of this world should be conducted in a value-free way (Bahari, 2010). The researcher believes

that all things and events are real and the relationships between them are distinct (Bahari, 2010; Saunders et al., 2007). Therefore, the researcher is independent of what was researched and measurements were taken in an objective manner (Bahari, 2010). Further, a positivist view lends itself to a quantitative methodology that are more structured so that they can be replicable (Saunders et al., 2007).

4.4. RESEARCH METHODOLOGY

Methodology is described by Crotty (1998, p. 3) as "the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes". Simply put, research methodology considers how the researcher will find out the answers to the research questions posed (Guba & Lincoln, 1994). According to Scotland (2012) these involve addressing the why, what, where, when, and how data will be collected and analysed.

In line with a positivist paradigm, a survey was used to acquire information directly from individuals (Dane, 1990). According to Leedy and Ormrod (2005) and Bruwer (2013), large scale research can be used to ask specific questions from people about aspects of a topic that cannot easily be measured though general observation

4.4.1. QUANTITATIVE APPROACH

Quantitative approach is adopted within this study as its basis can be found in the positivist paradigm (Rahi, 2017). Quantitative research approach is utilised when researchers want to objectively collect and measure data from a large population in aims of addressing a research problem (Rahi, 2017). This often involves analysing numerical data through various statistical techniques (Amaratunga et al., 2002). It is believed that quantitative research can be useful for complimenting and extending findings from qualitative research (Rotimi, 2013). The researcher believe that a quantitative approach is apt within this study as the chosen theory is well researched. The existing knowledge around the TPB is extended by applying it to end-of-garment disposal through recycle and reuse.

Furthermore, this is a deductive research study as it involves developing and testing hypotheses. A deductive approach aligns well with the positivist philosophy that underpins this study (Al-Ababneh, 2020). This approach is appropriate in studies that test for relationships between variables and that seeks to make generalisation in people's social behaviour (Saunders et al., 2009).

4.5. RESEARCH METHODS

Research methods are the specific procedures used to collect and analyse data (Crotty, 1998, p. 3). These research methods are based on the methodology, epistemology, and ontological position adopted within the study (Scotland, 2012).

4.5.1. SURVEY QUEESTIONNAIRE

A questionnaire is a form of self-administered survey (Dane, 1990). A self-administered survey is one where respondents are required to complete the instrument without interference or intervention from the researcher (Dane, 1990). Using a self-administered survey ensures privacy for the respondent (Dane, 1990). In this study, a questionnaire was used to collect data from consumers as this offered a means to reach more participants in a shorter time.

The questionnaire contains closed-ended questions. The questionnaire is included in appendix A. This study used a discontinuous rating scale for its closed-ended questions, meaning respondents were only allowed to select one answer out of several possible discrete values (Nation, 1997). Various seven-multi-point measurement scales were used within the questionnaire and are presented in Table 4.1.

Indicator	**Measurement Scale**					
1.	Strongly Disagree	Absolutely no control	Very little	Extremely unlikely	Extremely difficult	Absolutely uncertain
2.	Slightly Disagree	Moderately no control	Moderately little	Moderately unlikely	Moderately difficult	Moderately uncertain
3.	Disagree	Slightly no control	Slightly little	Slightly unlikely	Slightly difficult	Slightly uncertain
4.	Not Sure	Neutral	Neither much nor little	Neither likely nor unlikely	Neither easy nor difficult	Neutral
5.	Agree	Slightly in control	Slightly much	Slightly likely	Slightly easy	Slightly certain
6.	Slightly Agree	Moderately in control	Moderately much	Moderately likely	Moderately easy	Moderately certain
7.	Strongly Agree	Completely in control	Numerous	Extremely likely	Extremely easy	Completely certain

Table 4.1. Measurement scales

4.6 PRE-TEST

Pre-testing is a process that happens before the final distribution of a questionnaire to the target population (Reynolds et al., 1993). It is done to determine potential errors in the questionnaire and helps to refine the questionnaire (Reynolds et al., 1993). Pre-testing can help researchers to identify issues with language, logic, flow and effectiveness of instructions within the questionnaire (Czaja, 1998). According to Perdue and Summers (1986) a pre-test is effective if suggestions are provided to correct the questionnaire. Consequently, the data collection for this study was started with a pre-test.

4.6.1. PRE-TEST: PRELIMINARY DECISIONS

A pre-test was conducted on the survey questionnaire to explore the appropriateness of the measurement items under each construct used within the study. The pre-test was conducted

individually and remotely without the presence of the researcher. The participants were informed of the purpose of the survey questionnaire and were assured of the confidentiality and anonymity of their data.

Reliability and validity of measurement items are of outmost importance in developing a survey questionnaire. As a result, the researcher undertook a rigorous review of relevant extant literature on behavioural theories and particularly the theory of planned behaviour and with a focus on sustainable processes. From this process, 15 constructs were established and deemed appropriate to examine the predictors of intentions to recycle and reuse end-of-life garments in Australia.

Whilst all measurement items used within this study were adapted from existing publications that are well cited and in high ranked journals, there is a need to ensure that the measurement scales are appropriate within the context of the current study. Hence, prior to administering the survey questionnaire, the wordings for the questions were carefully crafted to ensure unambiguity. The questions were also short, explicit, and consistent to reduce the chances of misinterpretation and increase clarity.

4.6.2. PRE-TEST: INSTRUMENT DESIGN

The pre-test involved a self-administered survey questionnaire that constituted of four main sections. At the beginning section of the survey, there were two main screening questions for age and state. Respondents must be above the age of eighteen and reside in one of the states or territories in Australia to participate in the survey. There were also questions to help test and ensure that respondents understood the definition of reuse and recycling as it partakes to this study. However, these questions were not included as one of the sections in the survey. The definition for recycling and reuse as provided within the survey are; Recycling is concerned with the use of recycling bins or when a person gives their end-of-life garments to recycling companies (such as Textile Recyclers Australia, Australian Clothing Recyclers, and SCRgroup). Recycling results in the breakdown of garments into fibers. Whereas reuse is considered as either the repair or re-purpose of unwanted garments. This means garments end up being used for a longer time either by the same person or disposing of garments to a different person(s). Reuse therefore can include mending your clothes for further use or using the clothes for alternative purposes. It could also be achieved through giving or handing down clothing between family, friends, and charity (op) shops, swapping, or selling of clothing in garage sales.

The first section of the survey included the pre-selected measurement scales that measured respondents' recycling behaviour. The constructs included here are intentions and behaviour to recycle, attitude, subjective norms, perceived behavioural control self-efficacy towards recycling.

The second section is very similar to the first section in that it explores the same constructs which are: intentions and behaviour to reuse, attitude, subjective norms, perceived behavioural control self-efficacy. However, these constructs are tailored towards reuse of unwanted garments (PCTW).

The measurement items in the third section of the survey were used to measure five constructs: self-identity, general recycling behaviour, eco-literacy, religiosity and quality consciousness. This section was classified as the 'other factors' section as the constructs where not specific to either the recycling or reuse of end-of-life garments.

Lastly, the fourth section of the survey included general demographic questions about the participants such as gender, highest education level completed, income level, marital status, life stage, number of children (if participants have any) and employment type.

For the measurement scales in sections one to three, respondents were asked to answer each question by choosing from a 7 multi-point scale of 1, strongly disagree to 7, strongly agree; 1 absolutely no control to 7 completely in control; 1, very little to 7, numerous; 1, extremely unlikely to 7, extremely likely; 1, extremely difficult to 7 extremely easy; or 1, absolutely uncertain to 7, completely certain. The measurement scales are provided in depth in chapters five and six.

4.6.3. PRE-TEST: SAMPLE SIZE AND SAMPLING TECHNIQUE

The groups of participants for the pre-test study were chosen by purposive sampling. Purposive or judgement sampling is defined by (Rahi, 2017) as when a researcher intentionally selects a group of participants based on their knowledge of the research problem. In this case the first group were chosen as they are known fashion consumers that are over 18 years old and reside in Australia. The second group of participants were chosen based on their knowledge of sustainability and consumer behaviour.

All sample participants were above the age of 18 and live in one of the Australian states, The legal age in Australia is eighteen, therefore we contend that individuals of this age are dependent and will be responsible for their clothing disposal decisions (Raisingchildren.net.au, 2022).

4.6.4. PRE-TEST: DATA COLLECTION

A small-scale pre-test was conducted over a two-week period between 2nd February and 15th February 2022. The pre-test was conducted online via Qualtrics in two parts. Firstly, the survey was distributed randomly to seven fashion consumers of which six responded. This group of participants were to provide generic information on their understanding of the survey questions and the logic of the questionnaire flow. Secondly, the survey questionnaire was sent out to ten subject matter experts in the area of consumer behaviour and sustainability. Seven responded with feedback on the survey

questionnaire. The second round of pre-testing was done to utilise the respondent's expertise on the topic area and provide more specific feedback about the wording of items adopted for the study. A total of 13 consumers participated in the pre-test and their feedback were recorded to help refine the survey ahead of the pilot study.

Participants were asked to provide feedback and comments on the questionnaire's format, layout, and content after completing the survey. Feedback was provided via email so that the researcher did not influence the feedback process. The respondents' feedback about the survey helped refine the survey.

4.6.5. FEEDBACK FROM PRE-TEST

There were a few improvement points raised by the respondents on completion of the pre-test survey questionnaire. Firstly, some participants suggest that there were some inconsistencies in the language used within the questionnaire. For example, some questions refer to 'in the future' whilst others specified a 12-month period. This was deemed confusing to the respondents.

Secondly, there was some feedback about the length of the questionnaire. Some participants stated that the survey was too long, whilst other said the length was not an issue if there was a way to show their progress.

Thirdly, there was feedback that the definition provided for recycling and reuse at the beginning of the survey could be improved. Participants suggested shortening the sentences to improve clarity.

There was also feedback provided about the inclusion of religiosity as a construct within the questionnaire. Most respondents did not feel it was an appropriate question within the survey, whilst others felt uncomfortable in addressing the question.

These points were all taken into consideration and helped refine the questionnaire ahead of the pilot survey.

4.7. PILOT TEST: PRELIMINARY DECISIONS

Churchill and Iacobucci (2006) suggest retesting the questionnaire once modifications have been implemented based on the initial pre-test. Therefore, based on the feedback received from the pre-test, the instructions and statements were modified and refined accordingly. The definition of recycling and reuse were amended based on the participants' feedback. Also, all questions that included a timeline were also restricted to a 12-month period. These edits were made to ensure that the instructions and statements were comprehensible and consistent so as not to influence responses and thereby jeopardise the objectives of the questionnaire.

Also, the religiosity construct as well as its corresponding measurement items were removed from the questionnaire. The researcher acknowledges the sensitivity of such topic within the context. Also, by eliminating the construct, the duration of the survey was reduced. Further, a bar was included throughout the survey so participants can track their progress.

The respondents from the pre-test were not included in the pilot survey to remove the chances of response bias. The participants were assured of the confidentiality and anonymity of their data. No identifying data was collected from the participants at any time during the data collection stages. The purpose of the responses received from the responses of the pilot study was to validate the items and constructs adapted within the study, ensure the relevance of these items within the context of the present study, and ensure the survey was easy to understand and follow.

4.7.1. PILOT TEST

Following on from the pre-test, a pilot study was conducted. In the pilot test, the respondents were asked to participate in the updated survey questionnaire from the pre-test. The pilot study was conducted to provide an initial indication on the suitability of the proposed methods or instruments within the context of our study. The pilot test was specifically used to check for the appropriateness of the questionnaires' wording, structure, flow and response scale in each item (Van Teijlingen & Hundley, 2002). IBM SPSS 27.0 statistical package was used to check for any univariate or multivariate outliers, as well as check for reliability and validity of the scales and constructs of the survey questionnaire.

4.7.2. PILOT TEST: INSTRUMENT DESIGN

The pilot study employed a self-administered survey questionnaire which comprised of four main sections:

1. Recycling questions
2. Reuse questions
3. Other factors questions
4. Demographic questions

Like the pre-test, a few screening questions were placed at the beginning of the survey. The screening questions were to ensure that only participants above the age of 18 years and residing in Australia were able to respond to the survey. Based on the feedback received from the pre-test, the respondents were made aware of the sections within the survey towards the beginning of the survey and a progress bar was included in the survey.

4.7.3. PILOT TEST: SAMPLE SIZE AND SAMPLING TECHNIQUES

The sample for the pilot test was randomly selected from the Purespectrum database of participants. The sample included participants that were above the age of 18, across various Australian states, various age groups and gender.

It is suggested by Parfitt (2005) that a sample size of at least 20 is sufficient to test for the usefulness and appropriateness of a survey questionnaire. To be included in the survey, a respondent must be above the age of 18 years and must reside in Australia. Any respondents that do not meet these conditions are screened out of the survey.

4.7.4. PILOT STUDY: DATA COLLECTION

The data collection for the pilot study was conducted over a two-day period between the 16th and 18th February 2022. The data collection was done electronically via the Qualtrics platform by Purespectrum. In total there were 120 responses to the survey questionnaire. The data was downloaded then tested for reliability and validity using Statistical Package for Social Sciences (SPSS).

Of the 120 responses that were recorded, eleven responses were eliminated as they did not complete the survey. A further 25 responses were excluded (24 did not meet the attention check and one did not meet the age requirements). As a quality check, in mass questionnaire surveys, the survey questionnaires completed in 7 minutes (420 seconds) or less were excluded from the survey. Lastly, 15 responses were eliminated as there were no variation in their responses throughout the survey. After the clean-up of data, a total of 55 responses remained and these were used for the data analysis of the pilot study.

4.7.5. PILOT STUDY: ANALYSIS

As earlier mentioned, the statistical software package SPSS was used to analyse the data within this pilot study. SPSS is a useful tool for calculating descriptive statistics such as frequency, mean, standard deviation, and analysing reliability and validity. More specifically, descriptive analysis and the validity and reliability of each construct were examined and recorded for the pilot study.

One of the questions was reversed coded, thus this was recoded to be in the same direction as the other questions in the questionnaire ahead of the analysis.

The general demographic profile for the pilot sample is provided in Table 4.2. The highest age groups for the pilot study range were between 45-54 to 65-74. The genders included in this survey included males, females, and non-binary/third gender, with majority being female. Lastly, the respondents were from the eight recognised states and territories in Australia with the most participants residing in Victoria, followed by New South Wales.

Demographic Profile	Frequency	Percentage (%)
Gender		
Male	22	40.0
Female	32	58.2
Non-binary / third gender	1	1.8
State		
Australian Capital Territory	1	1.8
New South Wales	14	25.5
Queensland	9	16.4
South Australia	6	10.9
Tasmania	3	5.5
Victoria	17	30.9
Western Australia	5	9.1
Age		
18 - 24	2	3.6
25 - 34	7	12.7
35 - 44	6	10.9
45 - 54	11	20.0
55 - 64	12	21.8
65 - 74	12	21.8
75 - 84	5	9.1
Total	**55**	**100.0**

Table 4.2. Demographic profile of pilot study

The reliability and validity of the constructs were calculated. Cronbach's alpha was used as a measure of the reliability of constructs. According to (Hair Jr et al., 2010), a Cronbach's alpha value higher than 0.7 signifies reliable measurement constructs. As seen in table 4.3, all constructs meet this threshold except for recycle perceived behavioural control with a value of 0.656. While this value does not meet this threshold, it is not too far off, and the researcher remain cautious but believes that a larger sample size would fix this issue. In terms of validity, the composite reliability (CR), average variance extracted (AVE) were calculated. A threshold of 0.7 or above and an AVE value greater than 0.5 and less than the CR value indicate good validity of constructs (Hair Jr et al., 2010; Hair Jr et al., 2017; Kline, 2015). From table 4.3, all constructs meet the stated threshold. Hence, the conclusion was drawn that there are no issues with the validity of the constructs.

4.7.6. FEEDBACK FROM THE PILOT STUDY

As mentioned earlier, the pilot study is a good way to check the validity and reliability of the measurement construct and to ensure that respondents understand the questions being asked. From conducting the pilot survey, it was found that respondents were very quick to complete the survey.

Whilst the estimated duration for completion of the survey was between 15 to 20 minutes, most respondents completed within 5 minutes. On observing the data, it seems most respondents entered the same answer for all the question which might explain the speed of completion of the survey. Also, on exporting data from Qualtrics as an SPSS file, some issues were noticed with the coding of some measurement items and constructs.

Construct	Number of Items	Source	Cronbach's Alpha		CR		AVE	
			Recycle	Reuse	Recycle	Reuse	Recycle	Reuse
Behaviour	3	Cruz-Cárdenas et al. 2019	0.856	0.882	0.855	0.888	0.662	0.727
Intention	3	Jain and Khan 2017	0.937	0.915	0.937	0.920	0.833	0.793
Attitude	3	Paul, Modi, and Patel 2016	0.945	0.949	0.948	0.954	0.858	0.874
Subjective Norm	4	Paul et al. 2016	0.918	0.931	0.922	0.942	0.750	0.806
Perceived Behavioural Control	5	Povey, Conner, Sparks, James, and Shepherd 2000	0.656	0.790	0.898	0.849	0.750	0.573
Self-efficacy	5	Povey et al. 2000	0.941	0.959	0.944	0.962	0.773	0.834
Self-Identity	3	Fielding et al. 2008	0.922		0.922	0.924	0.798	0.802
Eco-literacy	6	Cruz-Cárdenas et al. 2019	0.931		0.933	0.933	0.699	0.701
General Recycling Behaviour	5	Bianchi and Birtwistle 2010	0.810		0.873	0.835	0.698	0.516
Quality Consciousness	4	Lang et al. 2013	0.891		0.896	0.896	0.683	0.683

Table 4.3. Validity and reliability scores of recycle and reuse constructs

4.8. MAIN STUDY

4.8.1. MAIN STUDY: PRELIMINARY DECISIONS

Based on the result of the pilot study, the survey was amended slightly. An additional attention check question was included towards the end of the survey to ensure participants are engaged with the entire survey. The researcher decided to take the questionnaire from start to finish with their completion time set as a minimum threshold for other participants. The researcher completed the

survey in 5 minutes 36 seconds. Thus, the threshold was set at 5 minutes. Any questionnaire completed on or under 5 minutes (300 seconds) are to be excluded from data analysis.

To address the issue noted about exporting the SPSS file, I re-coded some of the construct and measurement items values on Qualtrics. This was done to ensure that the data obtained from Qualtrics was understandable and any confusion with the data could be avoided.

No changes, however, were made to the items within each construct as all Cronbach alpha values were around 0.7 indicating that the measurement items are reliable.

4.8.2. MAIN STUDY: INSTRUMENT DESIGN

The survey was divided into six sections including the introduction, the screeners, recycling questions, reuse questions, other factor questions and the demographics.

Section one, the introduction section includes detailed information about what the research is about, the researcher involved, statements on consent and ethics and information on who to contact. An information sheet was also embedded in this section.

The second section of the survey contains the screeners. This involves two questions to ensure participants are above 18 years old and reside in Australia. Another three questions were also included in this section to test that participants have a clear understanding of the difference between reuse and recycling as it is defined within the study. Participants must answer all five questions within this section appropriately to be able to continue the survey.

The recycling questions and the reuse questions form the third and fourth sections of the survey. The sections involved the measurements related to consumers intentions to recycle and reuse their end-of-life clothing. Under each section, questions relating to attitude, subjective norm, perceived behavioural control, general recycling behaviour and self-identity as it pertains to intentions to recycle and reuse end-of-life garments were presented. The questions within this section are made up of several seven-multi-point measurement scales questions to be answered between one to seven.

The fifth section includes the questions relating to other constructs that are relate in some way to reuse and recycle intentions. This section includes measurements pertaining to eco-literacy, quality consciousness, and self-efficacy. The measurements are to be answered on a multi-point measurement scale between one and seven.

The final section of the survey includes general demographic questions such as gender, highest education level completed, income level, marital status, life stage, number of children (if participants have any) and employment type. The questions are categorical and only one answer can be chosen for each question.

4.8.3. MAIN STUDY: SAMPLE SIZE AND SAMPLING TECHNIQUE

Non-probability (convenience sampling) method was used to collect the sample. The survey questionnaire was distributed amongst consumers across Australia based on the convenience sampling method. Non-probability sampling means that participants in the study are included with unknown probabilities, or, that some of these probabilities will be known to be zero (Vehovar et al., 2016). The sample for the study was randomly selected from the Purespectrum database of participants. One of the advantages of non-probability sampling is it is valuable and cost-effective for research aimed at making useful, exploratory inferences or interpretations (Schillewaert et al., 1998).

There is no rule of thumb for the sample size required for structural equation modelling. However, as Kline (2015) explained, most SEM computing tools that looks at latent variable models that are continuous and normally distributed and uses the maximum likelihood estimation method, often use the N:q ratio that looks at the number of cases (N) to the number of measurements that require statistical estimates (q). Bentler and Chou (1987) suggests a 5:1 ratio, Schreiber et al. (2006) recommended a 10:1 ratio, and more recently, Kline (2015) argues for a 20:1 ratio. The recommendation by Bentler and Chou (1987) was adopted Kline (2015) to determine the minimum sample size required for this study. There is a total of 64 measurement scales. So, a total of at least 320 usable responses are required for the study.

Following from this, a total of 500 questionnaires were distributed. 481 questionnaires were deemed usable for the recycle section while 464 were deemed usable for the reuse section. The difference in the number of usable responses is attributed to the sequence in which the questions were asked in the survey. However, there were still large enough usable number of responses (greater than the threshold) to test both intentions to recycle and reuse end-of-life garments amongst Australian consumers. This large dataset will ensure our results can be generalised to the greater Australian population.

4.8.4. MAIN STUDY: DATA COLLECTION

Questionnaire for this survey was administered via online methods. The online questionnaire is appropriate because it ensures the distribution of the questionnaire to a large sample at a shorter time and with relatively fewer errors (Wright, 2005). Participants can respond to the survey at a time suitable for them and can take the required length of time to adequately respond to the questions (Regmi et al., 2016). Finally, it also allows questionnaires to be distributed beyond the location (state) in which it was created.

After the survey questionnaire had been refined through the pre-test and pilot study, the improved survey questionnaire was disseminated via Purespectrum over a one-week period from 16th to 22nd

March 2022. Data were collected for the survey questionnaires from a list of potential participants purchased from Purespectrum. Hence participants were recruited for the survey if their names appear in the database of the company. The participants for this study included consumers above the age of 18 years who reside in Australia. The sample is nationally representative of the Australian population according to age, gender, and location (states).

4.9. DATA ANALYSIS

The data analysis technique used within this study is structural equation modelling (SEM) which was used to test the study's hypothesised model to determine the predictors of recycling and reuse behaviour. The use of SEM as it is utilised within the study is explained in the sub-section below.

4.9.1. STRUCTURAL EQUATION MODELLING

Structural equation modelling (SEM) is used to analyse the quantitative data collected through survey questionnaire. SEM is a statistical technique used to analyse inferential data and test hypotheses of a study constructs that are specified a priori and grounded in established theory (Hoe, 2008). One of the reasons why the use of SEM is common in quantitative research is its ability to be able to test relationships simultaneously into an integrated model (Sarstedt et al., 2014). The strength of SEM is its flexibility, that allows the analysis of complex relationships, use of different data types such as scales, dimensional, categorical, censored, and count variables, and the comparisons across varied models, while taking into consideration measurement error (Sarstedt et al., 2014; Wolf et al., 2013). Another strength is its versatility compared to other multivariate techniques as it ensures the simultaneous and numerous dependent relationships between variables (Hoe, 2008).

IBM SPSS 27.0 statistical package and IBM SPSS AMOS 28.0 statistical package are the tools used to analyse the data of the survey using SEM. The use of SEM as it was applied within the research will be explained further in chapters five and six.

4.10. ETHICAL CONSIDERATION

The issues of ethics and ethical dilemmas are of particular importance in research such as this, that involves data gathering from human (Gray, 2014). Research such as this brings about ethical dilemmas pertaining to participant consent, and privacy, anonymity and confidentiality of information provided (Morse & Richards, 2002). Research ethics thus goes beyond merely selecting the appropriate theoretical perspective, methodology, and methods for data collection to conducting research that is responsible and morally sound. Ethics was considered in relation to the participants of the study- the Australian consumers, the marketing company used for data collection (Purespectrum) and the researcher.

This research posed a few ethical issues. The first issue is that participants may be reluctant to give up information or provide true information if they feel they are at risk of being linked to the response they provide. To resolve this issue, no identifying information was collected and/or recorded throughout the questionnaire. Also, the researcher ensured that questions were not suggestive of proper sustainability or lack thereof.

Another issue was to ensure sufficient information was provided by the researcher so that participants can make informed decisions about their involvement or not in the study. To resolve this issue, an information page was provided at the beginning of the questionnaire. This provided information about the study such as the aim of the research, researchers' information and contact details of the chief researcher in case participants have further questions/feedback. It was made known that participants consent is implied by the completion and submission of the survey. Participants were also informed that their participation in the survey was voluntary and that they were free to withdraw at any time. On the information page (Appendix B), was an information sheet that provides more details about the research. This information sheet is included in Appendix C.

Thirdly, is the issue of privacy of the information provided by the participants. To address this issue, information obtained for this study are accessed only by the researcher and supervisors. The researcher ensured that no identifying information was collected from the participants to ensure participant's privacy. Permission to disclose any information is obtained through the consent forms. This right was communicated to the participant at the start of the questionnaire survey (Gray, 2014). Also, all data obtained from the questionnaires were kept in a secure location. Data are stored in multiple storage systems including a password protected external hard drive, and the University's OneDrive to prevent loss of data due to unforeseen circumstances and ensure privacy of information.

Lastly, was the issue of avoiding deception. Within the current research, care was taken to provide participants with the true nature of the research. Information was provided to the participants no matter how insignificant they may seem- in the introduction page of the questionnaire. This was done to reduce the chance of any deceptive act and allow for transparency between the researcher and the participants. Also, the involvement of Puresprectrum as it partakes to this study was clearly stated and acknowledged.

All participants were assured of their rights to privacy, confidentiality, and anonymity. The researcher did not collect any identifying information from the participants and/or Purespectrum. All responses and information provided were used solely for the purpose of the research. Further, findings of the research were shared with participants upon request and on completion of the research project. The aforementioned issues were addressed in the ethics application for this study.

Ethics approval for this study was obtained from the Swinburne University Human Research Ethics Committee (SUHREC) - SHR Project 20224162-9146: Behavioural determinants of consumers intention to reuse and recycle end-of-life garments in Australia with the approved duration period 16/12/2020 to 16/12/2023. The ethics approval is provided in Appendix D.

4.11. LIMITATIONS OF RESEARCH METHODS

Within this section, some of the limitations to the methodology and methods adopted with our study are presented.

Firstly, there is a possibility for response bias to the survey questionnaire. This is because sustainability in form of recycle and reuse is socially regarded as a good thing, participants may be reluctant to give their true responses to the questions especially if their truth contradicts this social norm. To mitigate the effect of this bias on the validity of our study, the responses to the survey were anonymous. No identifying information was collected from the participants. This should give respondents the ease of mind to answer the questions in a truer manner knowing their answers cannot be traced back to them.

Another limitation on the methodology chosen is the impact of the COVID-19 pandemic. The COVID-19 pandemic has impacted on people's lives in various way. One of the main issues is the lockdown and hinderance on the recycling and reuse process. This will have an impact on how people respond to the answers within the questionnaire. To counter this issue, the focus of the study is clearly stated as participant's recycling and reuse behaviour without COVID- that could be pre- or post-COVID.

According to Amaratunga et al. (2002), a limitation of a purely quantitative study is that it mainly provides a 'snapshot' of a situation. To address this issue, different types of data analysis techniques are implemented. This should provide deeper and richer understanding of the research topic.

4.12. CHAPTER CONCLUSION

This chapter addressed the philosophical stance, research methodology and methods that underpin this research. The researcher holds a critical realist world view and quantitative research approach was undertaken- these were discussed in depth as it applies to the study. A survey questionnaire was used to collect the research data. The responses from the questionnaire were analysed using structural equation modelling (SEM). The chapter concluded with a discussion of the issues experienced within the research, including the ethical dilemmas that existed within the research from four points; avoiding harm to participants, ensuring informed consent of participants, respecting the privacy of participants, avoiding the use of deception and limitations of the research methods.

The next sections (chapters 5 and 6) will provide publications that have resulted from the empirical study. This will include findings of the structural equation modelling (SEM) for recycle and reuse respectively.

PART TWO: FINDINGS SECTION

CHAPTER FIVE: RECYCLING END-OF-LIFE GARMENTS (STUDY TWO)

5.1. CHAPTER INTRODUCTION

The objective of this chapter is to establish the factors that influence consumers' intentions to recycle end-of-life garments in Australia. Within this chapter, empirical findings are provided for end-of-life garment recycling based on an analysis of data collected from a sample of Australian consumers. The findings of the review are presented as Paper 2 which was submitted to the Journal of Fashion Marketing and Management in June 2022. This paper is currently under review. This chapter provides the result of the first set of data analysed within this study.

5.2. PAPER 2: PREDICTORS OF CONSUMERS' BEHAVIOUR TO RECYCLE END-OF-LIFE GARMENTS IN AUSTRALIA

5.3. ABSTRACT

Purpose- An increase in the purchase and consumption of garments has led to a throw-away culture, increasing post-consumer waste. By extending the theory of planned behaviour (TPB), we explore the predictors of behaviour for recycling end-of-life garments. More specifically, attention is drawn towards attitude, perceived behavioural control (PBC), subjective norms, self-identity, and general recycling behaviour, as direct influences on recycling intentions. Indirect relationships involving eco-literacy and intentions to recycle with attitude as a mediator, and self-efficacy and intentions to recycle with PBC as a mediator were also explored. Finally, the relationship between intentions and behaviour to recycle was also examined.

Design/Methodology/approach- Data were collected from a sample of Australian consumers. A total of 481 usable survey questionnaires were analysed using structural equation modelling.

Findings and implications- Results show positive relationships between the factors explored. The findings of this study have theoretical and managerial implications: 1) Provide an understanding of factors that influence the recycling behaviour; 2) Bridge the gap in the explanatory nature of TPB; 3) Call to develop marketing campaigns that could help educate consumers on the impact of fashion waste; 4) Reform government policies around how garment recycling is conducted in Australia.

Originality- Little research has applied the theory of planned behaviour to end-of-life products, especially within the fashion industry. No study to our knowledge has also explored such an extensive list of factors that predicts recycling intentions and behaviour.

Keywords: recycle, theory of planned behaviour, consumer disposal behaviour, fashion industry, Australia

5.3. INTRODUCTION

The global fashion industry is estimated at around USD 1.3 trillion, with more than 300 million people working throughout its value chain producing over 150 billion garments each year (Ellen MacArthur Foundation, 2017; Zhang et al., 2021). The industry has undergone several transformations in the last few decades (Brydges, 2021). These include the evolution of clothing from a durable product to a trendy, low-cost commodity that increases purchase frequency and often leads to increased disposal of fashion items and textile waste (Birtwistle & Moore, 2007; Hvass, 2014). Some of these transformations, and increased clothing production, can be accounted for by the worldwide growth of the middle-class population and, especially within the last 15 years, increased per capita sales in developed nations (Ellen MacArthur Foundation, 2017).

One such waste is post-consumer textile waste (PCTW), fashion items that consumers no longer want and opt to discard (Büyükaslan et al., 2015, Koch and Domina, 1999. As Birtwistle and Moore (2007) explain, issues around PCTW are not new, but it is of growing concern for the global fashion industry. Furthermore, Niinimäki (2018) states that the overproduction of garments within the industry has resulted in the saturation of the markets and the pile-up of unsold clothes.

The decision to discard an item and the disposal method is the consumer's choice (Weber et al., 2017). Consumers are progressively more aware of sustainability practices relating to fashion consumption and disposal (McNeill et al., 2020b; Testa et al., 2021). However, while consumers acknowledge that fashion waste is a problem, they admit to having more clothes than they need (Ellen MacArthur Foundation, 2017). Research shows that clothing utilisation (the number of occasions a garment is worn on average before it is thrown away) has declined by about 36% in the past 15 years (Ellen MacArthur Foundation, 2017). Moreover, this growth in appetite for fashion is said to widen the gap between consumers' attitudes and behaviour. Consumers ideally want to purchase sustainably but may not follow through in their behaviour (Henninger et al., 2016). The issue is further compounded by the fact that fewer than 1% of the textiles used in manufacturing clothes are recycled into new clothing (Ellen MacArthur Foundation, 2017). As such result of the clothing underutilisation and shortage of recycling, globally, over $500 billion is wasted each year (Zhang et al., 2021).

What is evident from these articles is the disparity in consumers' attitudes and behaviour, especially regarding end-of-life garments and clothing disposal. Hence, within this paper, we apply one of the most popular theories exploring consumer behaviour; The theory of planned behaviour (TPB). The TPB addresses why we carry out a particular behaviour or act a certain way (Adel et al., 2021; Ajzen, 1991). While the TPB has been applied within the fashion industry, the focus has mainly been on consumer purchase intentions and sustainable consumption (Becker-Leifhold, 2018; de Lenne & Vandenbosch, 2017; Dickson, 2000; Maichum et al., 2016; Valaei & Nikhashemi, 2017). However, the fashion

industry's lack of engagement with sustainability extends beyond purchase and consumption to garment disposal (McNeill et al., 2020b).

Little research has focused on applying TPB to end-of-life products. An article by Verdugo et al. (1995) compared intentions to reuse and recycle; however, this looked at general garbage, not garments. A recent article by Kianpour et al. (2017) applied the decomposed theory of planned behaviour (DTPB) to examine consumer intentions to participate in reverse supply chain management, but their focus was on end-of-life electronic products. Further, Lai and Chang (2020) utilised Behaviourism Theory to explore the influence of environmental values and prosocial behaviours on various end-of-life clothing disposal, including reuse, resale, and donation. Koukouvinos (2012) used the Theory of Interpersonal Behaviour to investigate factors that impact clothing disposal behaviour in Greece.

We build on these articles and extend the TPB as the underpinning theory to explore consumers' disposal behaviour of garments at their end-of-life, focusing on consumers' recycling behaviour. We focus on attitude, subjective norms, PBC, general recycling behaviour, and self-identity as predictors of recycling intentions. Other indirect relationships such as consumers' eco-literacy and self-efficacy are also explored.

We address the research question: *what factors influence consumers to recycle end-of-life garments in Australia?* The paper begins with a literature review that provides context for the developed hypotheses. We present the conceptual framework and then discuss the applied methodology. Finally, we conclude the paper by discussing the results and theoretical and managerial implications.

5.4. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This study uses the theory of planned behaviour (TPB) to model essential factors that may influence consumers to dispose of their end-of-life garments through recycling. The TPB is appropriate in explaining intentions as a precursor of behaviour. Hence it is selected as the theory underpinning this study as we focus on factors influencing consumers to participate in recycling. This literature review will discuss the TPB and the hypotheses for the study.

5.4.1. THE THEORY OF PLANNED BEHAVIOUR (TPB)

TPB is an established theory explaining beliefs and behaviour (Valaei & Nikhashemi, 2017). This theory states that norms, attitudes, and perceived behavioural control (PBC) predict behavioural intentions, and subsequently, intentions explain a person's behaviour (Ajzen, 1991). TPB is a proven framework for conceptualising, measuring, and identifying factors that predict intention and actual engagement in behaviour (Ferdous, 2010). The TPB has been shown to explain a variety of sustainability-related behaviours. The article by Rex et al. (2015) looks at the factors influencing sustainable behavioural

intentions in Australia. Their study shows that attitudes, norms, and PBC all influence sustainable behavioural intentions but argued that the model is extended to include moral intensity and internal ethics (Rex et al., 2015). Similarly, in Ferdous (2010) study, the author applied the TPB model to explore sustainable marketing intentions and sustainable marketing behaviours. Ferdous found that the model accurately predicts marketing managers' intent and actual engagement in sustainable marketing behaviour.

Although the TPB has explanatory power, it is argued that gaps still exist in the relationship between the explanatory factors (subjective norms, attitude, and perceived behavioural control) of the TPB components and their subsequent behavioural intentions (Adel et al., 2021). Meta-analysis has shown that TPB prediction of behavioural intent is commonly lower than 40% (Armitage & Conner, 2001; Garay et al., 2019; Rise et al., 2010). Ajzen and Fishbein (2005) state that while the strength of the TPB is in its universal validity, they acknowledge that adding variables will strengthen the explanatory value of the model and its applicability in different contexts. Therefore, it is suggested that additional constructs are added to the model to enhance its explanatory nature. For example, purchase intentions are considered to be influenced by factors such as environmental knowledge and concern for green products (Maichum et al., 2016), and egoistic values, for example, interpersonal influence, status consumption, and fashion involvement can predict intention to collaboratively consume (rent) clothes (Becker-Leifhold, 2018), and awareness and perceived expensiveness (Maloney et al., 2014) have been investigated in articles that focus on the fashion industry.

5.4.2. ATTITUDE AND INTENTIONS TO RECYCLE

Becker-Leifhold (2018) defines attitude as the extent to which a person has or does not have a favourable disposition towards a given behaviour. In the case of clothing disposal, attitudes may involve personal beliefs and evaluation of the consequences of the impacts of different disposal methods. Many authors have argued attitude is a key and popular predictor of intention toward green consumption behaviour (Leonard et al., 2004; Si et al., 2020; Taufique & Vaithianathan, 2018). According to Si et al. (2020), behavioural attitude positively impacted sustainable usage intention for bike sharing. However, the authors advise that caution be taken as the influence of behavioural attitude on sustainable usage intention was the lowest of the four significant factors examined within their study (Si et al., 2020). This weaker effect contradicts the results described by Ru et al. (2018), who stated that behavioural attitude plays a vital role in promoting green travel intentions amongst Chinese residents.

Furthermore, it is argued that consumers who emphasise intrinsic goals have more favourable attitudes toward engaging in pro-environmental behaviour like recycling (Thomas & Sharp, 2013). This

line of argument is supported by Pietralla and Schröder (2018) in their study of 326 generation Y surveys that found that personal norms, driven by intrinsic motivators, have the highest impact on attitude. Findings by Kianpour et al. (2017) show that attitude influences consumers' intentions to repair, reuse, and recycle electronic products at their end-of-life through the reverse supply chain.

Considering the various arguments and findings, there is likely an association between attitude and recycling intentions. We, therefore, present the hypothesis:

H1: There is a positive relationship between attitude and intention to recycle

5.4.3. SUBJECTIVE NORM AND INTENTIONS TO RECYCLE

Another factor in the TPB is subjective norms (Ajzen, 1991). Subjective norm is the supposed pressure from society on whether or not to perform a behaviour (Ajzen, 1991; Becker-Leifhold, 2018). Subjective norms can also be defined as the effect of the influence of people on an individual's decision-making (Maichum et al., 2016). Mainly, the subjective norm involves the impact of the social environment on intentions and behaviour (Fishbein & Ajzen, 1980). This is often driven by a person's motivation to comply with the apparent expectation of particular individuals or groups that the person revere (Ajzen & Fishbein, 1977). Hence, Becker-Leifhold (2018) states that a person's attitude toward a behaviour to change to align with their subjective norms the more their peers influence them. In fact, their article (Becker-Leifhold, 2018) conveyed that social norms are being developed by consumers that favour the sharing of resources .

When purchasing clothes, consumers are often affected by others (Ekström & Salomonson, 2014). (Pietralla & Schröder, 2018) state that the same could be true for clothing disposal, which is evident in their findings that generation Y is often concerned with societal trends when choosing to recycle in-store. On the contrary, Koukouvinos (2012) found that the participants in their study perceived social surroundings as neutral to their intent to dispose of clothing. They suggest that this finding could be because important people in the lives of their participants may not care about clothing disposal, or they are not aware of how those people dispose of their old garments, considering that clothing disposal behaviour may not happen frequently and is moreover not transparent.

However, we posit that the more a person is influenced by their peers and society, the more likely they are to have intentions to recycle.

H2: There is a positive relationship between subjective norm and intention to recycle

5.4.4. PERCEIVED BEHAVIOURAL CONTROL AND INTENTIONS TO RECYCLE

Perceived behavioural control is the third predictor in the TPB and looks at a person's supposed difficulty or ease in carrying out a specific behaviour (Ajzen, 1991). It also considers a person's

experiences and potential obstacles they may face (Becker-Leifhold, 2018). Hence, a person is most likely to display a specific behaviour if they have both the ability and motivation to execute the behaviour rather than one or neither of those factors (Maichum et al., 2016). According to the TPB, having perceived behavioural control is essential before developing an intention towards a behaviour. Kim and Karpova (2010) agree with this claim. They state that an intention or behaviour is determined by a person's will and the opportunities and resources required to perform the behaviour. A study of end-of-life electronic products shows that consumers' intention to reuse, repair, and recycle is impacted by their perceived behavioural control and attitude (Kianpour et al., 2017). We, therefore, hypothesise that:

H3: There is a positive relationship between perceived behavioural control and intention to recycle

5.4.5. GENERAL RECYCLING BEHAVIOUR AND INTENTIONS TO RECYCLE

The general behaviour of a person to recycle everyday household products such as plastic, glass, and paper is believed to affect their attitude towards disposing of garments. Articles such as Biswas et al. (2000) have investigated consumers' recycling and how they can be motivated to engage in recycling behaviours. Findings from Morgan and Birtwistle (2009) indicate that recycling habits of items like plastic, paper, and glass and an environment consciousness are more likely to make a person donate their excess garments to charity. Hence, we posit:

H4: There is a positive relationship between general recycling behaviour and intention to recycle

5.4.6. SELF-IDENTITY AND INTENTIONS TO RECYCLE

Self-identity is a key predictor of behaviour because how issues are addressed are reflections of a person's self-identity, and important issues to their self-identity can affect changes in behavioural intention (Shaw and Shiu, 2003, Rex et al., 2015). Michaelidou and Dibb (2006) and Valaei and Nikhashemi (2017) support the idea of clothing as a form of self-expression that subsequently helps shape self-identity. The study by Ries et al. (2012) investigated the role of self-identity as a predictor of intention to participate in physical activity within two cultural groups; Estonia and Spain. Their findings and the study by Rise et al. (2010) confirmed self-identity as a distinct and vital construct to be included in the TPB (Ries et al., 2012). The Rise et al. (2010) findings further suggested that self-identity-behaviour has a similar, if not a more substantial, relationship than attitude-behaviour. Self-identity may predict intentions since a person is inclined to act according to their identity standards (Valaei & Nikhashemi, 2017). Chan et al. (2012) provide an example in the fashion context that while people may purchase the same brand as their friends to satisfy the need for ‘fit in’, they may select a different colour to distinguish themselves from those peers. Hence, we posit a direct relationship between self-identity and behavioural intent.

H5: Self-identity is positively associated with the intention to recycle

5.4.7. CONSUMER SUSTAINABILITY KNOWLEDGE (ECO-LITERACY) AND ATTITUDE

Consumer sustainability knowledge (also termed eco-literacy) is defined as a person's ability to understand the natural system around them that makes life on earth possible (Kianpour et al., 2017). In other words, this is a person's perception of the fragility of the environment and the level of awareness of the potential damage of their consumption to the environment (Bianchi & Birtwistle, 2010). Cheah and Phau (2011) define eco-literacy as a consumer's understanding of a product's impact on the environment and whether the production process is environmentally friendly. It is said that the quality of the environment is dependent on peoples' practices and their level of knowledge, attitude, and values (Kianpour et al., 2017). In the article by Malik and Singhal (2017), the authors hypothesised that environmental knowledge positively relates to consumer environmental attitudes. Their findings show a significant correlation between eco-literacy with consumer attitude (Malik & Singhal, 2017). They highlight that consumers' awareness of green products will increase with sufficient knowledge of the environment and environmental pollution causes. Therefore, consumers will develop positive attitudes toward environmentally friendly products (Malik & Singhal, 2017).

Pietralla and Schröder (2018) study also find that generation Y is motivated to recycle in-store as they consider it a way to solve environmental problems. Furthermore, the Shen et al. (2012) findings indicate that consumers that buy and use apparel that are recycled are more likely to act ethically. Consumers with an increased knowledge of the fashion industry and how it works are comparatively more eager to encourage and compensate business practices that are ethical through their purchases (Shen et al., 2012). These discussions imply that increased consumer awareness of the fashion industry's environmental impact would positively impact their attitude towards sustainable garment disposal. Therefore, we hypothesise that:

H6: There is a positive relationship between eco-literacy and attitude to recycle

5.4.8. SELF-EFFICACY AND PERCEIVED BEHAVIOURAL CONTROL

According to (Bandura, 1977, 1982) self-efficacy is an individual's confidence in their ability to execute a behaviour. Self-efficacy is established on the notion that an individual's ability to control events that may affect their lives is informed by their resources and technological possibilities (Bandura, 1977; Garay et al., 2019). Garay et al. (2019) suggest that a person's perceived behavioural control could also be supported by self-efficacy. Their study of hotels concluded that those hotels that consider support systems and quality of expertise are likely to be proactive in learning about sustainability and use more sustainable systems (Garay et al., 2019). This is said to improve their self-efficacy (Garay et al., 2019). The study by Taylor and Todd (1995a) also found that self-efficacy affects perceived

behavioural control in waste management behaviour such as recycling and composting. In another study looking at internet banking, Nasri and Charfeddine (2012) found a positive association between self-efficacy and perceived behaviour control of consumers in internet banking sector. Similarly, Kianpour et al. (2017) found self-efficacy is one of the key factors influencing consumers' perceived behavioural control in returning those end-of-life electronic products. They argue that if a customer thinks important resources are available, they have self-confidence and are likely to hand in the products for repair, reuse, and recycling (Kianpour et al., 2017).

H7: Self-efficacy positively affects the perceived behavioural control to recycle.

5.4.9. INTENTIONS AND BEHAVIOUR TO RECYCLE

Intentions include the motivations, decisions, attitudes, or factors that may influence a person to behave or act in a particular way (Ajzen & Fishbein, 1977; Becker-Leifhold, 2018). Ajzen (1991) elaborated on this definition as an indicator of the extent of a person's effort and willingness to engage in a given behaviour. The contention is that the stronger a person's intention towards a behaviour, the more likely they are to perform the behaviour (Ajzen, 1991). Ajzen (1991) states that when a person has the intention to engage in a particular behaviour, they are most likely to carry out that behaviour.

We look at consumers' behaviour in recycling end-of-life garments. Within this study, recycling is defined as a consumer providing their end-of-life clothes for its material to be processed into other reusable forms or later transformed into raw materials or fibres to create new products (Bukhari et al., 2018; Choi et al., 2012; Gręboszc-Krawczyk & Siuda, 2019). Research has shown that almost all forms of textiles can be recycled or, in some ways, repurposed to avoid landfills (Bertram & Chi, 2018). Within the context of this paper, recycling is concerned with the consumers' use of recycling bins or giving their end-of-lifecycle garments to recycling companies that could break down their garments. We contend that:

H8: There is a positive relationship between intention to recycle and recycle behaviour

Figure 5.1 illustrates the conceptual model for the study developed from our review of the literature and the hypotheses discussed.

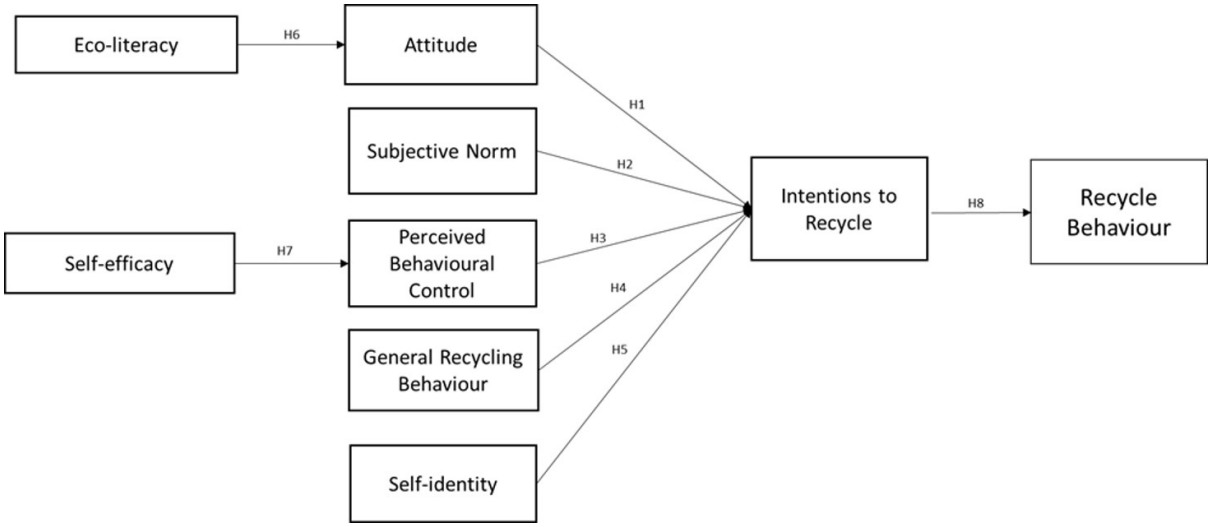

Figure 5.1. Extended TPB showing factors influencing recycle behaviour

5.5. RESEARCH METHODOLOGY

5.5.1. SURVEY DESIGN INSTRUMENT AND MEASUREMENT

The questionnaire contains nine constructs with measurement items adapted from existing literature with good internal consistency. Measurement items were modified to suit the context of our study. The chosen literature was also highly cited and ranked based on the Scimago (Q1 and Q2) and/or ABDC (A*, A, and B) rankings. All constructs are measured on a seven-point multi-point scale on a continuum ranging from strongly disagree to strongly agree (Dane, 1990), absolutely no control to completely in control, very little to numerous, extremely unlikely to extremely likely, extremely difficult to extremely easy or absolutely uncertain to completely certain (Povey et al., 2000). Three measurement items were used to measure the effects of recycling behavior, attitude, self-identity, and intention to recycle. Subjective norms were measured using four items. The perceived behavioral control, general recycle behaviour, and self-efficacy constructs were measured with five items. Lastly, the effects of eco-literacy were measured with six items. Table 5.1 shows the measurement items with descriptive statistics of each construct including the mean and standard deviation.

As a quality check, definitions for recycling were included at the beginning of the survey to ensure respondents understood the meaning of recycling in this study. Also, two attention check questions were included in the middle and towards the end of the survey. This was to ensure that respondents were concentrating when answering the questionnaire. Lastly, demographic questions were asked at the end of the survey.

5.5.2. DATA COLLECTION AND SAMPLE

The population of this study consisted of consumers above the age of 18 residing in any of the eight states or territories in Australia (Australian Capital Territory, Victoria, Western Australia, Queensland, New South Wales, Northern Territory, South Australia, and Tasmania).

The data for the study were collected through a marketing research company. The company distributed the developed self-administered survey questionnaire online to the study participants, who were incentivised to participate and complete the questionnaire. However, the researchers were not personally responsible for the payments to the participants. The data was collected between February and March 2022.

Of the 500 completed surveys, 481 were used for data analysis. The other responses were eliminated as they did not meet the quality threshold set (minimum completion time of 5 minutes).

5.5.3. DEMOGRAPHIC PROFILE

The 481 respondents analysed comprised mainly middle age and old age groups. Two age groups, 55 -64 and 65 -74, both accounted for 35% of the sample. These are followed by the age groups 34-44 and 45-54, which made up 31.6% of the sample, with most of the data respondents being female (61%). Also, although data were collected and distributed across the eight states or territories, most respondents lived in New South Wales (32%) and Victoria (26%). Most sample respondents were educated as they held a high school certificate or higher. Only one respondent did not attend school.

5.6. DATA ANALYSIS AND INTERPRETATION

5.6.1. EXPLORATORY FACTOR ANALYSIS (EFA)

EFA was conducted with a Principle Component approach using varimax rotation on IBM SPSS 27. The analysis was performed on the measures of the nine constructs within the study (recycle behaviour, intention to recycle, attitude, subjective norms, PBC, self-identity, eco-literacy, self-efficacy, and general recycling behaviour). Table 5.1 presents the result of the loading of each item in relation to components during the EFA. Similar to Khare and Sadachar (2017), factor loadings below 0.5 are considered poor. This pre-test showed that item 3 of the general recycling behaviour (GEN_REC) and item 2 of eco-literacy (ECO_LIT) loaded poorly within their respective constructs. Thus, these items were deleted for the main test.

Construct	Items	Statement	Mean	Std Dev	Factor Loading
Recycle Behaviour (REC_BEH)	REC_BEH1	When I decide that I no longer want my garments, it is very important to me to recycle it	5.549	1.393	0.644

	REC_BEH2	When I decide that I no longer want my garments, I prefer to recycle it rather than store it, sell it, or throw it away	5.152	1.611	0.821
	REC_BEH3	When I decide that I no longer want my garments, my first option is to recycle it	4.954	1.718	0.800
Recycle Intention (REC_INT)	REC_INT1	In future, I will try to recycle garments that I no longer want	5.376	1.681	0.877
	REC_INT2	Within the next 12 months, the probability that I would recycle garments that I no longer want is high	5.227	1.736	0.865
	REC_INT3	Within the next 12 months, I intend to recycle garments that I no longer want	5.391	1.679	0.839
Recycle Attitude (REC_ATT)	REC_ATT1	I like the idea of recycling garments that I no longer want	5.863	1.244	0.813
	REC_ATT2	I have a favourable attitude toward recycling the garments that I no longer want	5.780	1.317	0.823
	REC_ATT3	Recycling the garments that I no longer want is a good idea	5.865	1.245	0.804
Recycle Subjective Norm (REC_SBN)	REC_SBN1	Most people who are important to me think I should recycle the garments that I no longer want	5.027	1.422	0.828
	REC_SBN2	Most people who are important to me would want me to recycle the garments that I no longer want	5.214	1.376	0.842
	REC_SBN3	People whose opinions I value would prefer that I recycle the garments that I no longer want	5.268	1.383	0.856
	REC_SBN4	My friend's positive opinion influences me to recycle the garments that I no longer want	4.800	1.554	0.766
Recycle Perceived Behavioural Control (REC_PBC)	REC_PBC1	It is mostly up to me whether or not I recycle my unwanted garments	5.495	1.762	0.912
	REC_PBC2	How much control do you have over recycling your unwanted garments from now on?	5.443	1.815	0.895
	REC_PBC3	The number of events outside my control which could prevent me from recycling my unwanted garments from now on are. . .	5.499	1.770	0.893
	REC_PBC4	How much personal control do you feel you would have over whether or not you recycle your unwanted garments from now on?	5.472	1.793	0.878
	REC_PBC5	How much control do you have over whether you do or do not recycle your unwanted garments from now on?	5.557	1.731	0.906
General Recycling	GEN_REC1	I recycle plastic	5.553	1.702	0.923
	GEN_REC2	I recycle glass	5.441	1.747	0.904
	GEN_REC3	I recycle paper	3.684	2.283	0.473

Behaviour (GEN_REC)	GEN_REC4	Compared with the people I know, I make a greater effort to recycle	5.435	1.747	0.908
	GEN_REC5	I make an effort to find and use recycling bins	5.522	1.707	0.921
Self-Identity (SLF_IDN)	SLF_IDN1	I think of myself as someone who disposes off items sustainably	5.314	1.418	0.830
	SLF_IDN2	To engage in sustainable disposal of items is an important part of who I am	5.268	1.447	0.836
	SLF_IDN3	I am the type of person who would be involved in sustainable disposal of items	5.333	1.403	0.794
Eco-Literacy (ECO_LIT)	ECO_LIT1	It is important to me that the garments I own do not harm the environment, society or economy	5.593	1.250	0.772
	ECO_LIT2	I consider the potential environmental, social or economic impact of my actions when making many of my decisions	3.366	2.082	0.451
	ECO_LIT3	My disposal habits are affected by my concerns about our environment, society or economy	5.389	1.429	0.798
	ECO_LIT4	I am concerned about wasting the resources of our planet	5.817	1.262	0.809
	ECO_LIT5	I would describe myself as an environmentally, socially or economically responsible person	5.418	1.285	0.800
	ECO_LIT6	I am willing to be inconvenienced to take actions that are more environmentally, socially or economically friendly	5.212	1.429	0.789
Recycle Self-Efficacy (REC_SE)	REC_SE1	If I wanted to, I could easily recycle my unwanted garments from now on	5.694	1.483	0.887
	REC_SE2	For me, recycling my unwanted garments would be. ..	5.642	1.509	0.899
	REC_SE3	What is the likelihood that if you tried you would be able to recycle your unwanted garments from now on?	5.690	1.487	0.889
	REC_SE4	How certain are you that you could recycle your unwanted garments from now on?	5.674	1.497	0.887
	REC_SE5	For me to recycle my unwanted garments from now on would be. ..	5.757	1.470	0.905

Note: * denoted items were deleted due to poor factor loading.

Table 5.1. Constructs, measurements, descriptive statistics and pre-test EFA result

5.6.2. CORRELATION ANALYSIS AND RELIABILITY

The correlation between constructs and Cronbach's alpha is shown in Table 5.2. Hair et al. (2010) recommend Cronbach's alpha value of over 0.7 for reliability. The Cronbach's alpha for each construct within this study is between 0.858 and 0.977, which exceeds the threshold of 0.7. This shows that all items were reliable measurements for the constructs. Most correlations are significant at either the 1% or 5% levels regarding the inter-construct correlations. The insignificant correlations are between

PBC and recycle behaviour; general recycling behaviour with recycling behaviour, subjective norm, PBC, and self-efficacy; and eco-literacy and PBC.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Cronbach Alpha (α)
1) REC_BEH	1									0.858
2) REC_INT	0.411**	1								0.919
3) REC_ATT	0.528**	0.408**	1							0.907
4) REC_SBN	0.536**	0.308**	0.431**	1						0.918
5) REC_PBC	0.057	0.274**	0.195**	0.095*	1					0.934
6) REC_SE	0.441**	0.259**	0.389**	0.338**	0.166**	1				0.956
7) SLF_IDN	0.271**	0.286**	0.381**	0.257**	0.113*	0.170**	1			0.882
8) ECO_LIT	0.323**	0.205**	0.355**	0.477**	0.035	0.176**	0.503**	1		0.910
9) GEN_REC	0.032	0.199**	0.161**	0.043	0.065	0.018	0.150**	0.138**	1	0.977

Note: ** Significant at the 0.01 level (2-tailed); * Significant at the 0.05 level (2-tailed)

Table 5.2. Correlation matrix between variables and Cronbach's alpha

5.6.3. CONFIRMATORY FACTOR ANALYSIS (CFA) AND MODEL FIT

The results of the EFA were used to initiate the confirmatory factor analysis (CFA) on IBM SPSS AMOS 28.0. Table 5.3 shows the model fit indices were considered within our study. These include the chi-square (x^2)/degrees of freedom (*df*), incremental fit index (IFI), Comparative Fit Index (CFI), the goodness of fit (GFI), Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and Standardised Root Mean-square Residual (SRMR). The recommended threshold values by Collier (2020), Hair Jr et al. (2021), and Hair Jr et al. (2017) were used to determine acceptable goodness of fit. The values attained through the CFA analysis exceeded the recommended threshold, thereby suggesting an acceptable model fit. The chi-square (x^2 = 1105.672, N=481, *df* = 524, *p* = 0.000, x^2/df =2.110) is considered significant at less than 95% confidence interval. The CFI of 0.961 and the GFI of 0.879, inferred strong uni-dimensionality (Hair et al., 1995). According to Byrne (2011), the RMSEA accounts for errors of approximation within a model. This study's fit indices are between 0.05 to 0.08 suggesting a good fit. In the current study, RMSEA is 0.048. The TLI= 0.955, SRMR= 0.0315 all indicate a good model. Therefore, based on all the observed values of model fit indices, it is deduced that the measurement model is a good fit to model the sample data.

CFA Indicators	x^2/df	GFI	IFI	CFI	RMSEA	SRMR	TLI
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08	< 0.06	>0.90
Observed Value	2.110	0.879	0.961	0.961	0.048	0.0315	0.955

Table 5.3. Model fit indices

5.6.4. CONVERGENT VALIDITY

Composite reliability (CR) assesses the overall consistency of the constructs, which is calculated from the factor loadings after CFA is conducted using AMOS (Hair et al., 2021). Table 5.4 provides the average variance extracted (AVE), composite reliability (CR), and information on the discriminant validity. Kline (2015) and Hair Jr et al. (2017) suggest that a composite reliability score of above 0.7 indicates good reliability of constructs. Therefore, we conclude that the nine constructs possess excellent reliability as all CR values are well above 0.7.

We use AVE to evaluate the convergent validity of the constructs. According to (Hair Jr et al., 2010), an AVE value greater or equal to 0.5 indicates a high level of convergent validity. These values should also be less than the CR values (Fornell & Larcker, 1981). All AVE values in this study were above 0.5 and were lesser than the CR values. This signifies a high level of convergent validity for all nine constructs analysed.

5.6.5. DISCRIMINANT VALIDITY

Discriminant validity measures how diverse a construct is from others in the same model and whether each construct measures distinct concepts (Hair et al., 2009). Within this study, we measure the discriminant validity in two ways, and the results are presented in Table 4. The first method involved calculating the shared variance between constructs by observing the correlation between each pair of constructs in the CFA model through IBM SPSS AMOS 27.0. The correlations within the constructs in this study occurred between the range 0.020 and 0.589, which are clearly below 0.9. Correlations below 0.9 indicate very little chance that an item will have significant loadings on multiple constructs (Kline, 2016). The second method compares the square root of the AVE and these are presented on the diagonals in Table 5.4. Fornell and Larcker (1981) state that a square root value of AVE greater than the correlation of each pair of constructs implies that the constructs account for a more significant proportion of the variance of the assigned items. The highest correlation value of 0.589 has an associated value for the square root of the AVE at 0.869. Hence, the nine constructs within this study demonstrate a satisfactory discriminant validity level. This enabled the structural equation modelling (SEM) on the final measurement model to be performed to explore attitude, subjective norms, PBC, self-identity, eco-literacy, self-efficacy, and general recycling behaviour as predictors of intentions to recycle and recycling behaviour.

	CR	AVE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) REC_ATT	0.907	0.765	**0.875**								
2) REC_SE	0.956	0.814	0.419	**0.902**							
3) REC_PBC	0.947	0.780	0.211	0.176	**0.883**						
4) ECO_LIT	0.911	0.672	0.386	0.187	0.041	**0.820**					
5) GEN_REC	0.948	0.819	0.174	0.020	0.061	0.151	**0.905**				
6) REC_SBN	0.924	0.756	0.478	0.357	0.094	0.509	0.044	**0.869**			
7) REC_INT	0.920	0.793	0.440	0.275	0.290	0.224	0.209	0.313	**0.891**		
8) SLF_IDN	0.884	0.717	0.420	0.179	0.122	0.554	0.169	0.290	0.320	**0.847**	
9) REC_BEH	0.864	0.680	0.581	0.481	0.059	0.355	0.033	0.589	0.445	0.298	**0.825**

Table 5.4. Convergent and Discriminant Validity

5.6.6. STRUCTURAL EQUATION MODELLING AND HYPOTHESIS TESTING

All hypotheses developed were analysed using structural equation modelling (SEM) via IBM SPSS AMOS 28.0. The results of the hypothesis testing are presented in table 5.5. All suggested hypotheses were supported by the sample data. Findings show that the three predictors of intention and behaviour in the TPB, subjective norms, perceived behavioural control, and attitude, all have a significant relationship. Therefore, the result of the hypothesis testing showed that hypotheses 1, 2, and 3 were all significant, with all the p-values less than 0.001.

We extended the TPB by looking at general recycling behaviour, and self-identity as predictors of intentions to recycle. We predicted that there would be a positive relationship between self-identity and general recycling behaviour on intentions to recycle. Our findings show that there is indeed a significant positive relationship between general recycling behaviour and self-identity on recycling intentions. Both relationships were significant, with p-values of 0.002 and 0.006, respectively. Therefore, both H4 and H5 were supported by the sample data.

Lastly, we posited a positive relationship between eco-literacy and attitude to recycle, self-efficacy and perceived behavioural control, and recycling intention and recycling behaviour. Our findings showed that eco-literacy and attitude to recycling, self-efficacy and perceived behavioural control, and recycling intention and recycling behaviour have a significant positive relationship with p-values all less than 0.001. Thus, the sample data-supported hypotheses 6, 7, and 8.

Hypothesis	Paths	Estimate	S.E.	C.R.	P	Result
H1	REC_ATT→REC_INT	0.251	0.055	5.994	***	Supported
H2	REC_SBN→REC_INT	0.156	0.052	3.565	***	Supported
H3	REC_PBC→REC_INT	0.198	0.039	4.854	***	Supported
H4	GEN_REC→REC_INT	0.128	0.039	3.106	0.002**	Supported
H5	SLF_IDN→REC_INT	0.118	0.051	2.744	0.006**	Supported
H6	ECO_LIT→REC_ATT	0.355	0.043	8.312	***	Supported
H7	REC_SE→REC_PBC	0.166	0.053	3.694	***	Supported
H8	REC_INT→REC_BEH	0.400	0.038	9.555	***	Supported

Table 5.5. Result of hypothesis testing

5.6.7. MEDIATION RELATIONSHIPS

There were, in total, seven mediating effects present within our model. To test these direct and indirect effects, the decomposition tests using the bootstrapping method was conducted on IBM SPSS AMOS 28.0. The results of these are presented in Table 5.6. All direct and indirect effects of attitude, subjective norms, perceived behavioural control, and general recycling behaviour on recycling behaviour was observed. This signifies a partial mediation; there is a significant relationship between subjective norms, attitude, perceived behavioural control, general recycling behaviour on recycling behaviour, and behavioural intention to recycle also plays a role between the said variables.

Full mediation was observed between three relationships. The first is the relationship between self-identity and recycling behaviour. It is a full mediation as there is no significant direct relationship between self-identity and recycling behaviour; instead, the relationship is only significant in the presence of intentions to recycle as a mediator. Similarly, there is no significant direct relationship between eco-literacy and recycling intention. The relationship is, however, significant when mediated by attitude to recycle. Lastly, full mediation is also observed between self-efficacy and recycling intentions. No significant direct relationship is observed between self-efficacy and recycling intentions. However, there is a significant relationship between self-efficacy and recycling intentions in the presence of perceived behavioural control as a mediating variable.

Path(s)	Direct Effect	Indirect Effect	Result
REC_ATT→REC_INT→REC_BEH	0.326***	0.049***	Partial Mediation
REC_SBN→REC_INT→REC_BEH	0.353***	0.033***	Partial Mediation
REC_PBC→REC_INT→REC_BEH	-0.095*	0.040***	Partial Mediation
GEN_REC→REC_INT→REC_BEH	-0.075*	0.028**	Partial Mediation
SLF_IDN→REC_INT→REC_BEH	0.026 (ns)	0.029**	Full mediation
ECO_LIT→REC_ATT→REC_INT	-0.059 (ns)	0.083***	Full mediation
REC_SE→REC_PBC→REC_INT	0.075 (ns)	0.031***	Full mediation

Note: ns= not significant; All coefficients are standardized estimates. Bias-corrected percentile method was used; *** p≤ 0.001; ** p≤ 0.01; * p≤ 0.05 (2-tailed)

Table 5.6. Breakdown of the direct and mediating effects of the structural model

5.7. DISCUSSION AND IMPLICATIONS

The findings of our study are in line with those of Paul et al. (2016), who confirmed that extending the TPB is an efficient research model helpful in explaining behavioural intent. In their study they looked at consumers' green product purchase intentions, in our study, we explore intentions, and behaviour to recycle end-of-life garments. Their study also validates the positive relationship between attitude and PBC on intentions, as is true in our findings (Paul et al., 2016). Interestingly, attitude, PBC, and SBN explain over 60% of consumers' intentions to recycle their end-of-life garments.

While the correlation between general recycling behaviour and intentions to recycle does not account for a lot, the relationship is significant. This finding suggests that if consumers participate in recycling their general household items like glass, paper, and plastic, they are likely to recycle their end-of-life garments. This finding is in line with Morgan and Birtwistle (2009).

Similar to Ries et al. (2012), our study suggests a higher chance for consumers who express themselves through fashion and their outfits to have the intention and behaviour to recycle their end-of-life garments. Rise et al. (2010) argued that self-identity should be its own distinct and important construct, and our findings align with this. Outcomes of the present study show a significant association between self-identity and intentions to recycle. However, our study contradicts Rise et al. (2010) that the self-identity-behaviour compared to the attitude-behaviour relationships are similar, if not stronger. Our study reveals that the relationship between attitude and intentions to recycle is twice as strong as the relationship between self-identity and intentions to recycle. Though this is true, our study agrees with Valaei and Nikhashemi (2017) that self-identity is a good predictor of consumers' recycling intentions.

Our findings suggest that the level of knowledge a consumer has about the fashion industry's impact on the environment predicts their intention and, subsequently, recycling behaviour. There are similarities between the findings expressed by Malik and Singhal (2017) and those described by Kianpour et al. (2017) that there is a strong correlation between eco-literacy and consumer attitude.

Our findings further reinforce that if consumers understand the environment and the fashion industry's impact on the environment, this could lead consumers to adopt favourable dispositions toward recycling their end-of-life garments. The similarities between the current study's findings and the study by Malik and Singhal (2017) is uncanny, with both studies accounting for over 30% correlation between eco-literacy and attitude. Our study further shows that there is also a significant direct relationship between eco-literacy and intentions to recycle. Thus, this implies that eco-literacy is an important predictor to consider when encouraging recycling intentions and subsequent recycling behaviour.

Previous studies by Garay et al. (2019), Taylor and Todd (1995a), Kianpour et al. (2017), and Nasri and Charfeddine (2012) all highlighted a positive effect of self-efficacy on PBC. Our findings corroborate their findings. Our study shows a significant positive relationship between self-efficacy and PBC. This indicates that the more consumers feel confident that they have the required technologies, tools, and resources, the more at ease consumers will feel with recycling their end-of-life garments. It is important to note that the relationship between self-efficacy and intentions to recycle is only significant when mediated by perceived behavioural role. This means that self-efficacy alone may not lead to recycling intentions.

Finally, in establishing and further examining the TPB, there have been reports of a strong relationship between a consumer's intentions and their behaviour towards a particular end (Ajzen, 1991; Ajzen & Fishbein, 1977; Becker-Leifhold, 2018). We hypothesised that there is a positive relationship between intention to recycle and recycling behaviour. Our hypothesis was supported, and the data showed a strong relationship between consumers' intentions and recycling behaviour. This relationship was the strongest observed within our model consumers' recycling intentions explain 40% of their recycling behaviour.

5.7.1. THEORETICAL IMPLICATIONS

A key theoretical implication of the current study is that it provides an understanding of factors that could predict the recycling behaviour of end-of-life garments in Australia. While earlier research has looked into predictors of recycling behaviours using the theory of planned behaviour (Botetzagias et al., 2015; Kumar, 2019; Oztekin et al., 2017; Poškus, 2015), none of these articles have focused on the fashion industry. The study by Vilkaite-Vaitone and Jeseviciute-Ufartiene (2021) investigated the predictors of textile recycling using the theory of planned behaviour; however, this study's focus was on the Lithuanian household. In the present study, we explored predictors of end-of-life garments amongst Australian fashion consumers as Australia is the second-largest consumer of new textiles globally after the USA (Moazzem et al., 2018). Thus, the findings from this research could provide insights into how consumers' recycling behaviours could be improved to take advantage of the two main benefits of recycling: reducing waste and conserving natural resources (Botetzagias et al., 2015).

Secondly, we have addressed the explanatory issue surrounding gaps in the relationship between the TPB components (attitude, subjective norms, and perceived behavioural control) and their consequent behavioural intentions (Adel et al., 2021). We achieved this by extending the theory of planned behaviour. While previous studies (Botetzagias et al., 2015; Kumar, 2019; Oztekin et al., 2017; Poškus, 2015; Vilkaite-Vaitone & Jeseviciute-Ufartiene, 2021) have extended the theory of planned behaviour, none to our knowledge has explored such an extensive list of predictors as we have done

within this study. This study researched the factors that influence consumers to recycle end-of-life garments in Australia explored by considering predictors, including intentions to recycle, attitude, subjective norms, PBC, self-identity, and general recycling behaviours. Other indirect relationships such as eco-literacy and self-efficacy were also investigated.

5.7.2. MANAGERIAL IMPLICATIONS

The findings from this study have practical implications for developing marketing campaigns. Our results suggest that eco-literacy is an important predictor within our model and highlights the need to change consumers' attitudes toward recycling through consideration of the knowledge of the waste issues present within the fashion industry. This could help educate and inform consumers of the implications of their increased purchase and throw-away trends and their impact on improving the fashion wastes being sent to landfills.

Our discussion highlights sustainability efforts, especially recycling, as an essential focus and a key consideration in research agendas. However, we believe these findings should extend beyond theory refinement and the fashion industry and brands to policy discussions within the Australian government. Results suggest that if policies can be reformed to include fashion waste management in a similar way to which plastic, paper, and glass are being recycled in Australia, there may be a success in diverting more of the end-of-life garment waste from landfills. Perhaps, going further than this, the government could consider a reward system that could also hold brands accountable for the increased consumer purchase and consumption of their fashion products.

5.8. CONCLUSIONS AND LIMITATIONS

This study has explored predictors of recycling behaviour by conducting a survey questionnaire amongst Australian consumers. We focus on attitude, subjective norms, PBC, general recycling behaviour, and self-identity as predictors of recycling intentions. Other indirect relationships such as consumer sustainability knowledge or eco-literacy and self-efficacy were also explored. It was found that all these factors predicted intentions to recycle and further, recycling behaviour.

This study is not without its limitations. The scope covers the Australian context. Thus, further research could explore the same predictors as the current study within a different context, and perhaps a comparative study would offer interesting findings. Another potential extension of this study is to examine the relationships of factors within the model presented in this study through a qualitative approach. This could provide a richer and deeper explanation for why these particular results were obtained from Australian consumers.

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5.9. CHAPTER CONCLUSION

In this chapter, I provided our first set of empirical data analysis which forms the second study in this thesis. Findings from our analysis of data regarding Australian consumers' recycling intentions were used to suggest some theoretical and managerial implications. The subsequent chapter will provide the next data analysis which focuses on Australian consumers' reuse intentions and behaviour.

CHAPTER SIX: REUSING END-OF-LIFE GARMENTS (STUDY THREE)

6.1. CHAPTER INTRODUCTION

The objective of this chapter is to explore the factors that influence consumers' intentions to reuse end-of-life garments in Australia. Within this chapter empirical findings are provided for end-of-life garment recycling based on an analysis of data collected from a sample of Australian consumers. The findings of the review are presented as Paper 3 which has been submitted to the *Journal of Cleaner Production*. This chapter will provide the result of the second set of data analysed within this study.

6.2. PAPER 3: BEHAVIOURAL DETERMINANTS OF CONSUMERS' INTENTION TO REUSE END-OF-LIFE GARMENTS IN AUSTRALIA

6.3. ABSTRACT

Literature on garment reuse focussing on consumer behaviour and end-of-life products is scarce. Our study addresses this gap by exploring predictors that significantly impact consumers to reuse their end-of-life garments. Subsequently, this study extends the theory of planned behaviour by adding predictors such as general recycling behaviour, self-identity, quality consciousness, eco-literacy, and self-efficacy. Structural equation modelling is conducted to analyse data from a sample of 428 questionnaire responses retrieved from consumers that live in Australia. Our model contributes to an understanding of what factors significantly affect consumers' reuse of their end-of-life garments. We find that all the predictors of the theory of planned behaviour (perceived behavioural control, attitude, and subjective norms) have a significant effect on behavioural intentions and further end-of-life garment reuse behaviour. However, there is a negative relationship between perceived behavioural control and intentions to reuse. The indirect relationships of self-efficacy and eco-literacy through perceived behavioural control and attitude, respectively, show positive and significant relationships. This contributes to the scholarly work focussing solely on reuse, consumer behaviour and end-of-life garments. It also has implications for practice in improving our understanding of drivers of reuse. These findings are key to various fashion industry agents, including retailers, government agencies and the broader supply chain.

Keywords: Reuse, Theory of Planned Behaviour, Circular economy, Disposal behaviour, Consumer, Fashion industry, Australia

6.4. INTRODUCTION

The fashion industry is notorious for its social, environmental and economic impacts, and it is globally recognised as the second-highest polluting industry (Huang, 2022). The Ellen MacArthur Foundation (2017) reports that annually, textile production alone amounts to over 1.2 billion tonnes of greenhouse gas emissions. According to Ghoreishi, Bhandari and Franconi (2022), consumers own

their garments for a shorter time and they consume 60 per cent more clothes than in the past 10 years. On average, clothing utilisation has decreased by 36 per cent between the years 2000 and 2015 (Charnley et al., 2022). With knowledge of these negative impacts, the industry is slowly transitioning away from the take-make-waste model to a circular economy (CE) that encourages the extension of garment life beyond single use (Huang, 2022). The shift towards a CE offers a potential solution to these waste issues.

Few practices contribute towards CE. Previous research identified four sustainable practices: reuse, recycling, education and engagement, and recovery and redistribution (Rotimi, Topple, & Hopkins, 2021). Articles by Joung and Park-Poaps (2013) and Diddi and Yan (2019) suggest that consumers can either reuse, recycle or resell their unwanted clothing as an alternative to throwing it away in municipal landfills. The report by PBL (2019) (as cited inde Wagenaar, Galama, & Sijtsema, 2022, p. 1) explores the 10 R-ladder as sustainable practices towards achieving a CE. One of the practices on the 10R ladder is reuse which is the focus of this study to achieve CE.

Reuse has been defined as the extension of the clothing lifecycle beyond one cycle or use and, in doing so, can address sustainability issues within the fashion industry (Rotimi, Topple, & Hopkins, 2021). Reuse acknowledges that consumers do not have to avoid purchasing new clothing but they can still be satisfied by consuming previously worn clothes (Freudenreich & Schaltegger, 2020). Reusing clothes is said to be beneficial to the environment and might offer a better solution than clothing recycling (Charnley et al., 2022). Du (n.d.) contends that extending the garment life by three months could reduce water, carbon and waste footprints by between five to ten percent.

According to Charnley et al. (2022) the lack of acceptance and engagement of consumers towards the adoption of CE is one of the barriers to the transition. Further, the article by Taghikhah, Voinov and Shukla (2019) and Rotimi, Topple and Hopkins (2021) highlight the key role in which consumers play in the shift towards a more sustainable economy. Similarly, de Wagenaar, Galama and Sijtsema (2022) states that increasing consumer awareness around fashion consumption and disposal and its impact on the environment is crucial in the fight towards sustainability.

The aim of this study to explore significant factors that predict Australian consumers' intentions to reuse their end-of-life garments. Our paper begins with a review of literature. Then we provide a discussion for the hypotheses developed and present the resulting conceptual model. We discuss the study's method and finalise the paper by providing the results and the key contributions (managerial and theoretical) of the study.

6.5. LITERATURE REVIEW

6.5.1. REUSE

From extensive search of literature, we know that reuse is widely considered as one of the preferred dimensions to attaining circularity (de Wagenaar, Galama, & Sijtsema, 2022; PBL, 2019; The Commonwealth of Australia, 2018). In Australia, reuse is listed as the third preferred method for disposing waste after avoiding and reducing the waste (The Commonwealth of Australia, 2018). However, while there is knowledge of the positive impact that reuse could have on the environment, little research has focussed solely on reuse. Sandin and Peters (2018) investigated 41 studies on the environmental effect of textile recycling and reuse. Their findings show that majority of the articles (85%) are focused on recycling, 27 per cent cover both reuse and recycling topics and only 14 per cent of articles address textile reuse alone. From search of recent published works, we find that there few studies focus solely on reuse. The study by Uriarte-Ruiz (2022) for example conducted an in-depth interview of millennial consumers towards owning, replacing and disposing their mobile phone. Also, the article by Kessler, Matlin and Kuemmerer (2021) addresses whether reuse and recycle could help to decrease the materials produced in the textile sector. However, these articles do not solely focus on the role and impact of reuse.

The article by Ertz et al. (2017) also highlight the gap in literature around reuse with a focus on consumer behaviour. In their article they observed students consumption of reusable containers across a Canadian and Chinese university (Ertz et al., 2017). While there are some articles such as Lin et al. (2022) that looked at consumers reuse intention within a retail store, Kim (2021) addressed researchers satisfaction of data reuse, or Wang et al. (2022) study of consumers intention to use reusable drinking cups, none of these articles have addressed consumers reuse of garment and with a focus on end-of-life (unwanted) garments. Further, the authors Lin et al. (2022) call for studies to be conducted addressing reuse behaviour.

From the review of the aforementioned articles, it is evident that there is a gap in research on garment reuse, from the consumers' perspective and with a focus on end-of-life. Thus, our study explores consumer behaviour to reuse their end-of-life garments by extending the theory of planned behaviour (TPB). By exploring these gaps in research, we address the call from previous studies to investigate reuse behaviour.

6.5.2. EXTENDING THE THEORY OF PLANNED BEHAVIOUR (TPB)

The TPB was coined from the theory of reasoned action (TRA) (Jain, Khan, & Mishra, 2017). The theory is used to explain consumer behaviour and beliefs (Mohiuddin et al., 2018; Valaei & Nikhashemi, 2017). It posits that three factors control consumer behavioural intentions (Ajzen, 1991), namely; 1) A consumers predisposed willingness to partake in the said behaviour, termed as attitude; 2)

Subjective norm determines the influence of people's opinions on a person's behaviour, especially someone that is valued, and; 3) Perceived behavioural control is regarded as the level of control and resources that a consumer believes they have available to carry out the behaviour. According to the TPB, if a consumer possesses all three factors, that is, they have the willingness, their valued ones' believe in the behaviour and the consumer feels they have the necessary resources to carry out the behaviour, they will have the intention to partake in the behaviour (Ajzen, 1991). Further, behavioural intentions is believed to be linked to actual behaviour (Maichum, Parichatnon, & Peng, 2016; Sheoran & Kumar, 2022).

The TPB is widely used to explain sustainable and eco-friendly behaviours (Joshi, Uniyal, & Sangroya, 2021). According to Ogiemwonyi (2022), TPB is a widely used and tested theory in predicting individual's behaviour. However, it is essential to note that the TPB is not without its limitations. Several authors have questioned the predictive nature of the theory (Adel, Dai, & Roshdy, 2021; Mason, Pauluzzo, & Muhammad Umar, 2022). Ajzen and Fishbein (2005) and Joshi, Uniyal and Sangroya (2021) suggest that a potential solution to this issue is to include and explore more factors beyond the three observed within the theory. Extending the TPB in this way is believed to be crucial for studies that address social and ethical issues (Hosta & Zabkar, 2021; Mason, Pauluzzo, & Muhammad Umar, 2022; Shaw, Shiu, & Clarke, 2000).

Researchers have expanded the TPB when discussing various sustainability practices, especially around recycling. For example Ma et al. (2018, p. 339) included situational factors, that is factors that could influence households to manage their municipal solid waste in Guilin, Guangxi Zhuang Autonomous Regions in China. In another study by Jain et al. (2020), researchers explored the perceived cost and benefit on consumers' attitudes towards waste recycling from construction materials in India. Within the fashion industry, Maloney et al. (2014) has extended the TPB by adding the factors awareness and perceived expensiveness. Becker-Leifhold (2018) also included variables such as fashion involvement, status consumption, and interpersonal influence as predictors of collaborative clothing consumption. Al Mamun et al. (2018) extended the TPB by including self-efficacy, eco-literacy, and environmental concern as factors that could influence consumers' attitudes in low-income households towards sustainable products in Malaysia. The article by Rotimi et al. (2023) extended the theory of planned behaviour by including self-identity, self-efficacy, eco-literacy, and general recycling behaviour in understanding the intention to recycle end-of-life garments amongst Australian consumers. This study adopts the model used with Rotimi et al. (2023) article and we add an additional construct; quality consciousness to observe consumers reuse intentions of end-of-life garments in Australia.

6.6. HYPOTHESIS DEVELOPMENT AND CONCEPTUAL MODEL

A conceptual model is proposed in Figure 6.1. The model shows how additional predictors are incorporated into the TPB. Explanation is provided for the model development within the sub-sections below.

6.6.1. THE THEORY OF PLANNED BEHAVIOUR AND REUSE

We adopt the TPB as the theoretical framework that grounds our study in the explanation of end-of-life garment reuse behaviour. This theory is underlined by the fundamental assumption that a consumer's intention to behave drives actual behaviour (Ajzen, 2020). Thus, TPB argues that the there is a causal effect between intention and behaviour. This assumption is corroborated by the study by Ertz et al. (2017) that shows intention predicts consumers behaviour to engage in the consumption of reusable containers. Also, the article by Koshta, Patra and Singh (2022) show a positive significant relationship between intentions and the willingness to pay for recycled e-waste by Indian residents. Therefore, based on the TPB, we posit that if a person has the intention to reuse their end-of-life garment, they will follow through with the behaviour.

Intention is thus driven by three factors: subjective norm, attitude, and perceived behavioural control (Jain, Khan, & Mishra, 2017). The first and perhaps the strongest predictor within the TPB is attitude (Akbari et al., 2019; Sonnenberg et al., 2022). Attitude refers to level in which a consumer positively or negatively considers a specific behaviour (Ajzen, 1991). Within the fashion sector, previous studies have observed a positive link between attitude and consumers' intention and purchase intentions (Müller et al., 2021; Waris & Ahmed, 2020). The same is true in the study by Borusiak et al. (2020) that shows a positive link between attitude and intentions to purchase green products. Similar views are held around the reuse of products with Kianpour et al. (2017) confirming that attitude has a significant influence on consumers intentions to reuse, recycle, and repair their end-of-life electronic products. Similarly, Sumaedi et al. (2016) findings show that attitude has an influence on intentions to reuse public transport services. Lai and Chang (2020) provide contrary findings in that consumers have a low willingness to resell or reuse their clothing (Lai & Chang, 2020). Although this contradiction exists, in general, the previous studies imply that attitude has a positive relationship with sustainable practices such as reuse.

The second predictor stated in the TPB is subjective norm. It is believed that social pressure comes from those close to a person whether that is a family member or friends (Soomro et al., 2022). Subjective norm is therefore the implied pressure from social context that can influence a person's behaviour (Park & Ha, 2014). In the article by Soomro et al. (2022), there is evidence that society has an influence on a person's sustainable behaviour to recycle. They further state that reuse was one of

the popular methods to managing solid waste in the Kingdom of Saudi Arabia (Soomro et al., 2022). Comparably, the articles by Ertz et al. (2017) and Maichum, Parichatnon and Peng (2016) show that subjective norm influences sustainable consumption including reuse. When looking at the predictors of data reuse intentions, subjective norm is found to be a significant driver (Kim, 2021). Consistent with these findings we anticipate that subjective norm has a significantly positive relationship with the reuse of end-of-life garments.

PBC is an individual relative effort required to perform a specific behaviour (Reysen, Chadborn and Plante, 2018). The article by Ertz et al. (2017) found that PBC has one of the strongest impacts on intentions to consume reusable containers. While the study by Sonnenberg et al. (2022) that PBC has a strong and positive relationship with intention to dispose of post-consumer textile waste sustainably. However, it is the weakest of the three TPB predictors. On the contrary, the study by Wang et al. (2022) findings show that PBC has a strong relationship on intentions to use reusable cups from the data collected within 12 universities in Pakistan.

H1: Intention to reuse has a strong and positive association with reuse behaviour of end-of-life garments

H2: Attitude significantly and positively relates to reuse intention for end-of-life garments

H3: Perceived behavioural control significantly positively relates to reuse intention for end-of-life garments

H4: Subjective norm significantly and positively relates to reuse intention for end-of-life garments

6.6.2. GENERAL RECYCLING BEHAVIOUR AND INTENTION TO REUSE

Several literatures have shown that a consumer's general recycling behaviour of common household items like paper, plastic and glass could influence pro-environmental behaviour. For example, the Morgan and Birtwistle (2009) study found that consumers who partake and exhibit such recycling habits are more engaged with pro-environmental behaviours. Further, relationships have been discovered between an individual's general recycling behaviour and their clothing disposal behaviour (Bianchi & Birtwistle, 2010). In their 1995 findings, (Shim) concluded that general recycling behaviour has an influence on the two reuse clothing disposal patterns they observed which included environmentally motivated and economically motivated reuse. In a more recent article by McNeill et al. (2020), general recycling was found to have a significant relationship with garment repair. The article further elaborates the importance of these findings as there exists a link between general recycling behaviour and sustainable waste management behaviours that look at the extension of garment lifecycles (McNeill et al., 2020). We therefore infer that there is an association between general recycling behaviour and intentions to reuse end-of-life garments.

H5: General recycling behaviour significantly and positively relates to reuse intention for end-of-life garments

6.6.3. SELF-IDENTITY AND INTENTION TO REUSE

Sparks and Shepherd (1992) state that self-identity is synonymous with the concept of self which is how an individual view themselves and this is said to have an important effect on behaviour. Self-identity in this study can be explained in line with Balundė, Jovarauskaitė and Poškus (2020) as an individual that considers themselves to be environmentally friendly and tries not to harm the environment. Several authors have noted that self-identity relates to pro-environmental behaviours. For example, the article by Lalot et al. (2019) observed that self-identity, that is how much a person considers themselves to be an environmentalist has an impact on their intention to reduce their energy consumption. Lin et al. (2022) findings highlight self-identity as a vital driver of reuse intention amongst retail consumers in Northern Taiwan. Although the article by Van der Werff and Steg (2016) uses different models (the value-identity-personal norm model (VIP) and value-belief-norm theory (VBN)) compared to the TPB used within our study, they learnt that strengthening self-identity could lead to more favourable pro-environmental behaviours. Hence, it could conceivably be hypothesised that self-identity has an influence on consumers reuse intentions.

H6: Self-identity significantly and positively relates with intention to reuse end-of-life garments

6.6.4. QUALITY CONSCIOUSNESS AND INTENTION TO REUSE

The quality of a garment has an effect on a person's intentions to dispose garments. Degenstein et al. (2020) found that damage to garments is one of the key factors in determining a person's disposal method. In the article by Gibson and Stanes (2011) garment repair through mending is an essential part of maintaining and extending the life of garments. However, they found that most consumers are reluctant to engage in garment repair because of perceived lack of time, skills, and convenience of affordable options. In a more recent article, the participants in the study by McNeill, Hamlin, McQueen, Degenstein, Wakes, et al. (2020) mainly dispose their severely damaged garments in bins or use as rags instead of extending its life. Conversely, garments that are in good condition and not disposed of due to functionality, participants often extend the lifecycle of the garments through selling, gifting, donating or amendment(McNeill, Hamlin, McQueen, Degenstein, Wakes, et al., 2020). Thus, we hypothesise that the better the quality of a garment, the more a person has the intention to reuse the garment.

H7: Quality consciousness significantly and positively relates to reuse intentions of end-of-life garments

6.6.5. ECO-LITERACY (CONSUMER SUSTAINABILITY KNOWLEDGE) AND ATTITUDE

Based on the works by Ajzen and Fishbein (1977) and Fishbein and Ajzen (1980), eco-literacy can either have a direct or indirect relationship with behaviour. As early as 1996, Laroche et al. (1996) highlighted the indirect impact of eco-literacy on eco-friendly behaviour. More recently, Sonnenberg et al. (2022) found in their study that an awareness of environmental problems tends to lead to willingness to engage in pro-environmental behaviour. Similarly, Wang et al. (2022) found a positive effect of environmental concern on attitude to reuse reusable drinking cups. On the contrary, while the authors Zaidi et al. (2022) hypothesised that eco-literacy will significantly influence household's attitude to reduce food wastage, their findings suggest otherwise. They found no considerable statistical influence between eco-literacy and attitude to reduce food wastage (Zaidi et al., 2022). The conflicting findings on the association between eco-literacy and attitude suggests a need for further investigation. Hence, we seek to investigate how eco-literacy relates to attitude in the reuse of end-of life garments. We therefore posit that:

H8: Eco-literacy significantly and positively relates to attitude

6.6.6. SELF-EFFICACY AND PERCEIVED BEHAVIOURAL CONTROL

Ajzen (2020) argues that there is no theoretical difference between PBC and self-efficacy, noting that there is a difference between the two constructs at an operational level. On the contrary, George and Nair (2022) and Povey et al. (2000) state that self-efficacy differs from PBC. Bandura (1977, 1982) and Garay, Font and Corrons (2019) defines self-efficacy as the resources and technologies available to individuals that could increase their confidence to perform a behaviour. According to Block and Keller (1995) if an individual has high self-efficacy, they have perceived confidence to perform a behaviour which in turn will lead to the expected action. Another article by Janmaimool (2017) discovered that self-efficacy positively influences various sustainable waste management behaviours, with reuse being one of the observed behaviours. Similarly, the study by Kraleva and Ivanov (2020) shows that self-efficacy influences sustainable behaviour with regards to consumption and involvement. There are still some discrepancies in literature on whether the connection between self-efficacy and intention is direct or indirect. We therefore postulate that the relationship is indirect and mediated by PBC.

H9: Self-efficacy significantly and positively affects perceived behavioural control

6.6.7. CONTROL VARIABLES: AGE AND GENDER EFFECT

Gender and age have an impact on waste disposal methods and on garment reuse. Shim (1995) found in their study of 468 undergraduate university students that the older the student, the more likely it is that they will donate clothing and partake in reuse for environmental reasons. Similarly, they found that females tend to resell or donate their old garments and reuse them both for economic and

environmental reasons than the male students in the study (Moussaoui et al., 2022). According to Moussaoui et al. (2022) gender has an effect on organic waste sorting behaviour. Their research found that females are more likely to use publicly funded kitchen scraps recycling bins than their male counterparts (Moussaoui et al., 2022). This finding is mirrored in several articles that state that females are generally more environmentally conscious than males (Davidson & Freudenburg, 1996; Xiao & McCright, 2015; Zelezny, Chua, & Aldrich, 2000). The literature review carried out by Gazzola et al. (2020) showed that females within the ages of 18 and 34 are often more informed and interested in sustainability endeavours than males. Younger consumers are also believed to be more environmentally friendly (Balderjahn, 1988; Birtwistle & Moore, 2007; Gazzola et al., 2020). Therefore, we control for the effect of age and gender within our study.

Based on these discussions, we present the proposed conceptual model in Figure 6.1. The model is established by extending the Theory of Planned Behaviour (TPB). This was achieved by including self-identity, general recycling behaviour, and quality consciousness as factors that could influence reuse intentions and further the reuse behaviour of end-of-life garments. We also investigate the indirect effects (eco-literacy and self-efficacy) in this study.

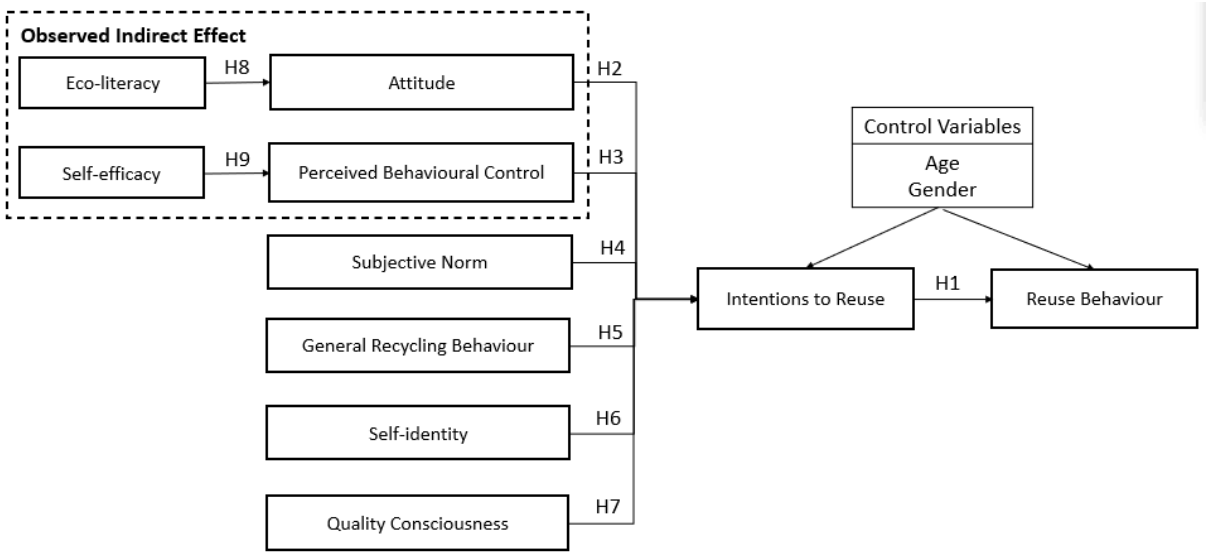

Figure 6.1. Proposed conceptual model

6.7. MATERIALS & METHODS

6.7.1. SAMPLING

The data used in this study was gathered from participants that reside in one of Australia's eight recognised territories or states (Victoria, South Australia, Northern Territory, New South Wales, Queensland, Tasmania, Western Australia, and Australian Capital Territory). The participants were aged over18. Purposive sampling was utilised by a marketing research organisation to identify respondents for this study. Using a marketing research company ensured distance between the

researchers and the participants. The company were responsible for distributing the questionnaire online.

6.7.2. SURVEY DESIGN INSTRUMENT

Within this study, 10 constructs were observed. The measurement items for each construct were sourced from existing literature published in high-ranked journals and with high citation count. The adapted measurement constructs have good internal consistencies and were modified to the context of our study. All measurement items were rated based on a seven multi-point scale. Three items measuring reuse attitude and four items measuring reuse subjective norms were adapted from Paul, Modi and Patel (2016). Five measurement items were sourced and altered from Povey et al. (2000) for perceived behavioural control and self-efficacy in the reuse of end-of-life garments. Three items measuring reuse behaviour and six items measuring eco-literacy were adapted from Cruz-Cárdenas, Guadalupe-Lanas and Velín-Fárez (2019). Three measurement items measuring reuse intentions were adapted from Jain, Khan and Mishra (2017), three measurement items measuring self-identity were adapted from Fielding, McDonald and Louis (2008), five items measuring general recycling behavior are taken from Bianchi and Birtwistle (2010), and four measurements for quality consciousness are adapted from Lang, Armstrong and Brannon (2013). The descriptive statistics such as the mean, standard deviation (SD) and factor loading for each measurement item are presented in Table 6.1.

Definition of reuse was provided at the beginning of the study and was adopted from Rotimi, Topple and Hopkins (2021). Reuse was defined to participants as “either the repair or re-purpose of an unwanted garments. This means garments end up being used for a longer time either by the same person or disposing of garments to a different person(s). Reuse therefore can include mending your clothes for further use or using the clothes for alternative purposes. It could also be achieved through giving or handing down clothing between family, friends, and charity (op) shops, swapping, or selling of clothing in garage sales.”

Three questions were asked to ensure the participants understood the difference between recycling and reuse as it pertains to this study. Two screening questions were asked to ensure appropriate participants were recruited; 1) What is your age group? and, 2) In which state or territory do you live? To be eligible to complete the questionnaire, participants had to older than 18 years old and reside in one of the eight recognised Australian states or territories. Further, two questions were included in the questionnaire (one in the middle and one towards the end) to ensure participants concentration and quality of responses were maintained when completing the questionnaire.

6.7.3. DATA COLLECTION

Data was gathered between February and March of 2022. The questionnaire was sent out to 500 participants and after the clean-up of the data, 428 responses were deemed valid and appropriate for use within this study.

Constructs	Items	Mean	SD	Factor Loading
Reuse Behaviour (REU_BEH)	REU_BEH_1	5.49	1.370	0.862
	REU_BEH_2	5.6	1.392	0.886
	REU_BEH_3	5.32	1.542	0.852
Reuse Intention (REU_INT)	REU_INT_1	5.64	1.340	0.891
	REU_INT_2	5.51	1.408	0.920
	REU_INT_3	5.56	1.407	0.948
Reuse Attitude (REU_ATT)	REU_ATT_1	5.84	1.225	0.955
	REU_ATT_2	5.8	1.254	0.931
	REU_ATT_3	6	1.147	0.890
Subjective Norm (REU_SBN)	REU_SBN_1	5.11	1.299	0.914
	REU_SBN_2	5.15	1.244	0.947
	REU_SBN_3	5.14	1.250	0.935
	REU_SBN_4	4.8	1.410	0.761
Perceived Behavioural Control (REU_PBC)	REU_PBC1	6.55	0.701	0.700
	REU_PBC2	6.64	0.698	0.856
	REU_PBC3	5.45	1.959	-
	REU_PBC4	6.56	0.795	0.900
	REU_PBC5	6.57	0.770	0.904
Reuse Self-Efficacy (REU_SE)	REU_SE1	6.14	1.168	0.817
	REU_SE2	6.01	1.190	0.874
	REU_SE3	6.03	1.236	0.891
	REU_SE4	5.93	1.300	0.881
	REU_SE5	5.94	1.260	0.884
Self-Identity (SLF_IDN)	SLF_IDN_1	5.59	1.201	0.821
	SLF_IDN_2	5.43	1.276	0.916
	SLF_IDN_3	5.54	1.205	0.921
Eco-Literacy (ECO_LIT)	ECO_LIT_1	5.57	1.198	0.840
	ECO_LIT_2	5.25	1.342	0.861
	ECO_LIT_3	5.37	1.389	0.855
	ECO_LIT_4	5.82	1.213	0.789
	ECO_LIT_5	5.36	1.249	0.821
	ECO_LIT_6	5.16	1.407	0.792
General Recycling Behaviour (GEN_REC)	GEN_REC_1	6.38	0.834	0.832
	GEN_REC_2	6.41	0.851	0.789
	GEN_REC_3	6.41	0.832	0.834
	GEN_REC_4	5.4	1.295	-
	GEN_REC_5	6.16	0.976	0.688
Quality Conciousness (QLT_CON)	QLT_CON_1	4.39	1.538	0.874
	QLT_CON_2	5	1.370	0.821
	QLT_CON_3	3.79	1.742	0.797
	QLT_CON_4	4.74	1.534	0.855

Table 6.1. Constructs, measurements, descriptive statistics and factor loading

6.8. FINDINGS

6.8.1. DEMOGRAPHIC PROFILE

Of the 428 responses, respondents were aged over 18 with the highest distribution between the age range of 55 to 64 years, with 17.8 percent and 65 to 74 years, with 17.1 percent. Most of the respondents attended school with the majority (35.5 percent) having graduated from high school with a further 32 percent holding a certificate or diploma degree. Most respondents earned between AUD25 000 to AUD49 999. Most respondents resided in New South Wales, Victoria and Queensland with 31.8 percent, 26.6 percent and 19.4 percent, respectively. These demographic profiles are provided in Figure 6.2.

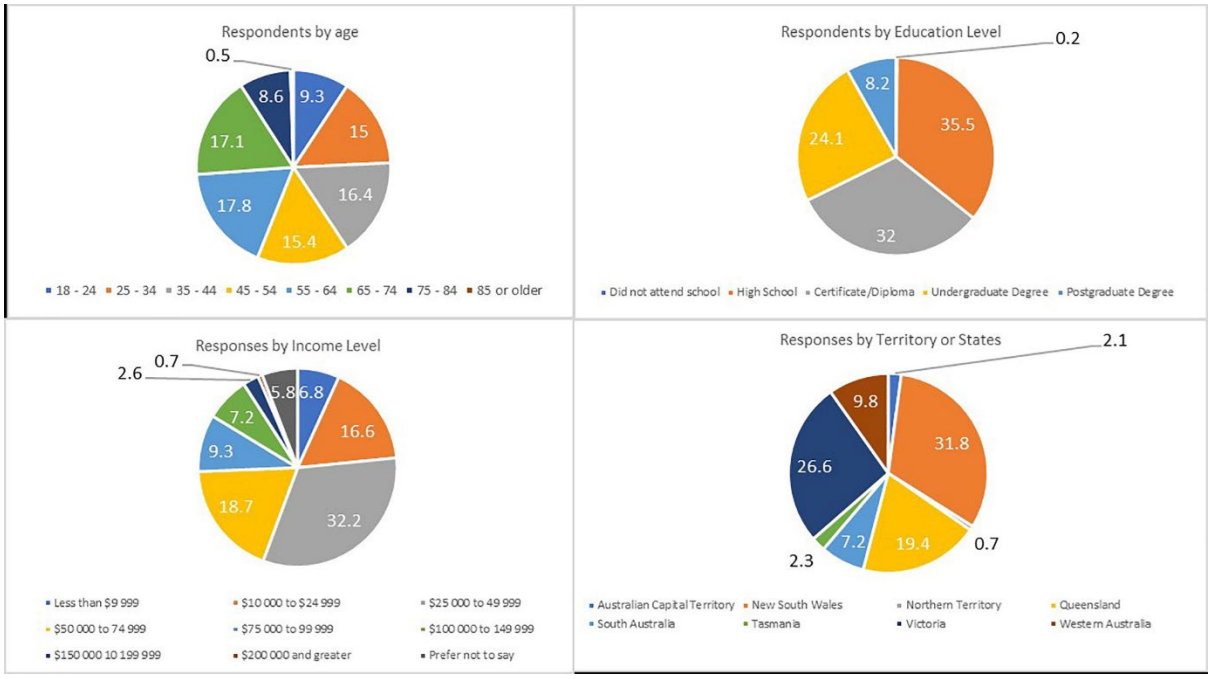

Figure 6.2. Demographic profile

6.8.2. CORRELATION ANALYSIS

The results obtained from the correlation analysis and the Cronbach's alpha scores for each construct are presented Table 6.2. All correlations are significant at either 1% or 5% levels except for three inter-construct correlations. All non-significant relations are observed with the quality consciousness construct and the relationship with reuse attitude, PBC, and self-efficacy. There is also a negative relationship noted, however this is the non-significant relationship between quality consciousness and PBC.

6.8.3. COMMON METHOD BIAS

Similar to the studies of Parkinson, David and Rundle-Thiele (2017) and Cunningham and Petzer (2022), we conduct Harman (1976) single factor analysis to test for common method variance in our data. The results of this test showed that no single factor accounted for most of the variance (35.8%)

in our study. Consequently, this indicates that common method bias does not impact on the results of our study.

	1	2	3	4	5	6	7	8	9	10
1) REU_BEH	1									
2) REU_INT	.800**	1								
3) REU_ATT	.748**	.825**	1							
4) REU_SBN	.515**	.584**	.551**	1						
5) REU_PBC	.181**	.179**	.270**	0.051	1					
6) REU_SE	.572**	.600**	.608**	.422**	.379**	1				
7) SLF_IDN	.395**	.339**	.379**	.357**	.233**	.291**	1			
8) ECO_LIT	.385**	.398**	.467**	.438**	.200**	.325**	.749**	1		
9) GEN_REC	.243**	.279**	.333**	.183**	.245**	.173**	.457**	.458**	1	
10) QLT_CON	.125**	.118*	0.051	.255**	-0.085	0.080	.260**	.340**	.121*	1

n=464; ** Significant at the 0.01 level (2-tailed); * Significant at the 0.05 level (2-tailed).

Table 6.2. Correlations matrix between constructs and Cronbach's Alpha

6.8.4. MEASUREMENT MODEL ASSESSMENT

The measurement model within this study was analysed by confirmatory factor analysis (CFA) using IBM SPSS AMOS (version 28.0). We tested the extended TPB model for the goodness of fit measures based on the criteria and threshold recommended by (Collier, 2020; Hair Jr et al., 2017): x^2= 1315.366, *df*= 657, x^2/df= 2.002 (p-value=0.000), GFI= 0.864, IFI= 0.957, CFI= 0.957, RMSEA= 0.048, SRMR= 0.0479, TLI= 0.952. All measurements show an acceptable fit. Therefore, we conclude that the measurement model is a good fit for our data sample.

Analyses provided in Table 6.3 reveals that our data is reliable and valid. The reliability of the constructs is tested using the Cronbach's alpha. According to Hair Jr et al. (2010), the Cronbach's alpha value should be equal to or greater than 0.7. The Cronbach's alpha of constructs within our study ranged from 0.858 to 0.946 indicating that all constructs met the thresholds. Therefore, our constructs are reliable, and the measurement items adapted within our study are adequate for the constructs.

Convergent validity is assessed using two methods; composite reliability (CR) and average variance extracted (AVE). According to Hair Jr et al. (2017) and Kline (2015), a CR score of 0.7 or above implies that the constructs have good reliability. Within our study, all CR scores are above 0.7, with the lowest value belonging to the general recycling behavior construct with 0.867. Hair Jr et al. (2010) suggests that an AVE score of 0.5 or greater indicates high level of convergence. Fornell and Larcker (1981) also recommends that the AVE value should be less than the CR scores. Our AVE scores are above 0.5, with the lowest value being 0.621 for general recycling behavior. All AVE scores were also less than their corresponding CR scores. This implies excellent validity for all ten constructs examined.

Discriminant validity measures the diversity between constructs and whether each construct explains different concepts (Hair, 2009). The discriminant validity within this study is also measured using two methods: calculating the shared variance and the square root of the AVE. We first calculated the

shared variance between the construct by observing the correlation between pairs of constructs. According to Kline (2016), correlation values of 0.9 or below signify little chance that a measurement item loads on multiple constructs. The correlation values within our study range between -0.085 and 0.868. Secondly, we assess the square root of AVE. The values showing the square root of AVE are presented in bold on the diagonals of Table 6.3. Based on Fornell and Larcker (1981), the value for the square root of AVE should be higher than the correlations between pairs of constructs. The highest correlation value of 0.868 between reuse attitude and intention has an associated square root of AVE value of 0.920. Based on these two methods, we contend that the discriminant validity levels of the ten constructs analysed within this study are satisfactory.

	1	2	3	4	5	6	7	8	9	10
1) REU_BEH	**0.867**									
2) REU_SE	0.626	**0.870**								
3) REU_PBC	0.189	0.402	**0.844**							
4) ECO_LIT	0.423	0.342	0.203	**0.827**						
5) GEN_REC	0.263	0.177	0.239	0.463	**0.788**					
6) REU_SBN	0.542	0.444	0.062	0.452	0.195	**0.892**				
7) REU_INT	0.866	0.639	0.175	0.425	0.284	0.600	**0.920**			
8) SLF_IDN	0.441	0.311	0.240	0.817	0.463	0.389	0.369	**0.887**		
9) REU_ATT	0.812	0.648	0.271	0.498	0.341	0.578	0.868	0.419	**0.926**	
10) REU_QLT	0.147	0.088	-0.085	0.390	0.135	0.272	0.137	0.299	0.063	**0.837**
CR	0.901	0.939	0.908	0.928	0.867	0.940	0.943	0.917	0.947	0.904
AVE	0.751	0.757	0.712	0.684	0.621	0.796	0.846	0.787	0.857	0.701
Cronbach's Alpha	0.898	0.942	0.946	0.934	0.905	0.939	0.916	0.927	0.858	0.900

Table 6.3. Discriminant and convergent validity and reliability scores

Based on our conclusion that the 10 constructs satisfy the requirements for validity and reliability; we can conduct structural equation modelling on the constructs and relationships provided in Figure 6.1.

6.8.5. STRUCTURAL EQUATION MODELLING

The structural model was assessed using structural equation modelling (SEM) conducted on IBM SPSS AMOS 28.0. With age and gender controlled, the structural model reveals an acceptable fit (x^2= 1717.042, *df*= 738, x^2/df= 2.327 (p-value=0.000), GFI= 0.840, IFI= 0.937, CFI= 0.937, RMSEA= 0.056, SRMR= 0.1020, TLI= 0.930) (Collier, 2020; Hair Jr et al., 2017). Although the SRMR value is above the threshold of 0.06, Hair Jr. et al. (2015) suggests that model fit analysis should not compromise the theory that grounds the study. We present the results of the hypothesis tested in the structural model are presented in Table 6.4.

Hypothesis 1 to 4 tests the original factors within the TPB and its relationship with reuse intention and behaviours. As is shown in Table 6.4, H1 to H4 are all supported, and their p-values are less than or equal to 0.001 or 0.01. However, the significant negative relationship between PBC and reuse intension is noteworthy. This suggests that contrary to what has been observed in the literature, the

more difficulty and less control a person feels, the more likely they are to reuse. This contradicts the findings by Sonnenberg et al. (2022) and Wang et al. (2022) that there is a positive relationship between PBC and reuse. Most especially, our results oppose the findings by Ertz et al. (2017) that PBC has the strongest relationship with reuse intentions. Instead our findings support (Akbari et al., 2019) that attitude is the main predictor of behavioural intention. Our findings also show a significant relationship between reuse intention and behaviour. This is in line with the studies by Ajzen (1991), Maichum, Parichatnon and Peng (2016) and Sheoran and Kumar (2022) that an individual with intent will most likely execute the said behaviour.

Hypothesis 5 to 7 tests the direct relationships with the factors we added to the TPB and its relationship with reuse intentions. From Table 6.4, it is evident that general recycling behaviour, self-identity and quality consciousness do not have significant relationships with reuse intention. Hence, H5 to H7 are not supported.

Further, we observed the relationship between eco-literacy and attitude to reuse end-of-life garments. We hypothesised that there is a positive relationship between an individual's understanding of the environmental effects of the fashion industry on their attitude to engage in the reuse of the end-of-life garments. Our test reveals that our hypothesis, H8 is supported and there is a positive and significant relationship between eco-literacy and attitude to reuse end-of-life garments with p-value less than 0.001. Our findings is similar to that by Laroche et al. (1996), Sonnenberg et al. (2022) and Wang et al. (2022) that eco-literacy has an indirect effect on pro-environmental and sustainable behaviour through consumers attitude.

Lastly, we hypothesise that if a person has the confidence in the resources available to them (self-efficacy), they will feel capable to reuse (PBC) their end-of-life garments (H9). Table 6.4 shows the hypothesis, H9 is accepted at a p-value equal to or less than 0.001 level. Our findings supports that self-efficacy should be included as a separate construct to PBC (George & Nair, 2022; Povey et al., 2000).

Paths	Estimate	S.E.	C.R.	P	Result
REU_INT→ REU _BEH	0.86	0.046	18.953	***	H1 accepted
REU _ATT→ REU_INT	0.79	0.038	19.491	***	H2 accepted
REU_SBN→ REU _INT	0.144	0.033	4.091	***	H3 accepted
REU_PBC→ REU_INT	-0.089	0.072	-2.777	**	H4 accepted
GEN_REC→ REU_INT	0.034	0.056	0.961	0.336	H5 not accepted
SLF_IDN→ REU_INT	0.077	0.065	1.322	0.186	H6 not accepted
QLT_CON→ REU_INT	0.053	0.027	1.588	0.112	H7 not accepted
ECO_LIT→ REU_ATT	0.517	0.055	10.846	***	H8 accepted
REU_SE→ REU_PBC	0.402	0.027	7.475	***	H9 accepted

Note: *** p≤ 0.001; ** p≤ 0.01; * p≤ 0.05

Table 6.4. Result of hypothesis testing

6.8.6. INDIRECT EFFECTS

Table 6.5 presents the results of the two mediating paths examined within our model. To test these direct and indirect effects, we conduct a decomposition test using the bootstrapping method IBM SPSS AMOS 28.0. The result of the test shows a full mediation between eco-literacy and reuse intentions. The relationship between eco-literacy and reuse intention is only significant with reuse attitude as a mediating factor. The second relationship between self-efficacy and reuse intention is significant both with and without the presence of PBC as a mediating factor. Therefore, a partial mediation is observed in the relationship between self-efficacy and reuse intentions.

Path(s)	**Direct Effect**	**Indirect Effect**	**Result**
ECO_LIT→REU_ATT→REU_INT	-0.141 (ns)	0.408***	Full mediation
REU_SE→REU_PBC→REU_INT	0.206***	-0.036*	Partial mediation

Note: *** p≤ 0.001; ** p≤ 0.01; * p≤ 0.05
Table 6.5. Result of indirect effects

6.9. CONCLUSION AND CONTRIBUTIONS

6.9.1. THEORETICAL CONTRIBUTIONS

This study provides insight into factors that could influence consumers to reuse their end-of-life-garments in Australia. We offer three key contributions to theory within the sustainability, fashion, and consumer behaviour space.

As is highlighted in the study by Sandin and Peters (2018), few studies have solely focussed on the concept of reuse. Thus, this study offers significant contributions to the existing literature by primarily focussing on garment reuse intentions and behaviour. We answer the call by Lin et al. (2022) for research that explores consumers reuse behaviour. In so doing, we offer greater understanding as to how consumers could engage in reuse as a sustainable practice for achieving circularity in the fashion industry.

As was discovered in our review of the literature, few studies (Ertz et al., 2017; Kim, 2021; Lin et al., 2022; Wang et al., 2022) have focussed on the consumer behaviour of garment reuse. No study to our knowledge has explored reuse intentions of end-of-life products within the fashion industry. Thus, a key contribution of our study is the development of a conceptual model that shows the significant predictors of consumer's reuse behaviour. These predictors are insightful as they enrich theoretical knowledge on the different influencers of consumers' reuse of garments. In addition, the current study addresses a significant gap by explaining garment reuse behaviour from consumer's perspective

Our findings support extant literature (Joshi, Uniyal, & Sangroya, 2021; Ogiemwonyi, 2022) that the theory of planned behaviour is a robust theory for understanding sustainable practices. We found that the three predictors, attitude, subjective norm and PBC all significantly influence intentions to reuse

end-of-life garments and further intention leads to behaviour. There is also a case for extending the theory by adding more predictors to the model. For example, our study found that eco-literacy and self-efficacy significantly predict intentions to reuse end-of-life garments through attitude and PBC, respectively. Conversely, this study found that predictors such as general recycling behaviour, self-identity and quality consciousness do not have significant relationships with intentions to reuse. These finding is subject to further theoretical explorations.

6.9.2. MANAGERIAL CONTRIBUTIONS

While our research focus is on the consumers perspective in the reuse of garments, it is important to note that the effort towards improving reuse as a sustainable practice to achieving circularity needs to be a collaborative process. In line with the findings by Rotimi, Topple and Hopkins (2021), we agree that while consumers are an important agent in the drive for sustainability, achieving circularity requires a committed effort from all the supply chain agents both upstream and downstream. These extend to include designers, manufacturers, fashion retailers and government agents, for example. By understanding significant factors that influence consumers to reuse their garments, retailers and governing bodies can better tailor their circularity messages and campaigns to increase reuse intentions and behaviour.

This study is placed within the Australian context. According to Ertz et al. (2017) and Lin et al. (2022) 'context' is a key driver of behavioural intentions. Thus, the current findings add substantially to our understanding of consumer's intentions and behaviour within Australia. This could have implications for the Australian government, retailers and the wider fashion industry as it highlights what factors they need to consider when trying to engage consumers about garment reuse. At a broader level, this could have considerable implications for reducing garments being sent to landfill.

6.10. LIMITATIONS AND FUTURE RESEARCH

We observed an unexpected result in our study with a negative significant relationship observed between PBC and reuse intention. This was contrary to the expected results from the seminal work by Ajzen and Fishbein (1977) and studies by Ertz et al. (2017), Sonnenberg et al. (2022) and Wang et al. (2022) that have applied the TPB in their study of reuse intentions. Future research should conduct a comparative analysis to identify whether the negative relationship between PBC and reuse intention is specific to the context of Australia or the fashion industry. Another limitation of this study is that the reuse behaviour was measured through self-reporting. Future research should observe actual behaviour through experimentation or observation methods as a more rigorous method of data collection. Finally, given the focus of the study is on Australia, this could limit the generalisability of

the results. Therefore, it would be advantageous to replicate the study in other developed countries that have similar characteristics as Australia to compare similarities or differences in results.

Funding

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6.11. CHAPTER CONCLUSION

In this chapter, I provided the second set of empirical data analysis which forms the third study in our research. I analysed data regarding reuse intentions of end-of-life garments amongst Australian consumers. Findings from this analysis were used to suggest some theoretical and managerial implications. The following chapter will provide will collate findings from all the three studies conducted within the research and provide recommendations for all major stakeholders involved within the fashion industry.

PART THREE: CONCLUSION SECTION

CHAPTER SEVEN: CONTRIBUTIONS AND IMPLICATIONS

7.1. CHAPTER INTRODUCTION

Prior chapters have provided an extensive systematic review on extant literature. The Theory of Planned Behaviour was adopted and extended and its relevance within this study discussed. Then, the two published articles that discussed the results of the SEM conducted on; 1) the recycle, 2) the reuse of end-of-life garments in Australia was provided.

While the papers provided within this study are distinct, they are also interrelated and address aspects of the aim of our research. The theoretical and managerial/practical implications have been discussed within the publication of each paper. Thus, we offer a summative discussion of the key results from all the papers and provide recommendations that will address the overall aim of this research.

7.2. CONTRIBUTIONS TO KNOWLEDGE

This thesis has significantly contributed to the literature in the intersecting fields of sustainability, consumer behaviour, supply chain, and the fashion industry.

As seen in papers 1 to 3, there is a need for greater research into sustainable practices within the Australian fashion industry. The three papers found in chapters 2, 5, and 6 showed that few studies address sustainable disposal practices, especially with a focus on recycling and reuse. Much of the literature has concentrated on Scandinavian countries such as Sweden and Finland with limited considerations for sustainable disposal practices in the Australasian region. This research contributes to knowledge by offering some perspectives into Australian consumers and their intentions and behaviour to engage with two sustainable disposal practices, recycling and reuse.

Several authors have queried the use of TPB in exploring pro-environmental/ sustainable behaviours. Papers 2 and 3 considered the shortcomings of the theory and implemented solutions to extend the TPB and observe self-efficacy and PBC as two separate and distinct constructs as well as including more predictors like self-identity, quality consciousness, general recycling behaviour and eco-literacy (George & Nair, 2022; Hosta & Zabkar, 2021; Joshi et al., 2021; Mason et al., 2022; Shaw et al., 2000). The findings in both papers are in line with the thinking of Joshi et al. (2021), Ogiemwonyi (2022), and Sheoran and Kumar (2022), that state that the TPB can be used to explore sustainable behaviours. Beyond this, several studies have adopted the TPB to explore sustainable disposal through recycling and reuse but most have focussed on consumer purchase intentions and consumption or a different context than the fashion industry (Becker-Leifhold, 2018; de Lenne & Vandenbosch, 2017; Dickson, 2000; Ertz et al., 2017; Kim, 2021; Lai & Chang, 2020; Lin et al., 2022; Maichum et al., 2016; Valaei & Nikhashemi, 2017; Verdugo et al., 1995; Wang et al., 2022). This research significantly contributes to

knowledge byvalidating the use of the TPB in predicting sustainable behaviours and also extending the use of the theory towards sustainable disposal practices within the fashion industry.

In the review of the literature, findings show that there is an ever-increasing shift towards a closed-loop, circular economy but the role of consumers is still not sufficiently considered especially post-sale. While more research acknowledges this (Gazzola et al., 2020; Ki & Ha-Brookshire, 2021; Palomo-Lovinski, 2020; Ta et al., 2022), the focus has mainly been on consumers' consumption patterns (Gomes et al., 2022; Kovacs, 2021; Petreca et al., 2022). Little research has focused solely on the role of consumers in the sustainable disposal of their end-of-life garments. Thus, this thesis has contributed to the research domain on end-of-life practices within fashion through the publication of papers 2 and 3. Both papers have addressed the idea of sustainable disposal of end-of-life garments moving towards a closed-loop, circular economy from the perspective of consumers.

Lastly, this doctoral work theoretically contributes a conceptual framework of how sustainable garment end-of-life cycle practices can lead to the achievement of strategic competitive advantage. The framework was fundamental in highlighting that the cooperation of all supply chain agents is central to achieving the four sustainable practices of managing PCTW at garment end-of-life. Further, by applying the NRBV theory to achieve sustained competitive advantage, there needs to be a consideration of the entire lifecycle of the garment, the environmental impact of the garment in terms of emissions and waste and finally, the minimisation of the lifecycle cost. Establishing the conceptual framework revealed avenues for future research directions (some of which resulted in the research objectives covered in papers 2 and 3).

7.3. ACADEMIC CONTRIBUTIONS AND THEIR IMPLICATIONS FOR PRACTICE

Based on these theoretical contributions, we provide recommendations to Australian consumers, the fashion industry, the broader supply chain, the Australian government, and non-government agencies. There are six key takeaways from the studies conducted, these are summarised in the sub-section below.

7.3.1. CONSUMER EDUCATION AND AWARENESS

A striking result from the literature review (study 1) presented in chapter 2 is the need to educate consumers on their role in extending the garments' lifecycle when placed back into the system. According to Norum (2017), this is a key success factor in the recycling of end-of-life garments. Both Ekström and Salomonson (2014) and Sandvik and Stubbs (2019) agree that educating consumers about their end-of-life garments is valuable in the reuse and recycling processes. This education should stress the importance that garments of any quality is important to the recycling and reuse process (Bertram & Chi, 2018; Ekström & Salomonson, 2014; Mukherjee, 2015). Similarly, study 2 (chapter 5)

and study 3 (chapter 6) explored the effect of eco-literacy on consumers' attitudes to predict intentions to recycle and reuse their end-of-life garments, respectively. Both papers show that eco-literacy is an essential predictor of recycling and reuse intentions. Study 2 further emphasised that programs must be developed to educate consumers on recycling their garments. This involves educating consumers that regardless of the condition a garment is in, whether it is soiled, torn or ragged, the garments can still be used in some form (Ekström & Salomonson, 2014; Mukherjee, 2015; Norum, 2017). That is, waste can be an opportunity for new life (fibres) (Bertram & Chi, 2018). Secondly, we learnt that consumers must be educated on the difference between reuse and recycling. In Australia, a common disposal method is donating end-of-life garments to charitable organisations (not-for-profit organisations) (Bianchi & Birtwistle, 2010). Consumers need to be aware that most of those donations end up in landfill if they are not of high quality (Liu, 2019). Hence, consumers can take those clothes to recycling companies instead of donating lesser quality garments to charitable organisations These garments can then be broken down to make new garments or repurposed into other forms, such as housing insulation (Norum, 2017; Sandvik & Stubbs, 2019).

Retailers and the Australian government need to work collaboratively to develop single-message campaigns to be run throughout the country on the importance of PCTW and its environmental impact. These could be achieved through videos, pictures, and reels on various social media platforms, company websites and through traditional forms of marketing including billboards, in-store advertisement, newspapers and magazines. The Australian government should capitalise on the fac that consumers are increasingly becoming more interested in sustainability objectives (Jacometti, 2019). This recommendation could strengthen the shift towards the sustainable disposal of end-of-life garments in Australia.

7.3.2. ENGAGEMENT ACTIVITIES

Papers 1 to 3 (chapters 2, 5 and 6) have shown the need to engage consumers in sustainable disposal activities. As earlier mentioned in chapter 2, Han et al. (2017) and Vehmas et al. (2018), state that to enabling public understanding and improving consumer awareness of sustainability issues within the fashion industry involves community-run engagement projects and involvement of multiple communication channels. All three papers highlight the need for collaboration amongst several supply chain agents, thus, we recommend that the engagement activities should be done in a different form by the various fashion stakeholders. For instance, the Australian Government could partner with agencies such as charitable organisations or agencies in charge of vulnerable communities to run swapping workshops. Camacho-Otero et al. (2020) found that higher quality garments are often used in swapping events while lower quality garments are donated to vulnerable communities and charities. The author argued that this contradicts the purpose of swapping event which is to encourage

sustainability through a sense and value of community. Therefore, while we suggest that a similar swapping strategy could be adopted, this should be implemented in a more positive approach. For example, the Government, retailers and/or charitable organisations could run clothing collection campaigns and swapping events (swapping good-quality clothing) for vulnerable communities, people leaving the prison system, and low-income earners. In the process, low-quality garments will also be collected, and this could be sent to recycling companies. Retailers also have a role to play. They could also adopt the repair model, where clothing bought from their stores could be amended for free or at a discounted price to allow consumers to extend the lifecycle of the garments. Also, as mentioned in paper 1, there is a role for retailers to help retrieve end-of-life garments in their stores by offering collection boxes through the take-back scheme (Norum, 2017). Bertram and Chi (2018) provided the example of Reformation, an online eco-conscious clothing brand that urges customers to return old clothing upon receiving new ones. The initiative partners with Community Recycling (an organisation that resells collected clothing at affordable prices to low-income countries), appeals to those who want to recycle and help the environment, in a convenient way. Lastly, regarding recycling engagement activities, recycling organisations could offer annual school trips to the recycling plant. Targeting the younger population through planned school trips will ensure they are aware of the impact of their disposal choices early with the hope that they make better, more informed choices in adulthood.

7.3.3. GOVERNMENT-LED INITIATIVE

In study 2 (chapter 5), I found that consumers likely to recycle their household items such as plastic, paper, and glass are more likely to recycle their end-of-life garments. This same study showed that consumers need to feel like they have the technology, tools, and resources in order to feel capable of recycling their end-of-life. Therefore, a recommendation is that the Australian Government consider policy reform, including fashion waste management, in a similar way to which plastic, glass and paper are recycled. This would be beneficial as consumers will feel they have access to a convenient method to recycle their end-of-life garments.

As Freudenreich and Schaltegger (2020) explains, most end-of-life garments collected are shipped to other countries for resale. However, they argue that retailers should look to localised supply chains. In a similar vein, I recommended that the Australian Government consider funding the establishment of more and bigger recycling companies onshore. Sending garments offshore to be recycled provides a sustainability paradox in that the recycling process is positive for the environment but transporting the end-of-life garments to these countries contributes considerably to greenhouse gas emissions during transportation. As suggested in paper 1, a shorter, more localised supply chain might reduce the overall environmental footprint (Freudenreich & Schaltegger, 2020). Also, paper one highlights

the cost implications associated with not capturing value from end-of-life products (Azevedo et al., 2016). Having the recycling plants onshore may address this issue in the long run as more garments will be recycled and new life (fibres) can be created from the PCTW.

7.3.4. COLLABORATION

Attaining circularity and sustainable disposal of end-of-life garment cannot be realised by a singular agent. The most significant findings to come out from all three papers conducted within this research is that achieving more sustainable disposal of end-of-life garments through recycling and reuse must be a collective effort between all the supply chain agents. These agents include but are not limited to consumers, retailers, transport agents, the Australian government, not-for-profit (charitable) organisations, recycling companies, manufacturers, suppliers, and designers. Beyond this, we agree with Cramer (2022) that the collaborative efforts should extend to partnerships between public and private fashion sectors as well.

For example, for it to be a viable business decision for companies to consider recycling fashion items, there must be an assurance that they will get a sufficient volume of garments consistently and frequently. The Government and retailers could help with this process by providing collection bins and collection boxes, respectively. Charitable organisations could also provide lower-quality items to recycling companies. Likewise, funding is required for the project and therein lies an important role for external partnerships. This example highlights the importance of multi-layered, mutually beneficial partnership between various supply chain agents.

Ensuring a joint effort amongst all the supply chain agents closes the supply chain loop. This leads to circularity as the start and end process is blurred as each agent feeds into another. Thereby, the lifecycle of the garment continues either in its initial form or broken down and used in a new form within the loop. Figure 8.1 shows an example of such a closed loop/ circular system showing the role of the different supply chain agents.

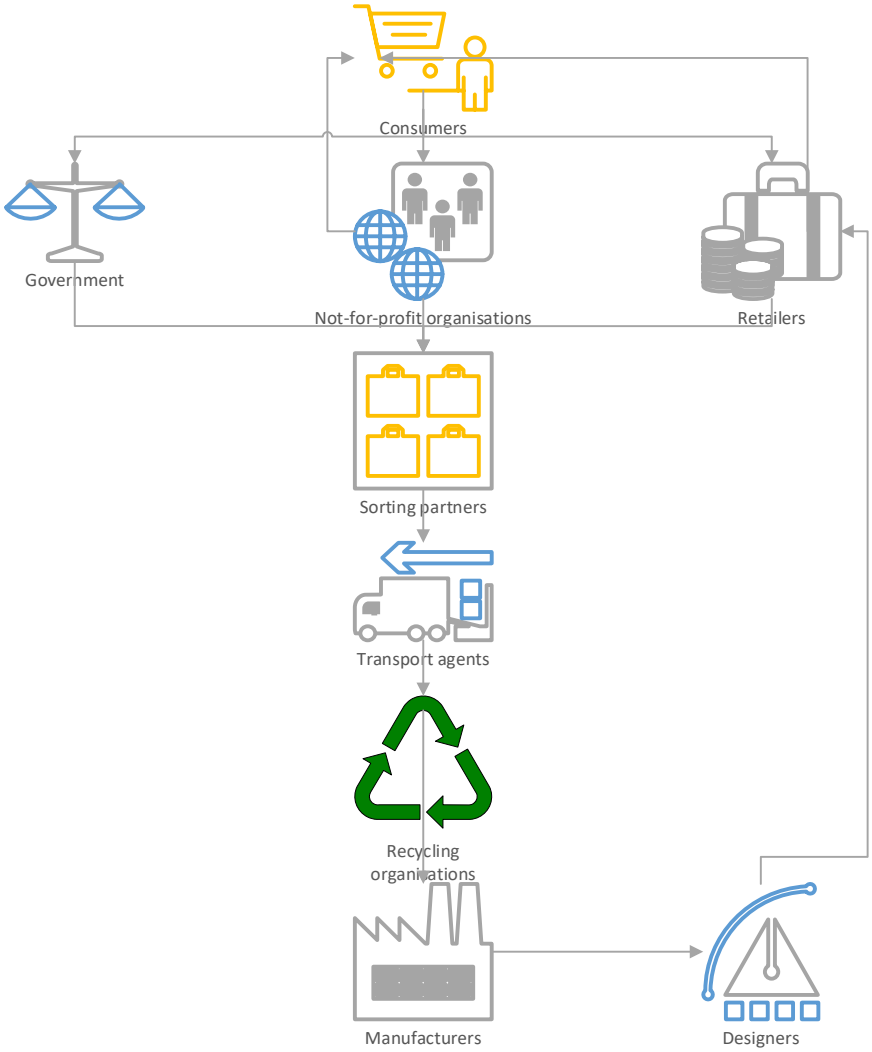

Figure 7.1. Example of a closed loop/circular fashion supply chain

7.3.5. CONSUMER EMPOWERMENT

This finding is particularly important in attaining circularity. The findings of all the papers show that the consumer is central to achieving circularity, blurring the line between who is start or end agent in garment lifecycle. Hence, it is important to ensure consumers feel empowered to be able to recycle or reuse their end-of-life garments.

Both papers 2 and 3 (chapters 5 and 6) found that self-efficacy is a significant predictor of consumers' intentions to recycle and reuse their end-of-life garments with and without PBC as a mediating factor. Also, PBC is a significant predictor in the recycling and reuse of end-of-life garments. An unexpected finding however was the negative nature of the relationship between PBC and reuse intentions. This suggests that an individual is likely to reuse their end-of-life garments if they feel it is easy to do. Thus, it can be assumed that if consumers feel like it is difficult, or they do not have the resources, tools and technologies, they are more likely to reuse their end-of-life garments than to recycle it.

An example of consumer empowerment is offering repair kit to each consumer that partakes in the takeback of their end-of-life garments to the retailers. Some of the barriers to clothing repair are: high repair costs, lack of repair skills, and repair being a time-consuming activity (Diddi & Yan, 2019). Offering repair kits will address some of these barriers. The kits should include simple instructions and provide the basic tools needed for consumers to be able to mend their torn or damaged clothes. Thereby allowing consumers to be able to reuse the garments and extend the garment life. Repairs also help to extend the lifespan of consumers clothing (Diddi & Yan, 2019). By doing so, they could develop some emotional attachment to their clothes, which in turn may help to change their consumption behaviours. Diddi and Yan (2019, p. 13) have indicated that "buying less often, buying fewer clothes, taking care of clothing (e.g., laundering at cool temperatures), and investing in higher quality clothing", makes consumers more sustainable. Producers and clothing brands could adjust their product lines, to higher quality clothes that last longer, which could be mended when necessary.

7.3.6. LESSONS FROM EUROPE

As seen in all three papers (chapters 2, 5 and 6), research on sustainability within the fashion industry, especially focusing on recycling and reuse in Australia, are limited. Greater research into sustainable disposal of garments and the achievement of a circular economy through this process can be driven by the government as well as the private fashion sector. However, the key takeaway is that there needs to be more research conducted, and there is a lot to learn from European countries (as observed in paper 1, chapter 2) that seem to be ahead of the curve in the drive towards circularity.

Both Sweden and Finland adopt various strategies such as rewarding and compensating retailers involved in the take-back scheme (Ekström & Salomonson, 2014; Macchion et al., 2018; O'Reilly & Kumar, 2016). In France, they have developed a national programme termed the extended producer responsibility (EPR) policy that allows for increased textile and clothing recovery and creates new markets for the reuse of PCTW (Bukhari et al., 2018). Another article observed two German companies as case studies for a closed-loop supply chain and emphasises the need to link and integrate efforts at the societal, SC and actor levels (Morana & Seuring, 2011). Lastly the study by Holtström et al. (2019) investigated the Houdini sportwear brand business model which is based on a product-service systems and discusses how sustainable solutions should be incorporated in the strategic development of a product from idea to disposal in form of reuse and recycling. These are valuable insights in which the Australian fashion industry could learn from. There is evidence that collaboration and incorporating sustainable disposal at the strategic and policy levels could be beneficial in the move towards circularity.

7. 3. CHAPTER CONCLUSION

In light of the findings from papers 1 to 3, this chapter provided a summative and cumulative discussion of the contributions of the current research to knowledge and industry. Moreover, the chapter provided some recommendations in the form of academic contributions and their implications at the practical level for Australian consumers, the fashion industry, the broader supply chain, the Australian government, and non-government agencies.

The following chapter will conclude the thesis by providing an overview of the research and state how the research objectives and aim has been fulfilled. The next chapter will also address the limitations of the study and suggest areas for further research.

CHAPTER EIGHT: CONCLUSION

8.1. CHAPTER INTRODUCTION

This research makes recommendations to help reduce post-consumer waste sent to landfill by understanding consumers' perspectives on end-of-lifecycle garments. The research focussed on Australian consumers' intentions and subsequent actions to recycle and reuse their end-of-life garments. This chapter concludes the thesis and consists of five main parts. Part one will provide an overview of the thesis and the key points covered within each chapter. Part two will summarise the key findings in relation to how each research objective has been fulfilled. Thereafter, the third part will reflect on the research methodology, methods and techniques. The fourth part will review limitations to the research. Finally, the fifth part will conclude the chapter by suggesting opportunities for future research.

8.2. RESEARCH OVERVIEW

Chapter one provided a general introduction to the research project, discussed the context of the research problem and covered the basis for this research in terms of the rationale and significance of the research. There was also an introduction to the overall research aim and the research objectives.

Chapter two presented the first paper, which was a systematic review of the literature that identified sustainable practices classed under four key categories; recycling, reuse, recovery and redistribution, and education and engagement. The chapter highlighted gaps in the literature around the roles that consumers, retailers and the broader supply chain can have in the drive towards sustainability. Further, the study highlights the need for collaboration and interaction amongst these supply chain agents. Lastly, the study showed that there is lack of research on sustainability within the Australian fashion industry. The findings of this paper provided direction for the rest of the thesis as recycling and reuse are selected as two sustainable practices that could be used to manage end-of-life garments in Australia.

Chapter three provided comparisons of various potential theories that could be adopted within this research. The TPB was selected, and justification was provided for the selection with consideration of the limitations of the theory. Hence, the TPB was extended with the inclusion of the self-identity, general recycling behaviour, eco-literacy, and self-efficacy as additional predictors.

Chapter four outlined in depth the research strategy and process undertaken throughout the doctoral study. This included an explanation and justification for the research paradigm (epistemology and ontology), the research approach, methodology, method and data analysis techniques adopted. Further, the chapter provided information on ethical considerations and an explanation of how quality was considered in the research.

Chapter five presented the second paper and explored the factors that influence consumers' behaviour toward recycling end-of-life garments in Australia. This was an empirical study based on an analysis of 481 questionnaire responses.

Chapter six conveyed the third paper and investigated the predictors of intentions and behaviour of Australian consumers to reuse their end-of-life garments. This was also an empirical study based on the analysis of 428 questionnaire responses amongst Australian consumers.

Chapter seven discussed the contributions of this research to knowledge. Some recommendations were also proposed for the Australian and broader fashion industry, not-for-profit organisations, and the government based on the key findings from the studies (papers 1 to 3) conducted within this thesis. These were presented as academic contributions and their implications for practice.

8.3. FULFILLMENT OF THE RESEARCH OBJECTIVES AND AIM

The aim of this research is to make recommendations that could help reduce post-consumer waste sent to landfill by understanding consumers' perspectives of end-of-lifecycle garments. The study established that there are gaps in the literature around sustainable practices available for the disposal of end-of-life garments. Also, while the role of consumers is significantly becoming more apparent, few studies have explored their intentions to sustainably dispose of their end-of-life garments with an emphasis on recycling (Botetzagias et al., 2015; Kumar, 2019; Oztekin et al., 2017; Poškus, 2015; Vilkaite-Vaitone & Jeseviciute-Ufartiene, 2021), and reuse studies (Ertz et al., 2017; Kim, 2021; Lin et al., 2022; Sandin & Peters, 2018; Wang et al., 2022). Moreover, there is a need for research on the Australian fashion industry due to the increased volume of waste produced and sent to landfill each year (Baptist World Aid Australia, 2019; Nayak et al., 2020; Shirvanimoghaddam et al., 2020).

Therefore, several research objectives were developed to address these issues effectively. These research objectives are re-stated here to allow a clear link to the findings from the different studies conducted within this doctoral study. The objectives of the research are:

1. To review the extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage post-consumer textile waste (PCTW) at the end of the lifecycle.
2. To establish the factors influencing consumers' intentions to recycle end-of-life garments in Australia.
3. To explore factors that predict consumers' intentions to reuse end-of-life garments in Australia.

This thesis has been designed so that the three objectives are individually addressed in each of the studies conducted within this research. The overall research aim was addressed by collating all the major findings and developing recommendations accordingly as presented in the discussion chapter (chapter 7). Based on the three papers (SLR and quantitative analyses), it can be concluded that Australian consumers want to dispose of their end-of-life garments sustainably through recycling and reuse. Table 8.1 presents an overview of my research. The following sub-sections will describe the fulfilment of the research objectives in depth.

Research Objectives	Hypothesis	Phase of the study	Sources of Data	Data Analysis	Key Findings
Objective 1: To review the extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage post-consumer textile waste (PCTW) at the end of the lifecycle.	N/A	Paper one (Chapter 2)	35 published articles covering the areas of sustainability, supply chain and the fashion industry.	1. Descriptive Analysis 2. Content Analysis	Four sustainable practices: 1. Reuse 2. Recycle 3. Recovery and redistribution 4. Education and engagement
Objective 2: To establish the factors influencing consumers' intentions to recycle end-of-life garments in Australia.	**H1:** There is a positive relationship between attitude and intention to recycle **H2:** There is a positive relationship between subjective norm and intention to recycle **H3:** There is a positive relationship between perceived behavioural control and intention to recycle **H4:** There is a positive relationship between general recycling behaviour and intention to recycle **H5:** Self-identity is positively associated with the intention to recycle **H6:** There is a positive relationship between eco-literacy and attitude to recycle **H7:** Self-efficacy positively affects the perceived behavioural control to recycle. **H8:** There is a positive relationship between intention to recycle and recycle behaviour	Paper two (Chapter 5)	481 questionnaires of Australian consumers across the eight states or territories in Australia (Australian Capital Territory, Victoria, Western Australia, Queensland, New South Wales, Northern Territory, South Australia, and Tasmania).	1. Structural Equation Modelling	H1-H8 accepted

Objective 3: To explore factors that predict consumers' intentions to reuse end-of-life garments in Australia	**H1:** There is a positive relationship between intention to reuse and reuse behaviour **H2:** There is a relationship between attitude and intention to reuse end-of-life garments **H3:** There is a positive relationship between subjective norm and intention to reuse end-of-life garments **H4:** There is a positive relationship between perceived behavioural control and intention to reuse end-of-life garments **H5:** There is a positive relationship between general recycling behaviour and intention to reuse **H6:** Self-identity is positively associated with intention to reuse **H7:** There is a positive relationship between quality consciousness and intentions to reuse **H8:** There is a positive relationship between eco-literacy and attitude **H9:** Self-efficacy has a positive effect on the perceived behavioural control.	Paper 3 (Chapter 6)	428 questionnaires were retrieved from Australian consumers across the eight states or territories in Australia (Australian Capital Territory, Victoria, Western Australia, Queensland, New South Wales, Northern Territory, South Australia, and Tasmania).	1. Structural Equation Modelling	H1-H4 and H8-H9 supported H5-H7 not supported H4 is a negative relationship.
Overarching research aim: To provide recommendations regarding consumers' intentions to reuse and recycle end-of-life garments and improve sustainability within the Australian fashion industry and broader supply chain. (Chapter 7) **Key contributions:** • Consumer education and awareness • Engagement activities • Collaboration • Government-led initiatives • Consumer empowerment • Lessons from Europe					

Table 8.1. Research overview: thesis at a glance

8.3.1. OBJECTIVE 1

The first objective of this research was to *review the extant literature on sustainability within the fashion industry's supply chain to establish available sustainability practices to manage post-consumer textile waste (PCTW) at the end of the lifecycle*.

A systematic literature review was carried out to explore sustainable practices available to manage PCTW at garment end-of-life. This involved establishing a systematic procedure to determine and review a broad range of literature to identify gaps in the literature on sustainability within the fashion supply chain to establish sustainable practices to manage PCTW at garment end-of-lifecycle. The study found that four sustainable practices, including reuse, recycling, education and engagement, and recovery and distribution, can be used to manage PCTW at garments' end-of-life. Another key finding from this study is the importance of involving the overall fashion supply chain in attaining sustainability and sustained competitive advantage. Based on the findings from this paper, recycling and reuse are selected as the two sustainable practices available at garment end-of-life in which consumers have direct impact and as such were selected as the focus for the empirical studies conducted in papers 2 and 3.

8.3.2. OBJECTIVE 2

The second research objective was *to establish the factors influencing consumers' intentions to recycle end-of-life garments in Australia*. The TPB was used and extended to ground this study. The significant predictors were used to develop a conceptual framework to test their relationships with recycling behaviour.

After addressing objective 1 by identifying sustainable practices that could be used to manage PCTW, the findings from paper 1 showed that recycling was one of the sustainable practices which consumers have a direct influence over. As such, a conceptual model was developed to determine the factors that predict consumers' recycling intention and behaviour toward end-of-life garments. A structural equation modelling technique was used to analyse these predictors. The analysis revealed that all hypotheses were supported, meaning that all the observed predictors (attitude, subjective norm, PBC, self-identity, general recycling behaviour, self-efficacy, and eco-literacy) had a positive significant relationship with the intentions to recycle. Further, there was a significant and positive relationship between the intention to recycle and Australian consumers' recycling behaviour. Beyond providing insight into the significant factors that predict recycling intentions and behaviour, the study also offered insight into the value of TPB. The findings of the study also showed that educating consumers, providing household collection bins and reforming policy are important in attaining sustainable disposal of end-of-life garments through recycling.

8.3.3. OBJECTIVE 3

The third objective of this research was *to explore factors that predict consumers' intentions to reuse end-of-life garments in Australia*. Similar to objective 2, the TPB was used and extended to determine the significant factors influencing Australian consumers' reuse behaviour.

Another sustainable practice that consumers could directly impact was reusing end-of-life garments. A conceptual model was developed to observe which of the factors (attitude, subjective norm, PBC, self-identity, general recycling behaviour, quality consciousness, self-efficacy, and eco-literacy) influence Australian consumers' reuse intention and behaviour. A structural equation modelling technique was also adopted to test the relationships in the developed model. While most of the hypotheses were supported, the analysis showed that there is no direct relationship between general recycling behaviour, self-identity and quality consciousness on the intentions to reuse end-of-life garments amongst Australian consumers. Another important finding was that the relationship between PBC and reuse intentions was negative. The result of this study offered important insight into reuse as a sustainable practice within the fashion field. Findings from this study also called for collaboration amongst various fashion supply chain agents, including the government, retailers, consumers and the broader supply chain.

8.3.4. OVERARCHING RESEARCH AIM

The overall aim of this research was *to provide recommendations regarding consumers' intentions to reuse and recycle end-of-life garments and improve sustainability within the Australian fashion industry and broader supply chain.*

According to our research, through the implementation and extension of the TPB, it is observed that various constructs predict intentions and, subsequently, recycling and reuse behaviour. From these findings, recommendations are provided in chapter 7. These are presented as academic contributions and their implications for practice. These recommendations will not be presented in their entirety within this section. Instead, a dot-point summary of the six recommendations is presented. These include:

- There needs to be a unified, single-message campaign led by fashion retailers and the Australian government throughout the country to help educate and raise awareness amongst consumers.
- Various fashion supply chain agents should consider running engagement activities such as swapping or repair workshops, offering take-back scheme options or running tour presentations of the recycling plants.

- There needs to be a systems perspective towards circularity by all the fashion supply chain agents in order to attain sustainable disposal and a closed-loop supply chain.
- The Australian government is challenged to take the initiative and lead the shift towards circularity by changing policies, improving convenience to dispose of garments sustainably through recycling and reuse and offering to fund sustainable disposal projects like recycling companies.
- Consumers need to be empowered to dispose of their clothes sustainably, and part of that is by providing repair kits that allow consumers to extend their garment lifecycle through reuse.
- There is an advancement in research and a drive towards sustainability and circularity among European countries. The Australian fashion industry, supply chain and government need to learn lessons from Europe.

These recommendations provide a starting point for understanding Australian consumers' intentions to recycle and reuse their end-of-life garments, improving sustainability, and encouraging the shift towards a closed-loop, circular economy.

8.4. REFLECTIONS ON RESEARCH METHODOLOGY, METHODS AND TECHNIQUES

A fundamental assumption of a positivist paradigm is the value-free manner to which research should be conducted (Bahari, 2010). Whilst this approach allows for objectivity, having a positivist viewpoint might be a limiting factor as distance is created between the researcher and what is being researched. A drawback of this approach is that it fails to recognise that interaction with the participants might yield some insightful findings. As sustainability is deemed socially acceptable behaviour, it might be good to utilise other research paradigms such as interpretivism or constructivism that allows for a relationship between the researcher, participants and what is being researched. This will allow data collection such as interviews, focus groups and observations to be used, which may yield more honest inquiry to the questions asked.

8.5. RESEARCH LIMITATIONS

Although the current research contributes theoretically and practically to the sustainable disposal of end-of-life garments in Australia, several important limitations must be considered. First, the empirical studies (papers 2 and 3) were conducted within Australia as a specific context. Each paper (chapters 2, 5 and 6) has provided a justification for why the focus is on Australia and this is mainly due to the limited research focussing on this context. However, focussing on Australia alone might limit the transferability of the results. Similarly, while the sample was taken of the Australian

population, it was not nationally representative of the age, gender, state or income levels in Australia. Thus, caution must be applied to generalise the findings for the entire Australian population.

Secondly, the theory adopted within papers 2 and 3 is the TPB, which is has several limitations. These limitations are well documented in chapter 3 with potential solutions to include more factors such as self-efficacy, self-identity, general recycling behaviour, quality consciousness and eco-literacy. Also, papers 2 and 3 (chapter 5 and 6) provides justification for the use of TPB and how its limitations have been considered. In adopting the TPB, the focus of the study is limited to the predictors observed within this research, which are attitude, subjective norm, PBC, self-identity, general recycling behaviour, quality consciousness (for reuse only), self-efficacy, eco-literacy as determinant of intentions and eventual recycling and reuse behaviours. Further studies might benefit from exploring other predictors, especially from combining the TPB with other theories, such as value belief norm theory, that look specifically at pro-environmental/ sustainable behaviours.

Thirdly, while this research clearly illustrates what predictors influence Australian consumers to recycle and reuse their end-of-life garments, it is imperative to acknowledge that the questionnaire on which paper 2 and 3 are based is self-reported. Thus, there may be some acquiescence bias in that partaking in sustainable behaviour is often deemed as socially desirable and therefore, individuals are more likely to self-report more desirable behaviours. Thus, future studies could benefit from conducting an experimental study so that the researcher can observe the actual behaviour in question.

Lastly, while this research offers a good foundation of the predictors to recycle and reuse end-of-life garments amongst Australian consumers, further research is required to understand why these variables predict the recycling and reuse behaviours of end-of-life garments in Australia. Therefore, it is suggested that future studies build on the findings of this research by employing a qualitative approach, either through interviews or focus groups, to generate a deeper and richer context as to *why* Australian consumers choose to recycle or reuse their end-of-life garments.

8.6. RECOMMENDATIONS FOR FUTURE STUDIES

In paper 1, we established four sustainability practices; reuse, recycle, recovery and distribution, and education and engagement to managing end-of-life PCTW. While we have chosen to focus on two of the practices (reuse and recycle), there is an opportunity for greater research into the other two practices. The importance of studying the other two practices further is highlighted in the second and third papers (chapters 5 and 6), where findings touch on the need to provide education and engagement to consumers and the improvement of the process to recover end-of-life garments. This

further emphasises how intertwined all four sustainable practices may influence each other. Therefore, it is beneficial to theory and practice for more research to be done within this space.

This research also adds to the body of knowledge on the appropriateness of the TPB in exploring sustainable/pro-environmental behaviour. From paper 2 (chapter 5) and paper 3 (chapter 6), we successfully adopted and extended the TPB in understanding Australian consumers' recycling and reuse intentions, respectively. However, this research is conducted only from the viewpoint of the consumers. Throughout the thesis, it has been stressed that encouraging the sustainable disposal of end-of-life garments in hopes of achieving circularity requires a joint venture between several fashion supply chain agents. As such, it is important to conduct research that considers the viewpoints of the various supply chain agents. It is suggested that similar questions as was administered in the current research be asked of the various supply chain agents. This may also help to identify where the issues or breakdown in sustainable messaging are within the fashion supply chain.

Lastly, as noted in the limitation section above, there are questions regarding the transferability and generalisability of the findings of this research within a context beyond Australia. An interesting direction might be to conduct the same study in similarly developed nations and compare findings. Further, a comparative study might be conducted with more sustainability-progressive nations (such as the European countries discussed in chapters 2 and 7) with the view of providing more advanced or best practice learnings for all.

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APPENDIX

APPENDIX A: SURVEY QUESTIONNAIRE

Behavioural determinants of consumers intention to reuse and recycle end-of-life garments in Australia

Start of Block: Introduction

INTRODUCTION Project title: **Behavioural determinants of consumers intention to reuse and recycle end-of-life garments in Australia**

Welcome to the survey!

You are invited to share your views on your intentions and behaviour towards the reuse and recycling of your unwanted garments. Some questions will ask about your understanding and involvement in the sustainable disposal of general household items. We seek to provide recommendations to help reduce post-consumer waste sent to landfills.

The study is being undertaken in the School of Business, Law, and Entrepreneurship at the Swinburne University of Technology. The results of this research will be used for the current research project (a PhD thesis), as well as publications by the researcher in the future, including articles, book chapters, and books.

You need to be 18 years and over and reside in Australia to participate in this survey. This survey should take approximately 15-20 minutes to complete. Please answer all questions, if you are unsure of how to answer a question, please provide your best estimate.

You are assured of strict confidentiality in this study. No identifying features of you will be recorded. Your participation in the survey is voluntary, and you are free to withdraw at any time by simply closing the browser. Your consent is implied by the completion and submission of the questionnaire.

This project has been approved by Swinburne's Human Research Ethics Committee (SUHREC) (20224162-9146, 18 January 2022) in line with the National Statement on Ethical Conduct in Human Research.

If you have any questions about the survey, please contact:

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For more information on the research project, please click on the attached information sheet link below:

Questionnaire: Information Sheet

End of Block: Introduction

Start of Block: Welcome

DEFINITIONS

Please read the below definitions of **reuse** and **recycling** before commencing the survey. For the purpose of this research:

Recycling is concerned with the use of recycling bins or when a person gives their end-of-life garments to recycling companies (such as Textile Recyclers Australia, Australian Clothing Recyclers, and SCRgroup). Recycling results in the breakdown of garments into fibers. **Please note that recycling is only from your point of view as the consumer. As such please complete the survey with the definition of recycling as an intention of giving your end-of-life garments to recycling companies or putting it in recycling bins.**

Reuse is considered as either the repair or re-purpose of unwanted garments. This means garments end up being used for a longer time either by the same person or disposing of garments to a different person(s). Reuse therefore can include mending your clothes for further use or using the clothes for alternative purposes. It could also be achieved through giving or handing down clothing between family, friends, and charity (op) shops, swapping, or selling of clothing in garage sales.

Please make sure you understand these definitions of recycling and reuse, as they are essential to complete this survey.

End of Block: Welcome

Start of Block: AGE

AGE What is your age group?

- ○ Under 18
- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65 - 74
- ○ 75 - 84
- ○ 85 or older

End of Block: AGE

Start of Block: STATE

STATE In which state or territory do you live?

- ○ Australian Capital Territory
- ○ New South Wales
- ○ Northern Territory
- ○ Queensland
- ○ South Australia
- ○ Tasmania
- ○ Victoria
- ○ Western Australia
- ○ None of the above

End of Block: STATE

Start of Block: Screeners

SCREEN_INTRO The purpose of the next few questions is to make sure you understand the definition of reuse and recycling. Please click next to see the questions.

Page Break

SCREEN_1 A consumer named Susan does not want two of her garments anymore. She decides to give these garments to her friend, Lisa. This process is an example of...

- Recycle
- Reuse
- I don't know

SCREEN_2 One of John’s shirts is old, and he no longer wants it. He decides to take the garment with him on his trip to the mall. Just before John got to the mall, he saw a recycling company and decides to drop his unwanted shirt at the company. This process is an example of...

- Recycle
- Reuse
- I don't know

SCREEN_3 Liam has trousers that he no longer wants. The jeans were expensive so he doesn't feel comfortable just giving them away. Liam decides to find another way of using the jeans. He decides to use them as casual lounge wear instead. This process is an example of...

- ○ Recycle
- ○ Reuse
- ○ I don't know

End of Block: Screeners

Start of Block: Correct_ans

correct_ans You are correct. Well done!

Please click next to continue with the rest of the survey.

End of Block: Correct_ans

Start of Block: Recycling

Sections_explained This survey contains four main sections: Recycling questions Reuse questions Other factors questions Demographic questions

Please answer all questions. If you are unsure of how to answer a question, please provide your best estimate.

Page Break

REC_INTRO

In this section we ask for your opinion on garment **recycling**.

In this study, recycling is concerned with the use of recycling bins or when a person gives their end-of-life garments to recycling companies (such as Textile Recyclers Australia, Australian Clothing Recyclers, and SCRgroup). Recycling results in the breakdown of garments into fibers. Please note that recycling is only from your point of view as the consumer. As such please complete the survey with the intention of giving your end-of-life garments to recycling companies or putting it in recycling bins.

Please keep in mind this definition as you answer the next few questions. Please click next to see the questions.

Page Break

REC_BEH1 Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
When I decide that I no longer want my garments, it is very important to me to recycle it.	○	○	○	○	○	○	○
When I decide that I no longer want my garments, I prefer to recycle it rather than store it, sell it, or throw it away.	○	○	○	○	○	○	○
When I decide that I no longer want my garments, my first	○	○	○	○	○	○	○

option is to recycle it.

REC_BEH2 How often do you **recycle** the garments you no longer want in a 12 month period?

- Weekly
- Monthly
- Quarterly
- Every 6 months
- Annually
- Never

REC_BEH3 How many garments do you **recycle** in a 12 month period?

- 0 to 4
- 5 to 8

- ○ 9 to 12
- ○ 13 to 16
- ○ 17 to 20
- ○ Over 21

Page Break

REC_INT Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
In future, I will try to recycle garments that I no longer want	○	○	○	○	○	○	○
Within the next 12 months, the probability that I would recycle garments that I no longer want is high	○	○	○	○	○	○	○
Within the next 12 months, I intend to recycle garments that I no	○	○	○	○	○	○	○

longer

want

Page Break

REC_ATT Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I like the idea of recycling garments that I no longer want	○	○	○	○	○	○	○
I have a favourable attitude toward recycling the garments that I no longer want	○	○	○	○	○	○	○
Recycling the garments that I no longer want is a good idea	○	○	○	○	○	○	○

Page Break

REC_SBN Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Most people who are important to me think I should recycle the garments that I no longer want	○	○	○	○	○	○	○
Most people who are important to me would want me to recycle the garments that I no longer want	○	○	○	○	○	○	○
People whose opinions I value	○	○	○	○	○	○	○

would prefer that I recycle the garments that I no longer want							
My friend's positive opinion influences me to recycle the garments that I no longer want	○	○	○	○	○	○	○

Page Break

REC_PBC_INTRO For the next few questions, please select the option that is most applicable to you.

REC_PBC1 It is mostly up to me whether or not I **recycle** my unwanted garments

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

REC_PBC2 How much control do you have over **recycling** your unwanted garments from now on?

- Absolutely no control
- Moderately no control
- Slightly no control
- Neutral
- Slightly in control

- ○ Moderately in control
- ○ Completely in control

REC_PBC3 The number of events outside my control which could prevent me from **recycling** my unwanted garments from now on are. . .

- ○ Very little
- ○ Moderately little
- ○ Slightly little
- ○ Neither much nor little
- ○ Slightly much
- ○ Moderately much
- ○ Numerous

REC_PBC4 How much personal control do you feel you would have over whether or not you **recycle** your unwanted garments from now on?

- ○ Absolutely no control
- ○ Moderately no control
- ○ Slightly no control

- ○ Neutral
- ○ Slightly in control
- ○ Moderately in control
- ○ Completely in control

REC_PBC5 How much control do you have over whether you do or do not **recycle** your unwanted garments from now on?

- ○ Absolutely no control
- ○ Moderately no control
- ○ Slightly no control
- ○ Neutral
- ○ Slightly in control
- ○ Moderately in control
- ○ Completely in control

Page Break

REC_SE_INTRO For the next few questions, please select the option that is most applicable to you.

REC_SE1 If I wanted to, I could easily **recycle** my unwanted garments from now on

- Extremely unlikely
- Moderately unlikely
- Slightly unlikely
- Neither likely nor unlikely
- Slightly likely
- Moderately likely
- Extremely likely

REC_SE2 For me, **recycling** my unwanted garments would be. . .

- Extremely difficult
- Moderately difficult
- Slightly difficult
- Neither easy nor difficult
- Slightly easy

- ○ Moderately easy
- ○ Extremely easy

REC_SE3 What is the likelihood that if you tried you would be able to **recycle** your unwanted garments from now on?

- ○ Extremely unlikely
- ○ Moderately unlikely
- ○ Slightly unlikely
- ○ Neither likely nor unlikely
- ○ Slightly likely
- ○ Moderately likely
- ○ Extremely likely

REC_SE4 How certain are you that you could **recycle** your unwanted garments from now on?

- ○ Absolutely uncertain
- ○ Moderately uncertain
- ○ Slightly uncertain

- ○ Neutral
- ○ Slightly certain
- ○ Moderately certain
- ○ Completely certain

REC_SE5 For me to **recycle** my unwanted garments from now on would be. . .

- ○ Extremely difficult
- ○ Moderately difficult
- ○ Slightly difficult
- ○ Neither easy nor difficult
- ○ Slightly easy
- ○ Moderately easy
- ○ Extremely easy

End of Block: Recycling

Start of Block: Reuse

complete_part1 Thank you for completing part 1 of the survey: recycling.

Please click next to move to the second part of the survey.

Page Break

REU_INTRO In this section we ask for your opinion on garment **reuse**.

Reuse is considered as either the repair or re-purpose of an unwanted garments. This means garments end up being used for a longer time either by the same person or disposing of garments to a different person(s). Reuse therefore can include mending your clothes for further use or using the clothes for alternative purposes. It could also be achieved through giving or handing down clothing between family, friends, and charity (op) shops, swapping, or selling of clothing in garage sales.

Please keep in mind this definition as you answer the next few questions. Please click next to see the questions.

Page Break

REU_BEH1 Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
When I decide that I no longer want my garments, it is very important to me to reuse it.	○	○	○	○	○	○	○
When I decide that I no longer want my garments, I prefer to reuse it rather than store it or throw it away.	○	○	○	○	○	○	○
When I decide that I no longer want my garments, my first	○	○	○	○	○	○	○

option is to reuse it.

REU_BEH2 How often do you **reuse** the garments you no longer want in a 12 month period?

- Weekly
- Monthly
- Quarterly
- Every 6 months
- Annually
- Never

REU_BEH3 How many garments do you **reuse** in a 12 month period?

- 0 to 4
- 5 to 8

- ○ 9 to 12
- ○ 13 to 16
- ○ 17 to 20
- ○ Over 21

Page Break

REU_INT Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
In future, I will try to reuse garments that I no longer want	○	○	○	○	○	○	○
Within the next 12 months, the probability that I would reuse garments that I no longer want is high	○	○	○	○	○	○	○
Within the next 12 months, I intend to reuse garments that I no	○	○	○	○	○	○	○

longer

want

Page Break

REU_ATT Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I like the idea of reusing garments that I no longer want	○	○	○	○	○	○	○
I have a favourable attitude toward reusing garments that I no longer want	○	○	○	○	○	○	○
Reusing the garments that I no longer want is a good idea	○	○	○	○	○	○	○
I pay attention and will	○	○	○	○	○	○	○

choose "agree" here	

Page Break

REU_SBN Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Most people who are important to me think I should reuse the garments that I no longer want	○	○	○	○	○	○	○
Most people who are important to me would want me to reuse the	○	○	○	○	○	○	○

garments that I no longer want							
People whose opinions I value would prefer that I reuse the garments that I no longer want	○	○	○	○	○	○	○
My friend's positive opinion influences me to reuse the garments that I no longer want	○	○	○	○	○	○	○

Page Break

REU_PBC_INTRO For the next few questions, please select the option that is most applicable to you. Please click next to see the questions.

Page Break

REU_PBC1 It is mostly up to me whether or not I **reuse** the garments I no longer want

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

REU_PBC2 How much control do you have over **reusing** the garments you no longer want from now on?

- ○ Absolutely no control
- ○ Moderately no control
- ○ Slightly no control
- ○ Neutral
- ○ Slightly in control
- ○ Moderately in control
- ○ Completely in control

REU_PBC3 The number of events outside my control which could prevent me from **reusing** my unwanted garments from now on are. . .

- ○ Very little
- ○ Moderately little
- ○ Slightly little
- ○ Neither much nor little
- ○ Slightly much
- ○ Moderately much
- ○ Numerous

REU_PBC4 How much personal control do you feel you would have over whether or not you **reuse** the garments you no longer want from now on?

- ○ Absolutely no control
- ○ Moderately no control
- ○ Slightly no control
- ○ Neutral
- ○ Slightly in control

- ○ Moderately in control
- ○ Completely in control

REU_PBC5 How much control do you have over whether you do or do not **reuse** your unwanted garments from now on?

- ○ Absolutely no control
- ○ Moderately no control
- ○ Slightly no control
- ○ Neutral
- ○ Slightly in control
- ○ Moderately in control
- ○ Completely in control

Page Break

REU_SE_INTRO For the next few questions, please select the option that is most applicable to you. Please click next to see the questions.

Page Break

REU_SE1 If I wanted to, I could easily **reuse** the garments I no longer want from now on

- ○ Extremely unlikely
- ○ Moderately unlikely
- ○ Slightly unlikely
- ○ Neither likely nor unlikely
- ○ Slightly likely
- ○ Moderately likely
- ○ Extremely likely

REU_SE2 For me, **reusing** the garments I no longer want would be. . .

- ○ Extremely difficult
- ○ Moderately difficult
- ○ Slightly difficult
- ○ Neither easy nor difficult
- ○ Slightly easy
- ○ Moderately easy
- ○ Extremely easy

REU_SE3 What is the likelihood that if you tried you would be able to **reuse** the garments you no longer want from now on?

- ○ Extremely unlikely
- ○ Moderately unlikely
- ○ Slightly unlikely
- ○ Neither likely nor unlikely
- ○ Slightly likely
- ○ Moderately likely
- ○ Extremely likely

REU_SE4 How certain are you that you could **reuse** the garments you no longer want from now on?

- ○ Absolutely uncertain
- ○ Moderately uncertain
- ○ Slightly uncertain
- ○ Neutral
- ○ Slightly certain
- ○ Moderately certain

○ Completely certain

REU_SE5 For me to **reuse** my unwanted garments from now on would be. . .

○ Extremely difficult

○ Moderately difficult

○ Slightly difficult

○ Neither easy nor difficult

○ Slightly easy

○ Moderately easy

○ Extremely easy

End of Block: Reuse

Start of Block: Other_Factors

complete_reuse Thank you for completing part 2 of the survey: reuse.

Please click next to move to the third part of the survey.

Other_Factors_Intro In this section, we are asking general questions not limited to either reuse or recycling. Please click next to see the questions.

Page Break

SLF_IDN Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I think of myself as someone who disposes off items sustainably	○	○	○	○	○	○	○
To engage in sustainable disposal of items is an important part of who I am	○	○	○	○	○	○	○
I am the type of person who would be involved in sustainable disposal of items	○	○	○	○	○	○	○

Page Break

ECO_LIT Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
It is important to me that the garments I own do not harm the environment, society or economy.	○	○	○	○	○	○	○
I consider the potential environmental, social or economic impact of my actions when making many of my decisions	○	○	○	○	○	○	○
My disposal habits are affected by my concerns about our environment, society or economy.	○	○	○	○	○	○	○

I am concerned about wasting the resources of our planet.	○	○	○	○	○	○	○
I would describe myself as an environmentally, socially or economically responsible person.	○	○	○	○	○	○	○
I am willing to be inconvenienced to take actions that are more environmentally, socially or economically friendly.	○	○	○	○	○	○	○

Page Break

GEN_REC Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I recycle plastic	○	○	○	○	○	○	○
I recycle glass	○	○	○	○	○	○	○
I recycle paper	○	○	○	○	○	○	○
Compared with the people I know, I make a greater effort to recycle	○	○	○	○	○	○	○
I make an effort to find and use recycling bins	○	○	○	○	○	○	○

Page Break

QLT_CON Please indicate the extent to which you agree or disagree with the below statements by selecting the option that is right for you.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I make a special effort to choose the very best quality garments	○	○	○	○	○	○	○
In general, quality is an important factor I look for when I am shopping	○	○	○	○	○	○	○
I usually own high quality brands	○	○	○	○	○	○	○
I care a lot about the fabric quality of the	○	○	○	○	○	○	○

garments I own							
I pay attention and will choose "strongly agree" here	○	○	○	○	○	○	○

Page Break

End of Block: Other_Factors

Start of Block: Demographic

Complete_other_facto Thank you for completing part 3 of the survey that looks at other factors that could influence your reuse and recycle behaviour.

Please click next to move to the final part of the survey.

Page Break

GENDER What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Page Break

EDU What is the highest level of education you have completed?

- ○ Did not attend school
- ○ High School
- ○ Certificate/Diploma
- ○ Undergraduate Degree
- ○ Postgraduate Degree

Page Break

INC Which of these describes your personal income in Australian Dollars (AUD) within the last 12 months?

- ○ Less than $9 999
- ○ $10 000 to $24 999
- ○ $25 000 to 49 999
- ○ $50 000 to 74 999
- ○ $75 000 to 99 999
- ○ $100 000 to 149 999
- ○ $150 000 10 199 999
- ○ $200 000 and greater
- ○ Prefer not to say

Page Break

MAR_STA What is your marital status?

- ○ Single (never married)
- ○ Divorced
- ○ Widowed
- ○ Married, or in a domestic partnership
- ○ Separated
- ○ Prefer not to say
- ○ Other _____

Page Break

LFE_STG Please select the category that best describes your current life stage.

- ○ Couple with no child
- ○ Group of adults living in shared accommodation
- ○ Family with children living at home, where youngest child is under 5yrs
- ○ Family with children living at home, where youngest child is 5-15yrs
- ○ Family with children living at home, where youngest child is over 15yrs
- ○ Single/Couple whose children have left home
- ○ Single

Page Break

CHILD1 Do you have children?

- ○ Yes
- ○ No
- ○ Prefer not to say

Page Break

CHILD2 Please indicate the number of children in your household by selecting the number that is right for you.

▼ 1 or 2 ... 7 or above

Page Break

EMPLOYMENT Please indicate your current employment status

- ○ Employed full time
- ○ Employed part time
- ○ Unemployed looking for work
- ○ Unemployed not looking for work
- ○ Retired
- ○ Casual
- ○ Other _____

End of Block: Demographic

APPENDIX B: INFORMATION PAGE

Welcome to the survey!

You are invited to share your views on your intentions and behaviour towards the **reuse** and **recycling** of your unwanted garments. Some questions will ask about your understanding and involvement in the sustainable disposal of general household items. We seek to provide recommendations to help reduce post-consumer waste sent to landfills.

The study is being undertaken in the School of Business, Law, and Entrepreneurship at the Swinburne University of Technology. The results of this research will be used for the current research project (a PhD thesis), as well as publications by the researcher in the future, including articles, book chapters, and books.

You need to be 18 years and over and reside in Australia to participate in this survey. This survey should take approximately 15-20 minutes to complete. Please answer all questions, if you are unsure of how to answer a question, please provide your best estimate.

You are assured of strict confidentiality in this study. No identifying features of you will be recorded. Your participation in the survey is voluntary, and you are free to withdraw at any time by simply closing the browser. Your consent is implied by the completion and submission of the questionnaire.

This project has been approved by Swinburne's Human Research Ethics Committee (SUHREC) (20224162-9146, 18 January 2022) in line with the National Statement on Ethical Conduct in Human Research.

If you have any questions about the survey, please contact:

Prof. Lester Johnson (Chief Investigator)

Department of Management and Marketing,

School of Business, Law, and Entrepreneurship, Swinburne University of Technology, Hawthorn, Melbourne

Phone: +61 3 9214 3880

Email: lwjohnson@swin.edu.au

Esther Rotimi (Student Investigator)

Department of Management and Marketing,

School of Business, Law, and Entrepreneurship, Swinburne University of Technology, Hawthorn, Melbourne

Email: erotimi@swin.edu.au

For more information on the research project, please click on the attached information sheet link below:

APPENDIX C: INFORMATION SHEET

PROJECT TITLE:

Behavioural determinants of consumers intention to reuse and recycle end-of-life garments in Australia

PRINCIPAL INVESTIGATOR: Prof. Lester Johnson

ASSOCIATE INVESTIGATORS: Dr Cheree Topple and Dr Hassan Kalantari Daronkola

STUDENT INVESTIGATOR: Esther Rotimi

School of Business, Law & Entrepreneurship, Swinburne University of Technology

WHAT THIS PROJECT IS ABOUT?

Australia is the second-largest global consumer of new textiles. Such high consumption has led to increase disposal of fashion waste, with majority sent to landfills and impacting on the environment, economy and society. This study aims to provide recommendations to help reduce post-consumer waste sent to landfills. To that end, understanding consumers' perspectives of end-of-life garments is crucial. As such, this study will investigate consumers' intentions and behaviour to reuse and recycle end-of-life garments, that is, garments you no longer want and choose to dispose of.

In this study, ***recycling*** is concerned with the use of recycling bins or when a person gives their end-of-life garments to recycling companies (such as Textile Recyclers Australia, Australian Clothing Recyclers, and SCRgroup). Recycling results in the breakdown of garments into fibers.

Reuse is considered as either the repair or re-purpose of an unwanted garments. This means garments end up being used for a longer time either by the same person or disposing of garments to a different person(s). Reuse therefore can include mending your clothes for further use or using the clothes for alternative purposes. It could also be achieved through giving or handing down clothing between family, friends, and charity (op) shops, swapping, or selling of clothing in garage sales.

PROJECT AND RESEARCH INTEREST

This is an independent research carried out to satisfy Esther's Doctorate Degree requirement. This project is supported by the Australian Government Research Training Program Scholarship.

For data collection, a list of potential participants has been obtained through PureSpectrum. Given that you are a registered participant with PureSpectrum, we are hereby contacting you to voluntarily participate in this study.

WHAT DOES THE STUDY INVOLVE, AND WHAT IS THE TIME COMMITMENT?

You are invited to participate in an anonymous online questionnaire survey. The questionnaire asks about your intentions and behaviour towards the reuse and recycling of your unwanted garments. Some questions seek your understanding and involvement in sustainable disposal of general household items. You need to be 18 years and over and reside in Australia to participate in this survey. Please answer all questions unless the instructions indicate otherwise. If you are unsure about an answer, please provide your best estimate.

Your participation in the questionnaire survey is completely voluntary. You are free to withdraw from or terminate the questionnaire at any time by simply closing the browser. Please note that your consent is implied on completion and submission of the survey. This gives permission for the use of your data by the researchers of this project. If you feel uncomfortable or emotionally distressed at any stage, you can withdraw your participation at any time by terminating the survey. The list of counselling services is listed at the end of this information statement if you need it. Please note that you are unable to withdraw your data once you submit the survey. The survey will take approximately 15-20 minutes to complete.

WHAT ARE THE RISKS AND BENEFITS OF YOUR PARTICIPATION?

There are no known risks in participating in this study. The questions relate to your intentions and behaviour in reusing and recycling unwanted garments. We will also ask some basic demographic information about you. Your participation in this research is valuable as it could deepen the understanding of garment reuse and recycling for the researchers, fashion industry, and potentially, the government. Participation in this survey will also earn you reward points as in your agreement with PureSpectrum.

WILL ALL DATA PROVIDED BE PRIVATE AND CONFIDENTIAL?

This project has been approved by Swinburne's Human Research Ethics Committee (SUHREC) (20224162-9146, 18 January 2022) in line with the National Statement on Ethical Conduct in Human Research.

The information you provide and your responses to questions are confidential. All data collected are anonymous as we will not be collecting any identifying information such as name, IP address, or email address. This survey will not record information that will individually identify you. This means that your responses cannot be traced back to you. No information about any participant will be given to Swinburne University or any other individual or organisation. The de-identified data will be stored electronically in the university's OneDrive cloud storage with password protection. Only the researchers of this project will have access to the data.

HOW WILL THE DATA BE USED?

At the end of data collection, the data file will be extracted from the online Qualtrics survey platform. The results of this study will only be used for scholarly purposes, and the doctoral thesis will be published in Swinburne Research Bank. It is expected that this project will result in the publication of academic journal articles and presentations at conferences and forums related to consumer behaviour, fashion and sustainability. The data collected for this project may be re-used/ re-analysed in future for new comparison research projects. This data set will be kept for five years after the last research output. After this, it will be completely and permanently deleted.

FURTHER INFORMATION ABOUT THE PROJECT – WHO TO CONTACT:

If you would like further information about the project, please contact:

Prof. Lester Johnson

Chief Investigator, Department of Management and Marketing,

School of Business, Law and Entrepreneurship, Swinburne University of Technology, Hawthorn, Melbourne

Phone: +61 3 9214 3880

Email: lwjohnson@swin.edu.au

COUNSELLING SERVICES AVAILABLE TO YOU:

You are recommended to contact support services, including counselling hotline if you feel upset or distressed after participating in any aspect of this research. Swinburne University provides limited,

low-cost counselling for research participants of Swinburne projects who may experience discomfort or distress as a result of their participation in a research.

Should you wish to access this service, please contact the Clinic Receptionist of the Swinburne Psychology Clinic on (03) 9214 863. Please indicate to the receptionist that you are a research participant.

If you do not wish to use, or cannot use, the Swinburne University Counselling service, there are other services available. Beyondblue offers free services including email responses, an online chat forum and a telephone counselling service 24 hours/7 days a week on (phone) 1300 22 4636. Lifeline is a national charity providing all Australians experiencing personal crisis access to free, confidential 24-hour crisis support on (phone) 13 11 14. If a participant contacts the researchers directly and discloses information that indicates that they may pose a risk to themselves or others, the researchers will recommend the support, services mentioned above.

This project has been approved by or on behalf of Swinburne's Human Research Ethics Committee (SUHREC) in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints about the conduct of this project, you can contact:

Research Ethics Officer*, Swinburne Research (H68),*

Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122.

Tel (03) 9214 5218 or +61 3 9214 5218 or resethics@swin.edu.au

APPENDIX D: ETHICS APPROVAL

18/01/2022

Ref: 20224162-9146 : Behavioural determinants of consumers intention to reuse and recycle end-of-life garments in Australia

Approved Duration: 16/12/2020 to 16/12/2023

Chief Investigator: Cheree Topple

I refer to your request to modify the approved protocol for the above project. The request was put to a SUHREC/SHESC delegate for consideration.

I am pleased to advise that, as modified to date, the project may continue in line with standard ethics clearance conditions previously communicated and reprinted below.

Please note that information on self-auditing, progress/final reporting and modifications/additions to approved protocols can now be found on the Research Ethics Internet

pages.

Please contact the Research Ethics Office if you have any queries about on-going ethics clearance, citing the project number. A copy of this correspondence should be

retained as part of project record-keeping and forwarded to relevant members of the project team.

This modification was approved during COVID-19 restrictions. The conduct of the research during this period should reflect any changes in relation to university

and government COVID-19 mandates in the relevant jurisdictions. To ensure you have accommodated these mandates please refer to the Swinburne Ethics

COVID-19 website here.

As before, best wishes for the project.

Yours sincerely,

Dr Astrid Nordmann
Research Ethics Office
Swinburne University of Technology
P: +61 3 9214 3845 | E: resethics@swin.edu.au

SIGNED AUTHORSHIP INDICATION FORMS

PAPER ONE

Swinburne Research

Authorship Indication Form

For HDR students

NOTE

This Authorship Indication form is a statement detailing the percentage of the contribution of each author in each submitted/published 'paper'. This form must be signed by each co-author and the Principal Supervisor. This form must be added to the publication of your final thesis as an appendix. Please fill out a separate form for each published paper to be included in your thesis.

DECLARATION

We hereby declare our contribution to the publication of the 'paper' entitled:

Towards a conceptual framework of sustainable practices of post-consumer textile waste at garment end of lifecycle: A systematic literature review approach

First Author

Name ESTHER OLUWADAMILOLA OLUFEMI ROTIMI Signature: Rotimi

Percentage of contribution: 80 % Date: 21 / 01 / 2023

Brief description of contribution to the 'paper' and your central responsibilities/role on project:

Esther Rotimi contributed to the Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing- Original Draft, Visualization of the manuscript.

Second Author

Name: DR CHEREE TOPPLE Signature: Cheree Topple

Percentage of contribution: ____% Date: 06 / 02 /2023

Brief description of your contribution to the 'paper':

Dr Cheree Topple contributed to the Validation, Methodology, Writing- Review & Editing, Supervision of the manusccript

Third Author

Name: A/PROF JOHN HOPKINS Signature:

Percentage of contribution: ____% Date: 06 / 02 / 2023

Brief description of your contribution to the 'paper':

A/Prof John Hopkins contributed to the supervision of the manusccript

Fourth Author

Name:_____ Signature:_____

Percentage of contribution: ____% Date: __/__/____

Brief description of your contribution to the 'paper':

Principal Supervisor:

Name: L W JOHNSON Signature: L W Johnson

Date: 08/02/2023

In the case of more than four authors please attach another sheet with the names, signatures and contribution of the authors.

Authorship Indication Form

PAPER TWO

SWINBURNE UNIVERSITY OF TECHNOLOGY

Swinburne Research

Authorship Indication Form

For HDR students

NOTE

This Authorship Indication form is a statement detailing the percentage of the contribution of each author in each submitted/published 'paper'. This form must be signed by each co-author and the Principal Supervisor. This form must be added to the publication of your final thesis as an appendix. Please fill out a separate form for each published paper to be included in your thesis.

DECLARATION

We hereby declare our contribution to the publication of the 'paper' entitled:

Predictors of consumers' behaviour to recycle end-of-life garments in Australia

First Author

Name ESTHER OLUWADAMILOLA OLUFEMI ROTIMI Signature: Otimi

Percentage of contribution: 80 %

Date: 27 / 01 / 2023

Brief description of contribution to the 'paper' and your central responsibilities/role on project:

Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing- Original Draft, Visualization.

Second Author

Name: Prof. Lester Johnson Signature:

Percentage of contribution: 5 %

Date: 09/ 02/ 2023

Brief description of your contribution to the 'paper':

Writing- Review & Editing, Supervision.

Third Author

Name: Dr Cheree Topple Signature: Cheree Topple

Percentage of contribution: 5 %

Date: 06/ 02 / 2023 Brief description of your contribution to the 'paper':

Writing- Review & Editing, Supervision.

Fourth Author

Name: Dr Hassan Kalantari Daronkola Signature: [signature]

_ Percentage of contribution: 8 % Date: 06 / 02 / 2023

Brief description of your contribution to the 'paper': Methodology,Writing- Review and Editing,Supervision

Fifth Author

Name: A/Prof. John Hopkins Signature: [signature]

_ Percentage of contribution: 2 % Date: 06 / 02 / 2023

Brief description of your contribution to the 'paper': Supervision

Principal Supervisor:

Name: L W JOHNSON Signature: [signature]

Date: 09 / 04 / 2023

In the case of more than four authors please attach another sheet with the names, signatures and contribution of the authors.

Authorship Indication Form

SWINBURNE UNIVERSITY OF TECHNOLOGY

Swinburne Research

Authorship Indication Form

For HDR students

NOTE

This Authorship Indication form is a statement detailing the percentage of the contribution of each author in each submitted/published 'paper'. This form must be signed by each co-author and the Principal Supervisor. This form must be added to the publication of your final thesis as an appendix. Please fill out a separate form for each published paper to be included in your thesis.

DECLARATION

We hereby declare our contribution to the publication of the 'paper' entitled:

Behavioural determinants of consumers' intention to reuse end-of-life garments in Australia

First Author

Name Esther Oluwadamilola Olufemi Rotimi Signature: Rotimi

Percentage of contribution: 80 % Date: 28 / 02 / 2023

Brief description of contribution to the 'paper' and your central responsibilities/role on project:

Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing- Original Draft, Visualization.

Second Author

Name: Hassan Kalantari Daronkola Signature: Kal

Percentage of contribution: 10 % Date: 01 / 03 / 2023

Brief description of your contribution to the 'paper':

Methodology, Writing- Review & Editing, Supervision.

Third Author

Name: Cheree Topple Signature: Cheree Topple

Percentage of contribution: 5 % Date: 28/02/2023

Brief description of your contribution to the 'paper':

Writing- Review & Editing, Supervision.

Fourth Author

Name: Lester Johnson Signature: L W Johnson

Percentage of contribution: 5 % Date: 01/03/2023

Brief description of your contribution to the 'paper':

Writing- Review & Editing, Supervision.

Principal Supervisor:

Name: L W JOHNSON Signature: L W Johnson

Date: 01/03/2023

In the case of more than four authors please attach another sheet with the names, signatures and contribution of the authors.

Authorship Indication Form

LIST OF PUBLICATION(S)

Rotimi, E. O. O., Johnson, L., Topple, C., Daronkola, H. K. & Hopkins, J. 2022. Recycling: A sustainable approach to managing clothing waste. *International Conference on Resource Sustainability*