Voluntary Sustainability Standards and the Fashion Industry: Opportunities and Challenges for Building a Circular Textile Economy

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Abstract

The race to the bottom that has enabled the rise of fast fashion is becoming increasingly intensified and, due to climate change and pollution, the environmental impacts of the industry are becoming more catastrophic. One sustainability solution that is rapidly growing in popularity across the industry is the Circular Economy (CE), due to its promise to deliver positive social, environmental and economic sustainability outcomes.

Voluntary sustainability standards (VSS) are widely used across many different industries for a variety of development objectives, and have started being used to facilitate the movement towards circularity. VSS is a prominent regulatory mechanism in the fashion industry, and thus exploring the alignment of VSS with – and hence its potential to effectively implement – the CE will help illuminate the value of both as sustainability approaches to addressing the enormous detrimental impact of fast fashion. This paper makes a unique contribution to the literature on CE in the fashion industry by taking both a conceptual and applied approach to assessing the congruence between VSS and CE, drawing from various bodies of literature and performing expert interviews.

This research aims to serve as a foundation for research on sustainability in the textile industry, and a resource for decision-makers, corporations and policy makers looking to promote a circular textile economy. Ultimately, the goal is to promote sustainable development and provide tangible outcomes towards these objectives.

1.0 Introduction

1.1 The Issue of Fast Fashion

The global fashion industry is one of the most environmentally destructive industries globally (Jia et al., 2020, Mishra et al., 2021). Annual greenhouse gas emissions from textile production alone equal 1.2 billion tonnes (Centobelli et al., 2022). Clothing represents more than 60% of the total textiles produced and is expected to remain the largest application (EMF, 2017). The textile industry relies mostly on non-renewable resources, including oil to produce synthetic fibres, fertilizers to grow cotton, and chemicals to produce, dye, and finish textiles; the total of which are currently used at a rate of 92 million tonnes per year (Centobelli et al., 2022). Many of these substances used in clothing production are harmful to those that handle the garments as well as the natural environment, and washing these garments releases microfibers into our waterways which contributes half a million tonnes annually to ocean pollution (Jia et al., 2020).

Driven by a growing global middle-class population and the globalization of capitalism and cultures of overconsumption, the last 15 years have seen an increase in clothing production of nearly 200% (Mishra et al., 2021). In addition, it is estimated that more than half of fast fashion produced is disposed of in under a year (McKinsey & Company, 2016). The global average number of times a garment is worn before it ceases to be used has decreased by 36% compared to 15 years ago (McKinsey & Company, 2016). While many low-income countries have relatively high rates of clothing utilization, wealthy countries' rates are much lower – in the United States, for example, clothes are only worn for around a quarter of the global average. This effect is most commonly understood as to the 'fast fashion' phenomenon, with an increased number of collections produced per year and lower prices, fueled by an ever-accelerating trend cycle and consumption culture (Centobelli et al., 2022). The growth of this industry is only projected to accelerate (Centobelli et al., 2022), and thus negative environmental impacts are likely to increase in scale and severity.

The fashion industry is also rife with social issues. Many workers face dangerous working environments due to unsafe processes and the hazardous substances used in production. High cost and time pressures are often imposed on all parts of the supply chain, which can lead to workers suffering poor working conditions with long hours and low pay (Cobbing & Vicaire, 2016). Additionally, local communities, while perhaps benefitting from employment in the industry, often suffer from these poor environmental practices (EMF, 2017).

Not only is environmental and social sustainability at risk under business-as-usual projections, but also the economic sustainability of the fashion industry itself. The *Pulse of the fashion industry* report by the Global Fashion Agenda and Boston Consulting Group projects that, by 2030, fashion brands would see a decline in earnings of more than three percentage points if they were to continue business as usual (2017). The current fashion industry takes a predominantly 'linear' approach to production of consumption and disposal. Simply put, this system begins with production from raw materials and ends in disposal of waste. Thus, moving away from the current system is thus necessary not only to address the multiple crises we are facing regarding pollution, global warming, resource depletion, and social injustice, but also for the economy and the fashion industry itself.

Improving the sustainability of the textile industry itself can also have significant development implications for the social and economic welfare of countries across the globe, making it a crucial area of focus. For many countries in the Global South, the textile industry makes up a large part of GDP, employment, and foreign exchange, thus playing a significant role in stabilizing national politics (Shen & Mikschovsky, 2018). Thus, the textile industry is not only significant in its harmfulness towards the environment but also in its importance to many national economies, especially in the Global South (Keane & te Velde, 2008). Keane and te Velde (2008) released a report on the role of textile industries in development and concluded that due to high economic dependence on these industries, the potential for the textile industry to contribute to development is great. Thus, exploring the improvement of the fashion

industry is important for improving sustainable development outcomes in environmental, economic, and social spheres.

Over the 20 years since its inception – and in particular over the last decade – the Circular Economy (hereafter, CE) has been gaining traction in global economic and environmental discourses due to its 'win-win' veneer - reducing waste while saving resources, creating jobs, and creating value (Kirchherr et al., 2018). This approach has been suggested to have potentially significant positive sustainability impacts if applied to the fashion industry due to its emphasis on decreasing waste, slowing production, and keeping material in a closed loop (EMF, 2017; Kirchherr et al., 2018; Jia et al., 2020; de Aguiar et al., 2021)

However, the issue that faces many stakeholders regarding improving the sustainability of the industry is how to coordinate, integrate and effectuate change along these complex value chains. Indeed, the splintering of the supply chain has resulted in a supply 'network' which necessitates a new way of governing these complicated systems (Hoekman, 2014). Regulation of any kind in the fashion industry is thus made complex by the highly nuanced and international nature of the industry that evades the jurisdiction of territorially defined nation-states.

Voluntary sustainability standards (VSS) have become a prominent form of sustainability approach in the fashion industry (Ikram et al., 2021), and are often the frontrunners of sustainability initiatives in this sector (Li et al., 2014). Circularity is also becoming an increasingly prominent focal point in VSS across the sector, as identified by Payne & Mellick (2019) in their analysis of the current VSS systems in the fashion industry. Thus, the extent to which VSS systems have been able to enact meaningful change towards a more sustainable fashion industry – and in particular, a more circular one – and where there remain untapped opportunities for further development and improvement of VSS systems, makes an important point of research.

Elucidating the effectiveness of achieving sustainability outcomes through third-party standards is important not only for the fashion industry but for all sectors of industry and development. VSS has been a part of global sustainability and development discussions for decades (Schöggl et al., 2020). However, this connection between VSS and development has been highlighted anew since the establishment of the Sustainable Development Goals (SGDs) and the 2030 Agenda for Sustainable Development in 2015 (Schöggl et al., 2020). In addition, the CE has emerged as an important topic within sustainable development literature (Schöggl et al., 2020), as well as more applied approaches to sustainability initiatives in political and business spaces (Ekins et al., 2019). Indeed, sustainable development is a core theme in development literature, and the importance of CE's role within advancing these objectives, is only increasing as social, environmental and economic sustainability becomes an increasingly topical and critical issue.

1.2 Research Question

To date, much literature on how the CE could provide a solution to sustainability issues focuses on developing the CE model conceptually, while less attention has been paid to the ways in which we are to implement it (Ekins et al., 2019); and even less literature has addressed the ways in which current sustainability approaches could be leveraged to support the transition to a more circular fashion system. This is an issue as efforts to promote circularity could be greatly expedited and made more efficient and effective from building off pre-established sustainability interventions.

The goal of this study is to provide an analysis exploring the overlap and any gaps between the understanding of CE principles for the fashion sector, and existing fashion standards or certification programs focused on sustainability initiatives. The leading question of this inquiry is thus: To what extent do current voluntary sustainability standards align with the principles of the circular economy, and where is there opportunity for standards to improve the circularity of the fashion industry? This paper accordingly seeks to identify where there is opportunity for standards to improve the circularity of the fashion industry, and in order to do so undertakes an evaluation of initial approaches to implementing

circularity through VSS. As the objective is to see how effectively circularity is currently manifested in VSS systems, three VSS systems were selected to be analyzed: Textile Exchange, Global Organic Textile Standard (GOTS), and Cradle to Cradle. These standards were chosen as they are the most prominent VSS in the fashion sector; represent the various types of standards that exist in fashion; and have been identified as the standards which have made the most prominent steps towards implementing circularity. The conclusions reached by this study will highlight what needs to be considered when developing standards to promote a circular economy in the fashion industry, how we understand progress towards this goal, and further areas for research.

The approach this study takes to answering this question is as follows: Firstly, Section 2.0 provides more detail on the methodology used to undertake the analysis. Section 3.0 provides background information in the form of a literature review to bring together various literatures and provide the context necessary for the rest of the analysis. Section 4.0 develops the framework to be employed for the analysis, drawing its framing from the literature. In Section 5.0, a discussion of the analyzed VSS systems is presented, using the developed framework to determine how CE principles fit within these systems by identifying possible opportunities and key gaps in understanding for improving the circularity of the fashion industry, drawing from the literature on VSS systems and circularity. Several interviews with experts in this field will be conducted to verify and build upon the findings of this study; the results of this will be presented in Section 6.0. Section 7.0 will then conclude with a summary of the findings regarding how VSS can be used to promote circularity, as determined by the extent to which the selected standards promote circular objectives (although perhaps not explicitly tied to the CE), and the extent to which VSS more generally align with the principles and demands of the CE.

2.0 Methods

While there are evidently many synergies between the approaches and aims of VSS systems and the goals of the CE, little work has been done to draw out these synergies and elucidate the potential VSS avenues have for promoting circularity. This paper will seek to fill this gap in the literature through an

applied analysis to determine the alignment between VSS systems and the principles of the CE, and explore opportunities for improving the circularity of the fashion industry.

In order to establish the context needed to approach the posed research question, three streams of literature need to be integrated which has not yet been done in the literature: literature on the CE, in order to identify its core principles; literature on the role of sustainability standards in fashion; and literature on key approaches to integrating the CE into fashion. The objective of this literature review and synthesis is to set up and contextualize a discussion regarding the potential for VSS approaches to contribute towards greater circularity in the fashion industry.

This literature review is complemented by an applied review of existing VSS standards to explore the opportunities and gaps regarding their alignment with the principles of the CE. Although many exist, there are three overarching standards systems used in the textile industry: the Textile Exchange, Cradle to Cradle, and Global Organic Textile Standard. Founded as Organic Exchange in 2002, Textile Exchange is a global non-profit that works with sectors throughout the fashion and textile supply chain after expanding their focus from organic cotton in 2010 to include a greater diversity of fibers and materials. The Global Organic Textile Standard (GOTS) was developed in 2006 in order to unify various existing standards and define internationally-recognized requirements that ensure the organic status of textiles. Cradle to Cradle certification is a multi-attribute standard system which provides a means to demonstrate efforts in developing circular materials and finished products throughout a number of sustainability dimensions. Each of these standards systems function as an international body that develops, manages and promotes industry standards as well as provides resources for brands and retailers to manage their production.

The potential of these standards to support and promote circularity in the garment industry is analyzed through an evaluation of their alignment with the principles of the CE using a framework informed by the findings of the literature review. This evaluation framework consists of various points of intervention along the product lifecycle that the present literature suggests would be needed to implement a CE, along

with guiding questions to determine the extent to which the VSS systems align with and satisfy the requirements of a CE. The results of this evaluation are analyzed in order to identify possible opportunities, points of synthesis, possible challenges, and key gaps in understanding for improving the circularity of the fashion industry through the analyzed VSS systems in the fashion sector.

To further validate the outcomes of this analysis, the conclusions reached in the section above were discussed with six experts in the field of sustainability in the fashion industry to garner their professional expertise on this topic through 1-hour, semi-structured one-on-one interviews. This process was approved by the University of Ottawa Research Ethics Board. The purpose of these interviews is to provide nuance and expert insights on the topics discussed in this study, to verify and build on the findings of the research presented.

To conclude, this study summarizes the key findings of this report and pose questions for future research that could help inform CE standard development. The conclusion also addresses the contributions of this study to the broader body of sustainable development research. While the context explored is unique to the textile industry, the broader discussions and methods of this present study can be applied to other industries and sustainability issues in order to achieve positive development outcomes due to the prevalent use of certifications and standards in development work to ensure social, environmental and economic sustainability

3.0 Literature Review

3.1 Traditional Approaches to Sustainability in Fashion

Over the past few decades, transnational standards initiatives formed by stakeholders from business and civil society have come to play the role of coordinating mechanism regarding the promotion and implementation of sustainability in many different sectors, including – and fairly significantly – in fashion. These modes of governance most often function under voluntary self-selection, range in focus from process to product to safety standards, and vary in terms of issue areas, processes, and objectives

(Ikram, 2021). Known as voluntary sustainability standards (VSS), these mechanisms have been developed to organize key industry players and other stakeholders behind the transition to a green economy. The United Nations Forum on Sustainability Standards (UNFSS) defines VSS as 'standards specifying requirements that producers, traders, manufacturers, retailers or service providers may be asked to meet, relating to a wide range of sustainability metrics, including respect for basic human rights, worker health and safety, the environmental impacts of production, community relations, land use planning and others' (pg. 3, 2013).

According to Textile Standards & Legislation, a leading media platform for the global textile and apparel industries, there are currently 77 voluntary standards, guidelines or process frameworks in operation in the fashion industry (Textile Standards, 2021) that aim to improve industry practices in the absence of more robust legislation. Indeed, the popularization of standards and certifications as a sustainability approach in the fashion industry can be attributed to a number of factors. Firstly, VSS are unique due to their intimate connection with brands, which have the most direct relative authority and power over global supply chains and markets, making this an effective means to implementing change. In addition, the nature of these standards requires that all stages of production must meet certification requirements for true integrity and assurance of compliance, thus directly impacting all involved clothing manufacturers and fibre producers, as well as businesses involved in the collection, sorting, processing, and recycling of garments, through which significant positive environmental outcomes can be achieved. Secondly, standards have multiple benefits for organizations wanting to advance their sustainability performance, such as cost reduction, competitive advantage, customer complaints reduction, productivity, and customer satisfaction. Additionally, VSS systems has been seen as a way to circumvent the lag of solution implementation that occurs behind newly established processes and technological capabilities as it draws on brands with preexisting resources and systems in place, and thus can be seen as an effective tool in such business transitions (Geissdoerfer, 2017). Lastly, the integration into global markets through VSS can help to remove barriers to international trade for sustainable producers (GOTS, 2021).

The strengths and weaknesses of using standards as a sustainable development approach is well documented in the literature. An overview of the connection between standards and positive sustainability and development outcomes is demonstrated in a paper by Ikram et al. (2021). The authors argue in their paper that standards are integral to the coordination and implementation of sustainability initiatives, as well as the promotion and expansion of such approaches as they "provide relevant mechanisms for codifying and transforming knowledge into organizational knowledge" (pg. 331, 2021). In the context of sustainable development, the authors hold that standards are not only useful but essential tools for government, industry and consumers in achieving objectives.

Indeed, VSS have become very popular in all sorts of industries and issue areas, and are being used to implement change throughout global economies. However, Derkx (2013) cautions of this rapid expansion that these systems are largely unconstrained and uncoordinated, which can result in the depletion of efficiency as a duplication of efforts occurs when many standards attempt to address overlapping sustainability issues and compete for membership within the same sector. Jia et al. (2020) suggests that the solution to this issue is not to abolish such systems but rather to coordinate these measures as a means to stimulate rather than impede organizational innovation. Likewise, Payne and Mellick (2022) suggest that the proliferation of such multi-stakeholder initiatives necessitates a 'metagovernance' system to regulate and coordinate them. Thus, what is needed is not *more* or *less* VSS systems per se, but rather a coordinated body that aligns, synergizes, and compounds the efforts being made for mutual benefit.

While the concerns around the sufficiency of VSS approaches are valid, it is important to acknowledge that VSS – or any one sustainability approach – will be insufficient for reaching any major environmental objective and needs to be paired with a multitude of other initiatives and changes on all levels of society in order to reach the amount of change required (Ikram et al., 2021). Local governments, international agencies, businesses, and stakeholders all have a role to play to advance global goals for more sustainable business practices (Ikram et al., 2021). VSS can be understood as the frontrunners in

implementing sustainability regulation, breaking ground and providing a foundation for other forms of initiatives and legislation (Li et al., 2014).

3.2 The Promise of the Circular Economy

Often presented as an alternative to our current take-make-waste linear system of production, the CE model has in recent years become a hot topic in discourse regarding issues of sustainability, specifically relating to production, energy, and waste (Kirchherr et al., 2018). This idea has come about as a reaction to the confrontation of our planetary limitations regarding resource extraction and pollution, and builds on concepts such as industrial ecology, material footprint analysis, and biomimicry (Raufflet et al., 2019). Boulding's paper from 1966, *The Economics of the Coming Spaceship Earth* has been identified as a seminal work for the circular economy, as it provided a philosophical and practical basis for the concept to develop (Ekins et al., 2019). Ekins et al. (2019) also point to the particular ways in which the concept of industrial ecology seeded what would later take form as the circular economy. The concepts of industrial ecology were developed throughout the 1970s and began to incorporate 'loop' thinking; however, it was not until the 1980s when this became central to this discipline. This emergence is notably seen in a paper by Stahel in 1982 where he identified a "spiral loop system" that employs reuse, repair, reconditioning, and recycling. The term 'circular economy' was fully described in economic terms by Pearce and Turner (1990); however, they neglect to provide a definition in particular terms (Ekins et al., 2019). The lack of definition was overcome with the establishment of the Ellen MacArthur foundation in 2010 and the subsequent release of their foundational papers in 2013 where the circular economy is defined as "an industrial system that is restorative or regenerative by intention and design. … It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models" (EMF, 2013). In 2015, the European Commission released its Circular Economy Package, signifying that the concept had arrived in the mainstream of business and politics (Ekins et al., 2019). Since then, numerous iterations of circular

economy policy have been developed, and it has been endorsed by organizations such as the G7, G20, European Commission (EC), Organization for Economic Cooperation and Development (OECD), United Nations Environment Programme (UNEP), World Business Council for Sustainable Development (WBCSD) and World Economic Forum (WEF) (McCarney, 2021). The CE is often a prominent point of discussions regarding the economics of sustainability in many sectors worldwide.

Most of the conceptual CE work over the last decade has been done by organizations in business and political spaces; while there is a notable dearth in academic contributions (Ekins et al., 2019). The greatest attempt at developing a definition for the CE in the academic sphere comes from Kirchherr et al. (2017), who developed a meta-definition by synthesizing the existing 114 definitions of the circular economy at the time of their publication into a single definition: "circular economy describes an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations" (224-225). Thus, the conceptual ideal of the CE is an economic system in which growth and prosperity is uncoupled from the extraction of resources from the earth and the creation of waste, securing wellbeing and wealth for, and despite, an increasing global population. Economies are made resilient and prosperous, while emissions, waste and pollution are concurrently reduced and ultimately eliminated.

As we increasingly come up against planetary limitations, global governments and businesses alike are turning towards the CE as a solution to circumvent these challenges. The implementation of a CE in the fashion industry could result in major positive impacts for people, profit and planet due to the scale and wealth – as well as the current unsustainability – of the industry. Currently, most textiles end up in the landfill, with less than 1% being recycled (Shirvanimoghaddam et al., 2020). Most of this recycling

consists of reuptake into other industries to be used in lower-value applications, from which value is currently difficult to recapture and therefore likely constitutes the material's final use (Watson, 2016). Even though some countries have high collection rates for reuse and recycling, much of this collected clothing is exported to countries with little to no collection infrastructure of their own, ultimately marginally increasing clothing utilization but not providing a solution to the waste problem of fast fashion (Watson, 2016). According to EMF "more than USD 500 billion of value is lost every year due to clothing underutilization and lack of recycling" (pg.3, 2017), with material disposal alone representing a value loss of more than USD 100 billion each year (Shirvanimoghaddam et al., 2020).

As the CE is an industrial system shaped by the use and reuse of resources as efficiently as possible through intention and design, there are a variety of mechanisms by which products are kept in the loop. The preferential order of such processes is outlined by the waste hierarchy, which aims to reduce environmental impacts by prioritizing prevention, reuse, recycling, and recovery over landfill (Ewijk & Stegemann, 2016). In this way, the waste hierarchy is a conceptual tool that supports the CE through identifying the greatest efficiencies, as the core of the CE is recovering value from products through a closed-loop via the narrowest loop possible (Jia et al., 2020). In addition, a CE necessitates new strategies regarding value extension such as sustainable design strategies, zero-waste design, product-life extension, resource recovery, repair and remanufacture services (Koszewska, 2018). As such, the CE develops a relationship between environmental protection and economic development (Jia et al., 2020). The CE is not only focused on decreasing landfill material flows, but seeks to establish an industrial metabolism that is self-sustaining and allows for resources to be kept in use infinitely (Jia et al., 2020).

Hence, it has been argued that moving to a circular model presents an opportunity to better products and services, create a resilient and thriving fashion industry, and pursue environmental regeneration, all the while ensuring that growth is evenly distributed and inclusive (EMF, 2021). However, implementing circularity is not without its own challenges. Circularity in any industry, but for fashion in particular, necessitates collaboration between many different stakeholders and requires

significant investment and innovation (Kirchherr et al., 2018). It will demand greater transparency and traceability, along with significant shifts in the way we treat, value, and understand clothing, such as improving the durability and longevity of products, increasing the use of service-as-a-product models, and ensuring full material reuse (Kirchherr et al., 2018). Kirchherr et al. (2018) identify four requirements that must occur in order to achieve a circular economy: novel innovation, novel market activity, novel policy, and novel consumer culture. This captures the extent to which a CE deviates from our current systems and structures, and the coordination it necessitates to bring to reality.

In addition, the integration of CE values and ethics into sustainability approaches could have significant positive development outcomes as CE adopts a broader, more holistic perspective on sustainability and ecological impact, which can aid in elucidating negative externalities that result from more narrow sustainability definitions and methods, and thus lead to their resolution (Jia et al., 2020). CE approaches are important new aspects of the broader sustainable development discourse, as they are intimately connected with the broader sustainability agenda (Schöggl et al., 2020). In fact, much of the current enthusiasm regarding the CE can be pointed back to its presumed benefits for sustainable development (Kirchherr et al., 2018). The development literature could thus benefit from greater considerations of how the CE would benefit development practice due to the potential extent of its impact.

3.3 CE and Sustainability

While VSS systems exist as an established mechanism to advance sustainability, it is important for this paper to outline the ways in which sustainability aligns with, and differs from, circularity. Indeed, while there are many existing activities focused on sustainability or partial aspects of circularity – and both concepts have environmental objectives – they are not synonymous and their relationship is somewhat undefined, making conflation of one with the other an all-too-common conundrum (Geissdoerfer et al., 2017). It is important to this study to make this relationship clear, to be able to define where there is overlap and where there are gaps between these concepts which could provide

opportunities and challenges for CE implementation through VSS. This is essential to be able to answer the proposed research question as the concept of sustainability has shaped the current VSS systems and their approaches, and also provides additional context regarding how circularity has come to be.

While sustainability itself has many definitions and understandings, the most prominent definition is that of the Brundtland Report (1987): "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (pg. 8). What is also integral to the concept of sustainability are its three pillars, also referred to as the 'triple bottom line' as coined by Elkington (1997): social, economic, and environmental. These pillars are themselves interdependent, being systemically intertwined and mutually affective (Geissdoerfer et al., 2017). It is thus both inter- and intragenerational in scope, and goes beyond simply providing common objectives but also serves as a foundation for discussions around what is to be sustained, how, and for whom (Geissdoerfer et al., 2017). Indeed, sustainability today has been argued to be a "political concept as persistent as are democracy, justice and liberty" (O'Riordan, 1993, in Geissdoerfer et al., 2017).

Both concepts of CE and sustainability are not geographically particular and exist at all levels from micro to macro; revolve around themes of innovation, industrial production, and consumption; emphasize environmental and social health alongside economic progress, and apply a systems-change approach at their very core (Geissdoerfer et al., 2017). They both hold central cooperation, coordination, and interdisciplinary action, and highlight the necessity of these in achieving objectives that are ultimately better for people, profit, and planet (Geissdoerfer et al., 2017).

However, these concepts vary significantly. Sustainability has been found to prioritize its environmental and social pillars, while CE often emphasizes the environmental and economic ones (Murray et al., 2017). Indeed, in their extensive review of the CE literature, Geissdoerfer et al. (2017) found that the social dimension was generally absent from CE considerations, and narrowly covered at best. A quantitative analysis done by Schöggl et al. (2020) showed that only a limited number of environmental aspects are centrally addressed in CE literature, while other environmental and social

aspects form the periphery of literature on CE. This can be explained by the fact that the social benefits of the CE are not generally inherent as the concept developed from more technical discussions around material retention and reprocessing (Schöggl et al., 2020).

Murray et al. noted that CE "is virtually silent on the social dimension" (2017, p. 376), and added that the mechanisms of how CE leads to more social equality and equal opportunities for everyone remains largely unclear. It can be argued that social dimensions have gained attention within the CE discourse in recent years, predominantly in relation to the area in which CE is embedded, namely in production and consumption systems; however, Schöggl et al., 2020 found that CE research and sustainable development tend to form a subset relationship, meaning that social topics remain underrepresented or are even neglected despite this being a clear point of criticism of late. This is a critical issue as the transition to CE needs to involve all of society in order to achieve the needed wide-reaching changes in production and consumption patterns (Schöggl et al., 2020).

Sustainability is a much broader concept than circularity. The CE concept falls within the wider umbrella of sustainability, which includes a whole multitude of other philosophies, approaches, and values regarding improving our systems to better protect life on our planet (Geissdoerfer et al., 2017). While CE initiatives can, and often do, attempt to implement sustainability beyond simply inputs and outputs, the concept itself is not generally understood to be grounded on any principles beyond these (Geissdoerfer et al., 2017). In terms of pragmatic relationship, Geissdoerfer et al. (2017) summarize how scholars conceptualize the relationship of these two concepts in three categories: the relationship between CE and sustainability can be either conditional (CE is a condition for sustainability), beneficial (CE benefits sustainability), or it may take the form of a trade-off (CE comes with costs and benefits regarding sustainability) (Schoggl et al., 2020). The first group see circularity as a crucial element of achieving sustainability, if not a precondition (Rashid et al., 2013) and absolute necessity, and some have even proven CE's positive contribution towards the triple bottom line (Bassi et al., 2021). Others (i.e., Payme & Mellick, 2021) understand circularity to be beneficial, even necessary, but insufficient in and of itself.

Bocken et al. (2014) conceptualize CE as one 'archetype' of sustainability approach among several options. Ultimately, it is crucial that the benefits of these concepts not be taken for granted at face value and are held to the highest possible standard of sustainability.

3.4 Points of intervention: Synergies between VSS and CE

Give the prominence of VSS as a sustainability governance mechanism in the fashion industry, as well as the emerging focus of CE as a core component of advancing sustainability objectives in the fashion sector, it is important to understand how or where existing VSS approaches fit within the broader suite of policy tools proposed to implement a CE. Implementing a CE requires a concerted, global approach; indeed, the Ellen MacArthur Foundation (EMF) emphasizes the need for "a coordinating vehicle that guarantees alignment and the pace of delivery necessary" (pg. 3, 2020). In this way, VSS could provide a significant opportunity for the advancement of the circular agenda due to its unique positionality to play such a role. EMF also points to the value of standards in their flagship report on circularity in the fashion industry (2017). In particular, they highlight the ways that standards could help improve safe material use, stimulate demand for recycled materials, align key stakeholders and secure their support, and encourage pre-competitive collaboration. They also highlight that such transnational bodies are necessary to ensure that progress is made towards more sustainable production. As such, VSS can be used at various points of intervention along the product lifecycle to promote greater circularity, in particular design, end-of-life, and business model innovation through their connection to brands and businesses. Hence, this section will explore these core points of intervention in the literature, thereby establishing the merits of why VSS could be an important tool in promoting circularity.

Circularity has become a recent trend in fashion-focused VSS as a solution to issues of production and pollution (Payne & Mellick, 2022). These efforts are to be understood as distinct from, as well as complementary to, broader efforts to improve the sustainability of the textiles system. The CE approach places specific emphasis on innovation towards an alternative system, which presents an opportunity to deliver substantially better economic, societal, and environmental outcomes. Kirchherr et

al. (2017) write that “CE must be understood as a fundamental systemic [innovation] instead of a bit of twisting of the status quo” (p.229), requiring essential changes to make it possible. Indeed, the transformations that need to occur for CE to function are so fundamental that Jia et al. (2020) use the term ‘CE paradigm’ in order to emphasize the drastic change in conditions required to achieve a CE, from our economic systems to the ways that we understand value, ownership, and production.

Circularity must be enacted at the design stage (Tyler & Han, 2019), and as VSS are an effective way to influence design, they thus hold great potential for being a valuable tool in promoting and enforcing sustainability objectives. For example, the process of eliminating the use of harmful substances begins at the design phase of production through the development of safe materials and processing systems (Tyler & Han, 2019). Products can also be designed in such a way that is conducive to large-scale recycling and do not require toxic chemicals in their production, as well as reduce the number of microfibers shed (Tyler & Han, 2019). Such examples reveal the importance of investigating deep into supply chains to determine factors such as what constitutes ‘safe materials’ as well the role of renewable sources in meeting processing demand in order to generate effective and relevant sustainability approaches. VSS can provide the incentive, guidance, and means to accomplish this, and thus make meaningful changes towards improving garment design and production.

Clothes can also be designed with a longer lifespan in mind, made for durability and easy recycling of components. Indeed, Tyler & Han (2019) claim that CE only is an effective system if products are created with recycling processes in mind. Andrews (2015) places designers at the forefront of the cultural ‘closed loop’ paradigm shift and argues that they have the potential to influence business and consumer behavior. Indeed, clothes are being seen as increasingly disposable, which is contrary to the goals and values of a circular economy. Making durability and longevity more attractive in products could present one means of achieving this. In fact, EMF identifies that “increasing the average number of times clothes are worn is the most direct lever to capture value and design out waste and pollution in the textiles

system" (pg. 24, 2017). VSS have the potential to affect these changes due to the brand-oriented nature of their intervention and focus on product development.

Circularity cannot only be affected at the design stage, however – as Savaskan et al. (2004) suggest, a comprehensive review of the entire manufacturing supply chain is an essential step towards a more sustainable production system based on resource reuse and remanufacturing. This is particularly significant in the fashion industry as textile waste is generated throughout the production process in the form of yarn, fabric residues, fibers, and often the entire product itself (Hugo et al., 2021). There are also high levels of pre-consumption waste at the retail level, such as defective or damaged products, or overstock. The biggest source of textile waste occurs post-consumption, in the form of unwanted clothes or fabrics that consumers no longer want after purchasing them, whether they be worn, damaged, outdated, or simply out of fashion (Kim et al., 2021). However, as waste is considered a resource in CE regimes, within a CE system, textile waste and by-products that cannot be designed out can be redistributed and returned to their supply chain at different stages through the CE model (EMF, 2013). Jia et al. (2020) introduce the concept of harmonized standards, which could be used to ensure products are designed and produced with an eye to end-of-life, and stimulate demand for recycled materials to create the impetus needed for innovation.

While most VSS focus on production, circularity also requires a focus on end-of-life and extended producer responsibility (EPR). For a CE to thrive, business models need to change to reflect the different priorities and value systems of a CE. Indeed, Boström & Micheletti (2016) suggest that modifying business-as-usual is a more difficult and important task in promoting greater sustainability in garment lifecycles than overcoming technological barriers. Daddi et al. (2019) discuss tensions in corporate sustainability that result from competition-based economic models and suggest that industrial symbiosis initiatives could be the solution whereby corporations are able to mutually benefit through the sharing of energy and by-products while reducing waste. Similarly, Pal (2014) also asserts that the CE cannot be approached by individual corporations, but its success necessitates collaboration. Standards are thus a

valuable tool for the promotion of circularity as they can play a role in both providing a facilitating mechanism for these connections and collaborations, as well as setting goals in working towards these ends.

4.0 Review of Existing VSS Standards

4.1 Framework

According to the definition developed by Kirchherr et al. (2017), the circular economy aims to implement sustainable development through three key objectives: creating environmental quality, economic prosperity and social equity, all to the benefit of current and future generations. These three dimensions align with the three pillars of sustainability: environmental, economic, and social.

The academic literature on CE has remained mostly in the theoretical space, and as such, there is a lack of pragmatic models developed to connect this vision to tangible objectives (Ekins et al., 2019). The Ellen MacArthur Foundation's (2017) report, *A New Textiles Economy: Redesigning fashion's future*, has developed a practical model wherein they lay out by what means the fashion industry can achieve the broader objectives of the CE. This model makes a valuable point of reference for this present study due to its relevancy to policy and business, as well as EMF's thought leadership in the circular fashion space (for examples of references in scholarly literature, see: Todeschini et al., 2017; Jia et al., 2020; and Mishra et al., 2021) . The EMF (2017) model identifies three core guiding principles by which the CE can achieve its overarching objectives as it relates to the fashion industry: the designing out of waste, the infinite use and reuse of material, and the regeneration of natural systems. This present study will employ these principles of the CE as defined by the EMF (2017) to inform the development of this study's evaluation framework, drawing from and situating this within the broader CE literature as reviewed above.

The CE principles outlined by EMF (2017) align with three respective points of intervention along the supply chain: the design phase, product end-of-life, and business model, respectively. However, as identified in the review of the literature, while social considerations are often lacking from the original

conceptualizations of the CE, they are found in more contemporary conceptualizations (including Kirchherr er al.'s (2017) definition), and are integral to sustainability as well as to the success and longevity of any circular initiative. Thus, social impact will also be included as a dimension of the evaluation scheme.

The three principles will be used to guide the evaluation of the alignment of the major standards in the fashion industry, framed by their respective intervention points, supported by a set of guiding questions. The development of these questions was informed by the literature reviewed and are intended to determine the extent to which a standard's initiative aligns with and satisfies the values and objectives of the CE by posing specific criteria for each sub-category, effectively connecting the model outlined by EMF (2017) to the broader body of CE literature.

Design is noted as a key intervention area regarding the implementation of circularity by Tyler & Han's (2019) and Andrews (2015), and so the first guiding question in this category seeks to identify the extent to which products are designed to enhance circularity. The second seeks to identify the extent to which waste is reduced in production, as waste reduction has been identified in the literature by Payne & Mellick (2022) and Pires & Martinho (2019) as a key component of circularity.

Regarding business models, two themes emerge in the literature: protecting the natural environment (Sandin & Peters, 2018) and shifting our linear production system by developing new ways of relating to our products (for example, see: Drew et al., 2018; Woggsborg & Schröder, 2019). EMF's (2017) model emphasizes the importance of regenerating natural systems as a priority in achieving a CE, which is measured by the first question in this category. To the latter point, the second question addresses the extent to which a standard's approach challenges our traditional notions of value.

End of Life category – and in particular, question 5 – aims to identify the extent to which the standards address value retention pathways – the other half of the circle – as this is central to the essence

of circularity (as discussed in Kirchherr et al., 2017 and Ekins et al., 2019). Oelze (2017) emphasizes the need for collaboration in achieving a truly circular society, which question 6 seeks to measure.

For social impact, an question regarding the improvement of livelihoods within a CE is included due to work by Christensen (2017). Lastly, question 8 speaks to broader social sustainability in the sense of fostering widespread and systemic change, as addressed by Pal (2014) and Cote & Nightingale (2012).

The key questions used to carry out the evaluation are outlined in the table below:

Point of Intervention	**Guiding Questions**
Design	1. To what extent does this standard facilitate change in a way that products are designed in a way that enhances circularity/circular potential?
	2. To what extent does this standard facilitate change in a way that reduces waste and byproduct in production?
Business Model	3. To what extent does this standard facilitate change in a way that regenerates natural systems?
	4. To what extent does this standard facilitate change in a way that changes the way value is understood?
End of Life	5. To what extent does this standard facilitate change in a way that reduces disposal, promotes reuse/recycling/repair?
	6. To what extent does this standard facilitate change in a way that encourages collaboration and exchange of materials to create industrial symbiosis?
Social Impact	7. To what extent does this standard facilitate change in a way that improves the livelihoods of stakeholders?
	8. To what extent does this standard facilitate change in a way that encourages social sustainability?

Table 1: Evaluation Rubric

4.2 Evaluation Approach

The aim of this framework is to identify possible opportunities, points of synthesis, challenges, and key gaps in understanding for improving the circularity of the fashion industry through a survey of the values, approaches and functions within a selection of existing VSS systems in the fashion sector.

For this analysis, the most recent standard document versions of each VSS system were analyzed using a thematic analysis guided by the framework above. At the time of writing, this is Version 4 of

Cradle to Cradle's Product Standard (2021), and for GOTS, Version 6 (2020). For Textile Exchange, the Global Recycling Standard (GRS) Version 4 (2017), the Recycled Claim Standard (RCS) Version 2 (2020), Organic Content Standard (OCS) Version 3(2020), and the Content Claim Standard (CCS) Version 3.1 (2021) were the most updated versions. While Textile Exchange has several standards under its jurisdiction, only these four standards are analyzed in this study as they relate most closely to the CE vision, with the others focused primarily on animal welfare. These standards were coded and then evaluated using the evaluation framework above to determine the extent to which they satisfied the criteria and with how much clarity and concreteness.

4.3 Selected VSS Systems

Three VSS systems were chosen for this study. While many standards exist for fashion products, GOTS, Textile Exchange, and Cradle to Cradle are the most prominent in terms of usage and maturity. In addition, these three VSS systems capture the variety of standards that exist in fashion, and their varying priorities and objectives. The table below summarizes the core information about each of the selected VSS systems.

Standard Body	**Purpose**	**Scope**	**Standards**
Textile Exchange	Drive positive impact on climate change	Textile products	Content Claim Standard (CCS), the Recycled Claim Standard (RCS), the Organic Content Standard (OCS), the Responsible Down Standard (RDS), and the Responsible Wool Standard (RWS) www.textileexchange.org
GOTS	Ensure the certified organic status of textiles	Textile products	Global Organic Trade Standard (GOTS) www.global-standard.org
Cradle to Cradle	Facilitate a global shift to a circular economy	Many product types, including textiles	Cradle to Cradle Certified Product Standard www.c2ccertified.org

Table 2: Selected VSS Systems Overview

Textile Exchange is a global non-profit whose vision is to drive positive impact on climate change across the fashion and textile industry by guiding brands, manufacturers, and farmers towards more purposeful production (Textile Exchange, 2022). Its mission is to help the industry to achieve a 45% reduction in the emissions that come from producing fibers and raw materials by 2030 (Textile Exchange, 2022). This focus on combating climate change within the mandate may be reflective of the values and understandings of sustainability at its time of origin. However, there are numerous aspects of this VSS system that promote circularity, such as creating a greater demand for recycled textiles, its detailed textile recycling resources, and tiered system for recycled content. Those that don't have such evident connections to circularity still have potential to be leveraged to further implement circular practices in the industry, namely its rigorous traceability system, regulation of outsourcing, prohibition of the destruction of deadstock, and promotion of greater durability of products. Textile Exchange believes that approachable, step-by-step instruction paired with collective action through third-party standards can change the system to make preferred materials and fibers an accessible default, mobilizing leaders through attainable strategies, proven solutions, and a driven community (Textile Exchange, 2022). As mentioned above, Textile Exchange has several standards under its jurisdiction: Content Claim Standard (CCS), the Recycled Claim Standard (RCS), the Global Recycling Standard (GRS) the Organic Content Standard (OCS), the Responsible Down Standard (RDS), and the Responsible Wool Standard (RWS). (The GRS, RCS, and CCS are most relevant for the intentions of this study). These standards are international, voluntary, full product standards that set requirements for third-party certification of many dimensions such as content, chain of custody, social and environmental practices, and chemical restrictions (Textile Exchange, 2022).

Global Organic Textile Standard (GOTS) is the worldwide leading textile processing standard for organic fibres, including ecological and social criteria, and is backed up by independent certification of the entire textile supply chain. Its mission is to provide a common standard for organic certification accepted in all major markets, giving brands and consumers the ability to make more informed and

sustainable choices (GOTS, 2020). The purpose of the GOTS standard is to ensure the certified organic status of textiles, from the harvesting of the raw fibre, through environmentally and socially responsible manufacturing up to labelling, providing credible assurance to the end consumer (GOTS, 2020). GOTS's focus is on the organic content of products, and so while not explicitly circularity-focused, it too includes many aspects that align with the principles of circularity, particularly when it comes to creating safe, high-quality materials, high transparency, regulation of subcontracting and prohibition of deadstock incineration. GOTS does not, however, emphasize design for end-of-life or promote the development of cycling pathways, nor does it explicitly promote greater product durability. However, organic production aligns with and supports better circularity, and does provide metrics for high quality organic materials which would lend themselves to better quality cycling, making it a useful point of research for this study. Organics is also one of the most well-developed textile standards sub-sectors, making it valuable to include in this study.

Cradle to Cradle Innovations Institute's mission since the non-profit's inception in 2005 is to accelerate innovation for the CE in production by enabling stakeholders across the global economy to create products that positively impact people and planet (Cradle to Cradle, 2021). Circularity is the *raison d'être* of this VSS system. The Institute's vision is for a global shift to a circular economy facilitated through partnerships and collaborative initiatives that equip businesses, governments and other stakeholders with the technical solutions and knowledge needed to change the way products are made (Cradle to Cradle, 2021). They provide a framework with designers, brands, retailers and manufacturers across the value chain to optimize materials and products according to evidence-based measures for material health, product circularity, renewable energy and climate, water and soil stewardship and social fairness (Cradle to Cradle, 2021), going beyond textile recycling to also emphasize other components of circularity such as reuse, remanufacturing, refurbishing, recycling, nutrient extraction/anaerobic digestion, composting, and biodegradation.

All of these standards are dynamic, meaning they are in constant progress towards the development of better textile standards systems and make regular, scheduled updates to their standards. In this process of continuous improvement, these standards organizations collaborate with international stakeholders, including the textile and apparel industry, chemical suppliers, organic farming and environmental organizations, workers' rights groups and labour unions, among others . All systems use independent certification bodies to carry out certification audits and procedures. These certification bodies regularly audit all parties involved in the manufacturing of textiles through on-site inspections, documentation checks and discussions with workers in order to verify that all environmental and social requirements continue to be met. These certification bodies are themselves assessed by an accreditation body against requirements outlined by each standards organization. There are high levels of traceability throughout the supply chain arranged by transaction certificates (TCs) and rigorous management practices. All standards emphasize that they are not intended to replace or override any national legal or regulatory requirements, and defer to whichever regulation standard is stricter.

3.4 Terminology

To further explore the different ideologies and approaches of each of these VSS systems, this study provides a brief analysis of the terminology used in each standard to frame the rest of the evaluation and subsequent discussion. Language can make an interesting and important point of analysis when evaluating any sort of standard, as the terminology used can affect the interpretation and subsequent implementation of the standard, as well as their integration with other regulatory systems and structures. As such, this section will compare and contrast the key terms of each standard and the definitions provided in their respective appendixes, and in addition, will highlight where there are consistencies and/or discrepancies between the various standards' definitions and usage of the terms in the standard body.

Firstly, it is important to note that the range of products covered by each standard varies (as can be seen in Table 2), and the language used by each standard reflects this. GOTS and Textile Exchange

cover all textile products, a large part of which is clothing, but the standards are not limited exclusively to garment manufacturing. Cradle to Cradle covers a vast array of products, including – but not limited to – textiles. As such, the language and terminology used in these standards reflects these differences in being more or less specific to textile manufacturing processes.

Turning now to the definitions and key terms, the definitions for pre- and post-consumer material are the most consistent terms throughout the standards. This is because they all pull from the same definitions for pre- and post-consumer material used in the ISO 14021:1999, section 7.8.1.1, subsection a.1 and a.2, respectively. However, each standard has its own way of referring to such materials: GOTS uses ‘waste’, Textile Exchange uses ‘material’ and Cradle to Cradle uses ‘cycled content’. These differences are reflective of each standard’s philosophies regarding such material, whereby Textile Exchange and Cradle to Cradle see this material as a resource to be used in recycling or other cycling systems, as opposed to GOTS who takes a waste-reduction approach to promoting sustainability. While these terms all refer to the same thing, they shape the way that they are viewed and managed. In addition, grounding terminology in the ISO or like internationally-recognized organizations is an effective way to ensure consensus between standards and other regulatory measures to ensure that meanings are clear and comprehensive, minimizing the risk of gaps. However, this is the only term that is explicitly so across all three standards.

The terminology which a standard employs can encapsulate its values and ideologies, and indicate its unique and distinct approach. Cradle to Cradle does this by centering their terminology around ‘cycling’, which is a term unique to their standard and reflects their circular focus. It employs ‘cycling’ to capture the wider array of sustainable material processing beyond mere recycling, consistent with the various streams and components that are necessary to make up a circular economy. Specifically, cycling pathways refer to the “specific method, system, or other means of processing a material at the end of its use phase” (Cradle to Cradle, 2021). Cradle to Cradle outlines two major streams of cycling in their standard: technical and biological. From the provided definitions, technical cycling refers to activities

through which a product's materials are reprocessed for a new product use cycle, whether that is via recycling, repair, refurbishment, or remanufacturing, and biological cycling occurs when materials are released into the environment and reprocessed via natural activities such as composting, biodegradation, nutrient extraction, or other biological pathways (Cradle to Cradle, 2021). In this way, for Cradle to Cradle, cycled content refers to the material that has been reclaimed, recycled, salvaged, or otherwise captured from a pre-consumer or post-use phase of a previous cycle (Cradle to Cradle, 2021). Indeed, Cradle to Cradle identifies more pathways to extend the life of materials beyond recycling and employs an umbrella term to capture them and their shared objective of circularity. Thus, the language differs significantly from the other standards to reflect their unique and holistic approach to sustainability through circularity.

Textile Exchange takes a more traditional approach by siloing the various streams of end-of-life material management and approaching them individually under distinct terms (Textile Exchange, 2022). Textile Exchange places an emphasis on recycling, having two standards – the Global Recycling Standard (2020) and the Recycled Claim Standard (2020) – dedicated to recycling. Regarding the definition of recycling specifically, the Textile Exchange and Cradle to Cradle definitions are not contrary. However, while the definition provided by Textile Exchange takes for granted what recycling entails, Cradle to Cradle provides a much more specific definition: "the process by which a material, after serving its intended function, is processed into a new material via mechanical or chemical transformation and then added to a new material formulation in a different context" (p. 88). In greater congruence, Textile Exchange and Cradle to Cradle both define Recycled Content as a measurement to mean the proportion, by mass, of Recycled Material in a product or packaging. GOTS does not provide a definition of recycling at all. However, all three standards also require that such material be pre-consumer or post-consumer materials in order to be considered Recycled Content. Textile Exchange also provides a definition for Reclaimed Material while Cradle to Cradle does not; although, this could be an intentional omission and Cradle to Cradle assumes that all material be reclaimed, making such a definition

redundant. Specificity is important in definitions as prominent and complex as recycling, especially if it implicates the ways in which a standard will interact with other systems such as legislation in order to achieve circularity.

Cradle to Cradle distinguishes between different types of products and materials to a greater extent than the other standards, with the purpose of providing additional information on the cycling needs and pathways of various products. As this standard is sensitive to the fact that products and materials cannot all follow the same cycling pathways, making these distinctions is important for proper preparation, handling, and execution of product cycling. Cradle to Cradle also ensures to make distinctions between various material types depending on their composition that indicates specific qualities about a material and its 'cyclability' and which pathway it is best suited for. GOTS creates a rudimentary form of this categorization by defining 'natural materials' and thus implying that everything else that does not meet this definition as 'unnatural materials'. GOTS also classifies different product types, but not by their composition as it relates to their cycling but rather their usage, such as 'topical products', 'invasive products', and 'textiles for babies'. Circularity requires high levels of traceability and categorization of materials, and hence having a system that categorizes materials by intended cycling pathway – if necessary, in addition to product intended usage – built into a standard's approach is highly important.

In Cradle to Cradle, products are further classified depending on the length of their use-phase time and material. Use-phase time is defined as the typical time of use of a product starting at the point the product is received by the user or customer, and ending at the time the product is cycled, excluding repair. There are two categories of product use-phases: short, being typically less than one year, and long, being typically greater than one year. These distinctions are important as products with different use-phase times will have different needs and demands in terms of cycling. Again, such detail is important to ensure that circular systems are implemented effectively through minimizing ambiguity.

Overall, the unique terminology employed by each standard is shaped by their particular values and ideologies, and in turn, shapes the ways in which it approaches the issues it seeks to address. Thus, language communicates a lot about a standard's overall sustainability approach through its framing. For example, taking an individual approach to end-of-life pathways, as in the Textile Exchange's standards, is advantageous as it allows for their particularities to be catered to; however, the ways in which these various streams can be used together is not made clear as it is in Cradle to Cradle. The language of circularity as used in Cradle to Cradle provides a greater sense of unifying goals and overall vision, which could improve the effectiveness standard as a whole. As such, these different terminologies inform the standards they support as they provide the framework and substance of which the standards are built, reflecting the unique approaches, values, and ideologies of the standards in the way they conceptualize, frame, and provide solutions to issues of sustainability.

5.0 Discussion

To answer the research question, this study now turns to a critical exploration of the strengths as well as the biggest challenges and areas of opportunity for circular VSS systems. The sections that follow are based in and follow the structure of the analysis framework identified above, moving through 'Design', 'Business Model', 'End of Life' and 'Social Impact', respectively, and using the guiding questions to inform the direction of the discussion. Ultimately, this section will determine the overlap, and any gaps, between the understanding of CE principles for the fashion sector and the selected existing VSS systems.

5.1 Design

The main point of intervention for all three standards is arguably the design phase, aligning with Tyler & Han's (2019) emphasis on the importance of design in circularity. It is in design that the decisions are made which will enable the fulfilment of a significant portion of the standards' requirements, especially as it relates to the product itself. Cradle to Cradle requires that products are

intentionally designed for their next use (Section 5.3), include a minimum percentage of recycled material content (Section 5.4), have identified cycling pathways and use materials that are compatible with these systems (Section 5.5). Similarly, the GOTS's main focus is regulating the organic content of materials, which must be determined at the design stage. While creating better products and reducing waste during production are necessary for a more circular fashion economy, if products are not designed to be cycled back into their respective systems at the end of the its life, circularity has not been achieved - the eventual end in the landfill has only been delayed. Cradle to Cradle goes beyond this to ensure products are designed for deconstruction and cycling pathways (Section 5.8). While the standard does not address it, Textile Exchange's emphasis on design provides a foundation to be further leveraged to promote design for deconstruction. GOTS and Cradle to Cradle standards also cover the product packaging design, requiring that the product packaging be waste-conscious and meet the same quality standards as the product itself (Section 2.4.12 and Section 9, respectively). GOTS even prohibits the use of single use virgin plastic hangers in the retail of GOTS products (Section 2.4.12). As mentioned above, circularity must be considered and implemented at the design stage due to the need to think ahead to end-of-life as well as in the reuse of collected materials, which VSS can effectively address.

The holistic, net-material perspective which the circular economy employs is one of the merits of the approach; however, it is crucial to look at the impacts at various stages of production when looking to optimize sustainability impacts. These considerations are particularly important to textiles due to their splintered and international supply chains, as well as their resource-intensive nature of production (Sandin & Peters, 2018). Environmental health beyond waste reduction is present as a priority throughout all three standards. Cradle to Cradle and GOTS have strict requirements regarding the chemicals, processes and materials used in production for those that threaten human health and the environment (Sections 6 and 7, and Section 2.3, respectively). This also increases the reuse value of these materials for future use and cycling. The Textile Exchange requires that organizations have an environmental management system and chemical management system in place to monitor and meet all requirements related to energy use,

water use, wastewater, emissions, waste (Section C, GRS) particularly as it relates to recycled material, thus reducing the environmental impact of production. However, the language used to outline the CE model by EMF (2017) does not merely emphasize that harms are reduced but rather asserts that, for a CE to be achieved, natural systems need to be *regenerated.* This language and objective is not present from the standards analyzed, and so including this emphasis would better align these standards with the principles of the CE. The standards thus prioritize the health of environmental systems and actively work to reduce damages caused by production.

While CE is increasing in popularity worldwide, most strategic thinking and policy development on the CE has been done by resource importing economies (McCarney 2021). This context has framed the development of the CE principles, models and values, resulting in a downstream focus on 'closing the loop' through reuse, repair, redistribution, refurbishment and remanufacture. This focus sometimes results in the neglect of more upstream issues and impacts. Indeed, most of the energy consumption, emissions, and water usage occurs at the treatment phases that occur after recycling (Myette, 2022), and hence impacts could continue despite material uptake if negative externalities are not offset. While all analyzed VSS systems did include considerations around environmental impact beyond source material, it is important to recognize that recycled materials often require significant energy and resources for their reuptake and processing, and so the net environmental benefits of recycling should not be taken for granted (Myette, 2022). Indeed, some estimates say that only approximately 15% of impacts are mitigated by using recycled materials in production – which does not even account for the resources used in recollection and reprocessing (Myette, 2022). As such, more emphasis should be placed on developing value retention and extension processes beyond material recycling, as well as implementing strategies to address impacts of reuptake. While diverting waste is crucial, the significant impacts of circular production must also be addressed if we are to move towards greater overall sustainability.

5.2 Business Model

Overproduction and overconsumption drive much of the current environmental crises we face today, especially in the context of fast fashion (Payne & Mellick, 2022). Payne and Mellick (2022) identify that these are areas that are significantly underemphasized in circular economy approaches, as well as in VSS systems more generally. They further assert that no approach can achieve true sustainability – or even be considered sustainable – without actively working towards reducing production and consumption. While all three standards include minimum percentages of recycled fibre content, thus increasing demand for circularly sourced materials in an attempt to close the loop, this may also have a potential 'rebound effect' (Sandin & Peters, 2018). Sandin and Peters (2018) warn that as supply increases, costs may reduce, thereby increasing consumption and virtually re-instilling the current system and having no positive impact. Indeed, if circular innovations focus on incremental efficiency gains but continue to neglect addressing the deeper issues of capitalist consumerism, the scale of production, raw material extraction, and pollution will continue to grow and damage the planet (Drew et al., 2018). While it could perhaps be implied that production rates would decrease under circular VSS given the other measures imposed, none of the analyzed VSS explicitly address production rates. As reducing production is a prominent component of circularity (Sandin & Peters, 2018), consumption habits merit more explicit attention within these systems.

Increasing brands' self-awareness regarding their structures, systems and priorities and integrating sustainability efforts more intentionally into business models and key performance indicators (KPIs) as through VSS systems can help increase the effectiveness of these initiatives. Putt del Pino et al. (2017) outline three things brands can do in order to address their role in creating a more sustainable business: (1) calculate their own projected growth and (re)consider their dependency on natural resources; (2) take a leadership role in changing the conversation on consumption with key stakeholders; and (3) transform their business into one that will succeed in a resource-constrained world. Extended producer responsibility (EPR) could also provide a solution by being required of standards in order to ensure that products are disposed of correctly, with the ultimate goal of reuptake of materials to make into new

products for a fully circular system. Cradle to Cradle does try to implicate EPR in requiring active reuptake and cycling of products (Section 8.9), and this has the potential to be taken further to promote more radical shifts in the ways that producers and consumers understand and treat their products. Thus, integrating new ways of looking at and conceptualizing products and their value can have radical implications for our environment as priorities shift both on the producer and consumer side. In addition, Woggsborg & Schröder (2019) advocate for the need to emphasize EPR schemes which places indicators and standards on corporations instead of suppliers. Thus, VSS should consider brands' role in increased demand and encourage business activities that reduce production and discourage excessive consumption.

The effectiveness of VSS approaches is necessarily influenced in part by the number of brands that become certified; thus, the effectiveness of systems can be understood as being determined by their rigorousness as well as accessibility – which are sometimes conflicting priorities. Drew et al. (2018) identified that a common barrier to brand adoption of VSS standards is a lack of data-backed evidence of impact as well as consumer demand. Meeting the standards required by VSS is often – and arguably should be – a challenge for most brands, requiring a significant investment of resources, time, and finances. Without a certain degree of surety that such changes will make a difference, and that consumers will be responsive to their changes, becoming certified can be seen as a high-risk endeavor. As such, VSS can play a key role in providing a source of this data, which can not only help their own initiatives but support other circularity projects. Data analysis and management is not, however, present in any of the present standards beyond collection for assessment and transparency purposes. Due to the demands of circularity for sophisticated data management, creating more requirements for data management and integrating data management best practices into standards could improve the integrity of the standards as well as encourage a broader movement towards circularity.

Since VSS systems create impact via requirements they place on brands, this emphasis and reliance on corporate control for implementing sustainability initiatives shapes the sustainability approaches of VSS systems. However, this can result in rather one-sided tactics and dysfunctional

retailer-supplier relationships (Christensen, 2017), disrupting the implementation and effectiveness of sustainability initiatives. Indeed, more corporate control does not inherently result in more sustainable supply chains; and can even result in conditions for even more precarious and harmful environments (Christensen, 2017). As such, sustainability measures must be implemented with regard to the suppliers' capacity to adapt to these changes and context (Cote & Nightingale, 2012). Audits and monitoring, while well-intentioned, may also create a culture of opportunism by suppliers because of their limited capacity to adhere to such standards (Christensen, 2017), their lack of involvement in determining such standards, and their perceived unfairness of the demands (Andersen, 2017). Implementing inspections does not inherently address the root causes of the issues (Tilly et al., 2013), and could download the responsibility of sustainability onto the capacities of the suppliers rather than treating it as a systemic issue (Christensen, 2017). In the way that it is laid out in the current standards, these nuances are not clear and could lead to uncooperative relationships. For example, in Section 3.1 of Cradle to Cradle's Product Standard, all methods of certification compliance assurance – such as controlling documents and performing internal self-audits – are expected to be completed by the suppliers. This is a consistent approach throughout the analyzed standards (Section 4 in GOTS; throughout CCS and GRS for Textile Exchange). Thus, while these actions can be necessary, without sufficient support from the brand, the burden of standards' requirements may be downloaded onto the suppliers, which could negatively impact sustainability outcomes.

The hierarchical nature of the industry creates challenges for sound collaboration and effective implementation of environmental sustainability initiatives (Christensen, 2017, Oelze, 2017). VSS systems operate in a top-down manner, whereby the standards set targets for brands; however, if this is not done carefully and collaboratively, this can result in rather a downloading of responsibility onto producers as the demands of brands get more rigorous (Christensen, 2017). Indeed, as Cote and Nightingale (2012) observe, "knowledge collides with power structures when we try to understand 'the right way of doing things'" (p. 483). Presently, power asymmetries exist between large buyers and a producer base that

present themselves in noncommittal relationships between buyers and suppliers (Drew et al., 2018). A more sustainable way of doing business is one where supply chain interdependency is achieved through more trustworthy partnerships (Sahan, 2018). In this way, circular business models could help create improved partnerships between buyers and suppliers due to the integration and collaboration between parts of the supply chain that they require. The foundation of this shift would be retailer-supplier relationships characterized by long-term commitment, trust and transparency (Oelze, 2017). VSS can facilitate this as they promote as well as rely upon investment, transparency, close partnership and collaboration between all parts of a supply chain. However, these requirements need to be implemented in such a way that does not burden the suppliers or take on a form of policing, which can negatively impact the effectiveness of such efforts.

An alternative management approach that could have positive results is supplier development, as under this model, workers themselves play a key role in promoting their own wellbeing as well as sustainability more broadly; yet this is an often-neglected consideration (Christensen, 2017). The supply chain must adopt this 'collaborative paradigm' (Oelze, 2017) through an epistemological shift from merely focusing on institutional arrangements to instead analyzing and transforming the relations and processes which uphold these systems (Cote & Nightingale, 2012). It is thus important that innovation take place bilaterally between producers and brands in order to provide local insight and considerations, especially regarding issues of sustainability. Such integration and collaboration with suppliers is not apparent in the analyzed standards, and should be made an explicit priority. Thus, combining top-down efforts to enhance transparency with bottom-up mechanisms that speak to local perspectives can provide a way forward (Martin, 2015). The closest that any of the VSS standards comes to achieving this is in Section 8.9 of Cradle to Cradle Product Standard that requires, for the Gold level to be achieved, that "[i]nput from stakeholders must be regularly obtained and used to shape the strategy for implementing the human rights policy, management systems, and related operations" (p.75). Hence, while VSS work in a

top-down fashion, an emphasis on fostering capacities and supporting initiatives along the production chain could have positive sustainability impacts and lead to greater efficiencies in achieving objectives.

Indeed, part of the popularization of the VSS approach to promoting sustainability can be explained by the fact that standards work 'within the system', capturing the benefits of more immediate change, greater buy-in, and less disruption to more fragile economies (Ikram et al., 2021). However, such VSS have also been critiqued as an incremental rather than transformative approach to environmental sustainability in fashion (Payne & Mellick, 2022), or what Mukendi et al. (2020) identified as 'pragmatic' rather than 'radical' change. This is an extension of the common practices in the industry whereby sustainability is grafted onto existing structures through the compliance system, usually also functioning as a marketing strategy, and thus corporations often adopt the mechanisms which better brand reputation but maintain their traditional functionality (Andersen, 2017). Arguably, adopting circular approaches might solve some of these issues presented by traditional VSS systems in the way that they would go above and beyond mere 'greening' of current practices and push for more holistic change across the supply chain. For example, Cradle to Cradle does this through three major requirements: that brands reach deep into their supply chains as well as participate in EPR in order to establish circular practices (Section 8); that brands look holistically at their environmental and social impacts (Sections 6, 7 & 8); and that brands collaborate with others in their industries (Section 8.10). This includes identifying opportunities and solutions for overcoming barriers to actively cycling their product via biological and/or technical pathways as well as taking demonstrable steps toward addressing any barriers to material recovery and processing in order to actively cycle those materials for their next use (Section 5.3, 5.9). While circular VSS systems may be similarly critiqued for their superficiality, adopting circular principles in VSS systems can be a way of improving the impact and value sustainability efforts as they encourage a move beyond the status quo and have a more concrete objective to work towards.

5.3 End-of-life

As standards systems interface only with brands, sustainability initiatives can only be implemented through the brand's own initiatives; this can prove as a challenge to achieving circularity via VSS systems as they only address the activities of brands and so cannot ensure proper disposal of products through direct control of the actions of consumers. While the effectiveness of this approach may be more limited than a legislative one, VSS can require brands to influence their consumers to properly treat their products. Cradle to Cradle is the only standard that attempts to influence the end-of-life treatment of their products. However, the standard is not prescriptive in how this is done, but rather sets requirements regarding the use of recycled material in production (Section 5.4), public availability of intended cycling pathway information (Section 5.6), and the active reuptake of products (Section 5.9); the means of meeting these requirements is left up to the brand.

Requiring that cycling pathways be identified and materials used are compatible with these systems, as in Cradle to Cradle, increases the likelihood of products being actively cycled into their respective pathways through various EPR schemes. There is strength in this approach as it leverages the innovative power of the market by allowing brands to develop ways to increase circularity, as well as providing positive incentive for the brand to make cycling pathways more effective and efficient. While the Textile Exchange and GOTS standards proudly state that they address the whole production chain up until final B2B purchase, they do not directly regulate what happens to the garment after sale, which can be seen as a major drawback when assessing sustainability along an entire product lifecycle. The biggest shortcoming of these standards thus far is this lack of guaranteed reuptake of material. Thus, there is an opportunity for VSS to play a role in promoting responsible disposal and EPR, but not all are undertaking efforts to do so.

Textile recycling is an integral part of a circular fashion system, and is addressed to varying degrees in Cradle to Cradle (Section 5.4), Textile Exchange (GRS Section A3; RCS Section A3), and GOTS (Section 2.4.9). This helps drive demand for used materials, resulting in innovation and investment in waste diversion as well as driving down costs. However, according to the waste hierarchy, a

philosophy in waste and resource management that prioritizes waste prevention practices (Ewijk & Stegemann, 2016), there are many other possible ways of value extension beyond recycling, and which can even be more efficient and profitable. Textile Exchange highlights this concept in their standard and emphasizes waste reduction and reuse without reprocessing first and foremost, stating that recycling should be the last step in the life of a material (Guide to Recycled Inputs, Section A3). Textile Exchange outlines biological, mechanical and chemical recycling, including fibre process steps and recycling process flow feedstock opportunities for biological and synthetic materials (Guide to Recycled Inputs, Section A4).

Cradle to Cradle also incorporates more than just recycling pathways into its standard by using the term 'cycling' to refer to all processes that "give material, parts, or whole products toward a new use cycle via a technical or biological cycling pathway that includes at least one of the following: reuse, remanufacturing, refurbishing, recycling, nutrient extraction/anaerobic digestion, composting, or biodegradation" (p. 85). This is a valuable contribution to discussions of circularity where the emphasis is often placed on waste material reuptake and conversion to raw material; whereas in reality, there are several other streams of material reuse that are less resource-intensive and allow value extension to be maximized. Determining cycling pathways for their materials' end-of-life is not included in GOTS. Greater negative impact reductions could be had through extending the use of products via other circular pathways and practices, and should be emphasized to a greater degree in VSS systems to alleviate the current reliance on recycling.

It has been argued that, by providing a minimum to aim for, some VSS systems may run the risk of unintentionally inhibiting innovation and proactive action in corporate sustainability as brands lack incentive to go above and beyond the minimum requirements (Oelze, 2017). A graduated standard system, such as Cradle to Cradle, can help mitigate these shortcomings and actively encourage improvements. To rank higher in the Cradle to Cradle Circularity category, a product must have several end-of-use cycling opportunities as well as be easily disassembled into discrete materials to facilitate

greater cycling potential. Cradle to Cradle's Product Circularity requirements outline that, to move up tiers, not only are products intentionally designed for next use but are actively cycled into their intended cycling pathways. Additionally, Cradle to Cradle's approach of mandating that there is consistent improvement over time (Section 3.3) is essential for maintaining momentum towards a more circular fashion system. Thus, providing minimum requirements can be more effective when paired with a graduated system that includes an emphasis on continuous improvement.

5.4 Social

Issues around social sustainability are of particular complex and critical nature due to the complexity of fashion supply chains, due to the number of stakeholders, geographic regions, and sub-industries involved (Centobelli et al., 2022). All three analyzed standards systems incorporated social sustainability as one of their main pillars; Section 3 in GOTS, Section 8 in Cradle to Cradle, and Section B in Textile Exchange's GRS. Generally, the aim is to ensure fair and ethical production of garments, and to ensure there are no human rights violations. Cradle to Cradle takes a step towards this by going beyond protecting human rights in that it is not sufficient that one organization changes its practices, but rather that industry-wide progress needs to be made toward solving social issues that are widely recognized as being difficult and complex (Section 8.10). As such, it incentivizes organizations to collaborate with others in the sector and push for more widespread change. Additionally, Cradle to Cradle encourages certified organizations to contribute towards creating a positive impact on a social issue of significant importance to the company and/or value chain of the product (Section 8.8). Thus, Cradle to Cradle is the one standard that seeks to actively facilitate change in a way that improves the livelihoods of employees and stakeholders beyond its immediate supply chain. While social sustainability requirements are present in each of the standards systems analyzed, specific strategies could be more explicitly captured in the standard to ensure brands undergo the most effective means to achieving these ends.

The social impacts of circular VSS also vary from more traditional VSS systems due to the demands of circularity for the supply chain. Coste-Manière et al. (2018) reveal that the CE model not only

puts pressure on developing economies due to a change in economic flow, but also geographical flow of goods. By setting rigorous environmental standards, VSS encourage and require brand investment in manufacturing facilities, processes, and people in order to meet the rigorous standards they set out as they deviate from the norm and become more specialized. This could contribute to more stable retailer-supplier relationships which can in turn foster greater senses of trust and security. However, the need for quick turnover of products, the extra expenditures that would result from two-way goods movement, as well as the importance of highly skilled workers (Coste-Manière et al., 2018) could cause brands to localize in the Global North. This 're-shoring' could ultimately reduce the social injustices that currently exist in the textile industry due to more rigorous standards in more developed countries, but not of improved conditions for current producers (Pal, 2014). On the other hand, Pal (2014) suggests that the high social standards of circular VSS could result in an increased incentive to invest in the skills of current employees under this model, which could create a more stable employment market and reduces demand for cheap labour – and these benefits may not be limited to employees in the Global North. As existing relations and investments have already been made, there may be benefits to both brands and current producers in the maintenance of preexisting relations. However, this was not evident in any of the standards analyzed, and perhaps falls outside of the jurisdiction of VSS systems. Thus, all standards systems included social sustainability considerations in their standards; however, the literature suggests that broader impacts on the labour market are hard to predict and control, and so the potential side effects of these standards' implementation should be carefully considered.

Another issue with implementing more sustainable practices in the fashion industry is that there are high levels of informality throughout the supply chain, posing barriers to sustainability initiatives such as VSS that rely upon formalization measures such as greater traceability, labour management, and auditing (Christensen, 2017; Oelze, 2017). Traceability becomes particularly challenging regarding occurrences of subcontracting. While seemingly straightforward, the management of subcontracting presents a radical shift from the opaqueness that has become the norm in clothing supply chains due to the

high rates of outsourcing and informal work. As trust and integrity in the supply chain are integral for standard accordance, it is not surprising that all three standards address subcontracting to some extent. Textile Exchange (Section C5, CCS) and GOTS (Section 3.10) addresses this issue by specifically addressing outsourcing and subcontracting. They do not prohibit such practices, but rather ensure that every subcontractor adheres to the certification criteria of the standards through an approval process by the standard organization and regular audits, thereby closing gaps in the traceability of products and increasing the reliability of certified products. Cradle to Cradle (Section 8.3) prohibits unauthorized subcontracting, suggesting that there is an authorization process by which organizations can follow, but explicit description of this process is lacking in the standard. Thus, subcontractor management has been identified as important by each standard system and there are measures to ensure greater compliance, despite varying degrees of clarity and cohesion. However, it may be beneficial towards achieving more sustainable outcomes for VSS systems to grapple more explicitly with the nuances of informality presently in the fashion industry beyond requiring that supply chains be rid of it.

Another important consideration to address regarding how informal labour is managed is the fact that at least three-quarters of the global garment workforce are women, and an even greater percentage of informal workers are women (Ascoly, 2004). The influx in informality has created more opportunities for women and migrant workers where formal systems have typically been inaccessible to these groups, as well as other marginalized populations (Ascoly, 2004). Although all three standards require the absence of workplace discrimination – which includes gender-based discrimination – introducing more requirements of labour needs to be done carefully to ensure that the most vulnerable workers are not made more so, or excludes them from the labour force altogether.

It is thus important to consider the impacts of formalization within the local context on different groups to ensure that social sustainability is not hindered as a byproduct of sustainability efforts. To do this, a supportive culture and holistic integration of values are highly enabling factors for sustainable practice across supply chains (Oelze, 2017). Changing wider normative factors such as social cultures,

power relations and values that uphold social inequalities is crucial to achieving social sustainability (Cote & Nightingale, 2012). Indeed, tightening restrictions without support for producers may also have the unintended effect of creating an influx in informal work, heightening the risk of unethical working conditions as due to a lack of accountability and pressure on suppliers to adopt illegal forms of production to meet unreasonable demand (Tilly et al., 2013). In this way, VSS systems could encourage more horizontal relations between brands and suppliers and ensure that there is proper communication and trust between all parties so that employees remain protected. While conflict mitigation and reporting structures are mentioned in Cradle to Cradle Section 8, GOTS Section 3.12, and GRS Section B1, often the emphasis is placed on protecting basic rights rather than proactive and progressive shifts in business models and practices, and hence should be an area of focus to improve the standard's overall sustainability performance.

5.6 Discussion Summary

The value of the dominant sustainability approaches in the fashion industry derive from the assumption that information results in informed consumption and accountability leads to ethical and ecological corporate practice, as seen in a general emphasis on transparency and traceability (Christensen, 2017). However, this is not to be taken for granted. It has been argued that the result of such efforts is rather that traditional sustainability approaches in the fashion industry typically oscillate between being symbolic capital and statist capital (Bourdieu, 1998, as cited in Andersen, 2017), as pressure from shareholders maintains short-term profit seeking as the economic strategy of most corporations (Woggsborg & Schröder, 2019).

VSS offer a possible way to mitigate these issues by acting as a third-party verification, encouraging or requiring continual improvement, and providing an antidote to greenwashing. High levels of traceability are elementary parts to each analyzed standard system, and transparency and data availability – as well as communication and collaboration – between all levels of the supply chain are integral to the success of the approach. VSS provide a pragmatic approach to sustainability

implementation which is informed by many stakeholders throughout the industry and supply chain. While not sufficient in and of themselves and need to be paired with other coordinated efforts from other sectors of society, these preexisting systems and requirements can be further leveraged to facilitate and permit circularity.

From the analysis, it is evident that Textile Exchange, Cradle to Cradle and GOTS have all taken meaningful steps to varying degrees towards promoting greater circularity (whether explicitly so or not) in the global fashion industry. The initiatives towards promoting the use of recycled materials, implementing environmental protection plans, and prioritizing ethical production all reflect an alignment with the principles of circularity. These standards also play a key role in informing consumers about the production impacts of certified products, and even – in the case of Cradle to Cradle – have been used to communicate end-of-life impacts as well as provide a solution by disseminating intended end-of-life treatment information. Their emphasis on supply chain transparency, performance-based accountability framework, and ability to function in and influence highly complex international supply chains could all be used to contribute towards implementing a more circular fashion economy.

However, there are still several areas that are lacking which are needed to achieve true circularity and 'close the loop'; namely, incorporating other cycling pathways beyond recycling as per the waste hierarchy, implementing EPR schemes into the standard's requirements, convening issue areas under a comprehensive standard, and reducing overall production through a shift in the way value is conceptualized. There is also room for development in taking proactive action in promoting greater social sustainability beyond just ensuring basic rights and freedoms are being met. The literature also identifies the need to ensure that the standards' implementation does not create a downloading of responsibility onto producers, as is a frequent criticism of such schemes, and that instead changes are undertaken in a collaborative manner. The general opaqueness of the industry also causes challenges for the traceability required for the integrity of standards, as well as the amount of transparency needed to support circularity. This myriad of challenges has resulted in a wide spectrum of effectiveness of VSS systems. In essence,

the challenge of creating VSS that are specific enough to be useful and simultaneously broad enough to capture the scope of issues they seek to address poses the greatest challenge to successfully implementing circular VSS systems.

Hence, the current leading VSS systems do align with the principles of the circular economy in that they work towards similar outcomes and share the similar priorities in terms of how sustainability can be achieved. In addition, the analyzed VSS have taken meaningful steps towards implementing circular initiatives, or that support the movement towards circularity, whether they explicitly align themselves with circularity or not. The present analysis has also identified where there are opportunities for standards to improve in ways that can promote the circularity of the fashion industry.

6.0 Interviews

To contribute an additional level of analysis to this study, six experts in the sustainable fashion space with experience with VSS were consulted to provide professional insights on the topics discussed in this study, as well as to verify and build on the findings of the research presented. These participants were identified using a snowball method of outreach, starting with a number of potential participants identified by the researcher from previous experience working in this space. Invitations to participate in interviews were sent via email to each prospective participant, totaling seven invitations. The six participants that accepted the invitations were a mix of representatives of the analyzed standards, thought leaders in the space of circularity and fashion, experts in fashion supply chain management, and heads of other sustainability regulatory organizations. The participants that opted to have their names included as Experts Consulted can be found in Appendix A.

The questions posed during these semi-structured interviews were open-ended to allow for participants' reflections, but surrounded themes of the CE, VSS, and the role of each in addressing the sustainability issues of the fashion industry. The interview guide can be found in Appendix B. The data

from these interviews was synthesized through a thematic analysis, and the insights garnered from this exercise is presented below.

6.1 Understanding of CE

All participants were familiar with the CE, to varying degrees, and all were able to speak to its merits and drawbacks to some capacity. One participant confirmed that the CE has been gaining interest recently across sustainability spheres, and has evolved from merely addressing design to reflect a holistic process which starts in manufacturing but extends into the continuous lives of a product. This emphasis on design, but acknowledgement of the importance of material retention is consistent with the findings of this study above. Participants acknowledged that circularity is not limited to supply chains but instead requires a whole ecosystem of society and government to create a culture where we think circular. As one participant put it well: circularity should sell function instead of products. It thus requires a shift in business models; in the way that we think about and value property; and the way that we treat, dispose of, and care for products. These conceptualizations of CE were consistent with the literature as established above by this paper, and revealed a generally strong understanding of the objectives, principles and value of the CE model of participants.

It was mentioned, however, by several participants that there is a lack of a systems-wide definitional framework of CE. Indeed, there was a general sense that the understanding of CE is fragmented and insufficient; one participant expressed that we don't know half of what we need to know. This ambiguity of CE is also consistent with the literature as highlighted by this paper above. In response to a prompt to reflect on the importance of CE in the fashion industry, many participants mentioned textile recycling initiatives, with one participant asserting that recycling is the linchpin to circularity in fashion. On the other hand, another participant noted that circularity is not about recycling more, but rather it is about consuming less – further asserting that, while recycling is important, we can't recycle our way out of this problem. This further reflects the conclusions of this study regarding the observed

over-emphasis on recycling; both as identified in the literature (see Allwood, 2014) and as exemplified in the applied analysis – in particular with regards to Textile Exchange's standards. Indeed, a consistent result of this study is a need to increase focus on other cycling pathways in VSS systems in the fashion industry.

6.2 Current VSS in fashion

When discussing the effectiveness of VSS systems in promoting greater sustainability in the fashion industry, several recurring themes emerged; namely, that they promote greater transparency, that they act as trailblazers regarding sustainability initiatives and regulation, and that they create an accountability framework for a performance-based approach to sustainability. These strengths are consistent with those identified in the literature review, wherein VSS were identified as effective measures to sustainability implementation within the context of the complexity of the fashion industry, the issues they are seeking to solve, and the processes required in order to get there due to their agility and intimacy with brands. In addition, it was noted by one participant that standards are an effective means of reaching the entire supply chain through a trickle down of impact whereby all levels of the supply chain are aligned with a standard's requirements, starting at the brand level. These insights reflect the strengths that were identified by Ikram et al. (2021) and Geissdoerfer (2017) in the literature review and subsequent discussion above.

Secondly, all participants noted in similar terms that the challenge of addressing a highly complex industry – such as the textile industry – via a VSS system is creating a standard that is both specific enough to be useful, but broad enough to capture the range of issue areas necessary. This tension can in part explain the plethora of standards that exist, which each seek to address aspects of the textile industry. Another explanation for the multitude of standards identified by participants is the challenge of compliance, whereby more, less stringent standards have multiplied due to market demand for standards that make brands 'look good' but do not require any radical changes in business practice. Hence, the

complexity of the industry as well as the web of existing standards elucidate the intricacy of the context in which circularity standards exist and function.

In addition, one participant noted that traditional standards were ineffective as they take only a snapshot in time; explaining that, once a brand meets the criteria and gets their certification, the motivation for improving further is diminished. Implementing a process model such as Cradle to Cradle Product Standard can encourage long-term investment, thoughtful implementation of change, and essentially align more closely with a brand's identity. Another participant noted that becoming certified cannot be a commercial decision, but instead needs to be motivated by a brand's culture, but to provide the motivation for continuing to improve as well as justify the investment that it will require. As several participants identified, what we do not need is *more* standards, but a distinct circularity standard that is manageable in size and at the same time globally applicable across varying supply chains and sub-industries.

However, another participant – in addressing the same challenge – asserted that this dissonance between breadth and relevancy comes from a disconnect between the language and the approach to solving issues around circularity. Hence, work needs to be done to align the language and the approaches used to achieve circularity in terms of the specificity it needs to be applied to industry as well as the holistic approach it takes in order to achieve the scope of change required. This disconnect was likewise identified in the analysis above in the disparate nature of approaches to achieving sustainability as seen in the analyzed standards. The high-level language often used to talk about the CE is discussed in Ekins et a. (2019) and exemplified in Kirchherr et al. (2018), and thus was previously concluded as a prominent shortcoming of CE approaches. The challenge of complexity in achieving a circular fashion economy was discussed by Jia et al. (2020) in the breadth and depth required by a CE to be effectively implemented, as highlighted in the conclusions of the discussions above regarding the impact and effectiveness of the analyzed VSS systems. The insights from the interviews thus validated these conclusions and added to the integrity of the discussions above.

6.3 Linking CE to VSS in fashion

Regarding how circularity can improve VSS in the fashion industry, several consistent conclusions emerged throughout the discussions with experts. Participants noted that the scope of circularity goes beyond that of traditional VSS, and so adopting circularity principles into these systems can broaden their impact. Additionally, circularity necessitates a more pragmatic focus, which results in more standardization between metrics, approaches and methods, and so could improve the effective implementation of VSS. Circularity further requires a method of systems-thinking that is uncommon to more traditional VSS approaches, and thus makes up a unique value proposition for circular VSS systems.

Likewise, VSS were also recognized as being a useful approach to implementing circularity, for several reasons. Firstly, participants highlighted the need for pragmatic approaches in order to implement a CE, which VSS can provide. VSS also bring together many different stakeholders in their development, thus providing a variety of perspectives and inputs. Additionally, as VSS is an opt-in mechanism rather than a government-imposed one, brands that seek to become certified have both the motivation and the resources to do so, leveraging market innovation and resulting in better implementation outcomes. The benefits of this voluntary approach were not significantly present in the literature review, which tended towards advocating for stricter regulation (for example, see Andersen, 2017; Centobelli et al., 2022), making this an interesting point of contrast and perhaps a valuable area of future study. Lastly, participants identified that VSS can help consumers understand the impact of products as well as provide information on what to do with them at the end of their use-phase, both of which can spur the understanding and adoption of circular practices by the public. Thus, the importance and intentions of this study were substantiated through the expert interviews as they identified a significant opportunity for mutual benefit between VSS and CE in the fashion industry in their mechanisms, areas of intervention, and required outcomes.

It was identified by several participants that, while most agreed that VSS systems were important in promoting sustainability and were effectively doing so, they were in themselves insufficient to tackle the magnitude of implementing a CE and achieving its objectives. First of all, participants identified that standards are not implementing change swift enough, nor in a coordinated fashion. In addition, there is still a significant amount of siloing of issue areas within and between standards, which opposes the concerted effort required by a CE. Textile Exchange is a prime example of this, whereby different textile types have their own standards, and even within these material types standards, different cycling pathways (i.e. recycling) are also given their own standard. The segregation of issue areas within and between standards was also identified as a weakness of current VSS practices through the analysis of the selected standards which concluded that a harmonized approach to sustainability issues is a more effective approach that targeting individual areas or pathways. Thus, the insights garnered through the interviews confirmed the conclusions of this study.

6.3 Challenges to implementation

Experts were prompted to reflect on the challenges to implementation that VSS systems face. One of the most significant challenges identified was the barriers the capitalist market creates for the promotion of circularity and sustainability more broadly. A participant highlighted that one of the most common challenges standards face is how to make the business case for certification. A proposed solution was to implement a true pricing model that would reflect the negative externalities caused by business-as-usual production, which would provide the incentive both for brands to adopt better practices, and also for consumers to make better purchasing choices. This was not addressed in the discussions above, and makes a valuable contribution to this study's discussions.

Relatedly, two key unknowns were identified as posing barriers to brand adoption of VSS: full supply chain transparency and impact measurement. Supply chain mapping was identified by experts as a common barrier to brands looking to become certified, as this undertaking is often intimidating and

overwhelming given the extent of nuance and complexity that is common in the fashion industry as well as the strict transparency requirements for VSS. Data collection on current environmental impact of production is not common practice, and there exists a lack of mechanisms to accurately model the results of sustainability initiatives, disincentivizing brands from adopting VSS. Thus, the equivocal nature of fashion supply chains, and the lack of methods to mitigate this, discourages brands from adopting VSS or disqualifies them from meeting standard requirements altogether.

Additionally, the effectiveness of standards varies widely, as identified by several participants. One participant pointed to the lack of standardization for standard development and thus lack of integrity assurance as a cause for the disparity in standard quality, while another pointed to the ways by which a standard is implemented as the determining measure of effectiveness. This disparity of efficacy was also noted by participants to undermine the integrity of all standards, making it a significant shortcoming of this approach. Overall, there was general agreement between participants that standards were useful as a starting point for sustainability initiatives; however, they face multiple limitations regarding jurisdiction, reliance on market conditions, and complexity of the issues they attempt to address that pose barriers to their effectiveness. These results confirm, and build on, the findings of this study regarding the importance of differentiating more effective standards from less effective ones through data validation and progress requirements, as well as creating a system whereby standards are themselves held to a standard. The current ambiguity negatively affects the overall potency of standards as a sustainability approach, thus serving as a point of improvement.

The opaqueness of standards themselves was also cited as a challenge to standard adoption and implementation. To consumers, and even brands, the differences between standards, their effectiveness, and overall impacts are highly obscured. This question of rigor can decrease the integrity and impact of a certification, which disincentivizes brand adoption and consumer buy-in. While the ambiguity of supply chains has been discussed in the study thus far, the emphasis on the importance of strong data collection

and validation practices as it relates to the implementation of VSS systems came forward as a much more prominent theme in the interviews.

Lastly, the lack of capacity and appropriate infrastructure to fulfill the requirements of circular supply chains was identified by experts as posing a huge barrier to circular VSS implementation. Currently, many challenges make high-value cycling very taxing for individual brands. More coordinated approaches to standardizing labeling practices, facilitating reuptake strategies, and managing chemical residues are potential ways to mitigate these challenges, according to one participant. Another participant asserted that our current infrastructure is not in a place to deliver a CE, and more investment needs to be made to develop the 'other half of the circle' of the CE and connect supply and demand. This reflects the findings of the literature review and analysis of the standards which both highlight the need of other initiatives and sectors to get involved to better enable the effective implementation of a CE, such as governments, advocacy groups, and other industries in the private sector.. The mobilization of other areas of society would also provide the regulation required for a CE that falls outside the reach and jurisdiction of VSS systems What was contributed anew to this discussion by the expert interviews was the ways in which other initiatives are needed to support the implementation and effectiveness of VSS standards.

6.4 Opportunities for improvement

With the strengths and weaknesses of current VSS systems in the fashion industry identified, the discussion was then turned to areas of opportunity for further improvement of VSS systems, and how they could be leveraged to promote circularity.

First identified was the need for a holistic approach to identifying where and how impacts occur so sustainability issues are not exacerbated. Participants suggested several strategies to achieve this. First, that circular strategies need to expand beyond recycling. Participants verified that recycling is a highly inefficient way of material retention and thus should be considered as the last step in product life extension, which is consistent with the discussion above. In addition, inputs such as chemicals need to be

treated with greater significance as they are often neglected from conversations regarding circularity. The impact and circularity of chemistry is often neglected from conversations regarding the CE, including the discussion above, and hence this point is a valuable contribution to the present study. Lastly, incorporating notions of regeneration into VSS systems would also benefit their net-positive impact. Thus, the expert interviews confirmed that taking a holistic approach will, in turn, improve the integrity of the standard.

Data plays a key role in addressing many of the shortcomings noted above, and was identified by experts as one of the most significant areas of development needed for circular VSS systems. As identified above, there is an identified need for significantly increased transparency in fashion supply chains to satisfy the assurance requirements of VSS systems as well as supply the data needed for circularity. Several participants stated that using smart data could have transformative ramifications for circular fashion and the effectiveness of VSS. One participant further suggested that better data collection and management would make integrating sustainability and circularity goals into business priorities as they could then be measured through key performance indicators (KPIs), thus becoming more central to the brand's core values. This emphasis on the potential transformational impacts of data make a valuable contribution to this study as the importance of innovations in data management was not emphasized as a priority in the literature as one of the strategies to improving the effectiveness of VSS systems and circularity success.

6.5 Other paths to circularity

When asked what other initiatives were necessary to implement circularity in the fashion industry beyond VSS, several topics recurred throughout conversations with experts. Government intervention was the most noted, and was consistently identified as the most important driving force. According to participants, governments can take several actions to increase circularity in fashion: endorse, enforce and/or integrate standards into recommendations and regulations; provide funding for circular innovation;

and set national standards for imports based on circularity principles and requirements. One participant also identified also that governments can provide incentives and campaigns to raise the profile of circular VSS. Indeed, it was noted during an interview that standards become the most impactful when they are referenced in legislation.

Consumer awareness and behaviour was another area highlighted as important to address by many of the participants. Public education around production impacts, as well as the sustainability potential for circularity, was also a commonly identified area of improvement. Campaigns, public education programs, awareness initiatives, and media attention were all proposed as ways to accomplish this. Storytelling was suggested by a participant to help address some of the issues discussed above regarding brand hesitancy and consumer buy-in through providing a way to engage with and conceptualize the potential of circularity for fashion. One participant suggested that building a narrative around CE can also help highlight how the CE supports and complements overarching mainstream sustainability goals. Another area that was established by participants to potentially benefit from storytelling is sharing success stories to address concerns about feasibility, quality, etc. This was also a unique contribution to the discussions around CE that was not previously identified by the literature reviewed.

In addition, there is a need for sufficient incentives for consumers to buy circular products and ensure they end up in their intended cycling pathways. Establishing the right processes and mechanisms to accomplish this will take coordination and intervention on behalf of governments, brands, and standards organizations. The role of consumer behaviour is often underrepresented in discussions around CE, as exemplified in the literature review above, and hence these reflections are highly significant to this study.

The most common response to the question of who else needs to be involved to push forward the circularity agenda was: everyone. Participants asserted that stakeholders across sectors and spaces have an

obligation to recognize the complexity of the issues we are facing and actively get involved in their resolution. It was also noted by several experts that taking a systems approach was necessary for addressing the extent of the sustainability issues we need to address. It was also argued that circularity standards should be integrated into global frameworks, to ensure that impacts are not just had across one supply chain but that this is replicated across industries. This response reflects the holistic, systems change emphasis of the CE literature, and provides an incentive to expand our notions of who needs to be involved to achieve a CE.

6.6 Interview Summary

The expert interviews conducted as a part of this study provided a significant addition to the analysis of this study. Many of the observations and conclusions from the analysis above were verified through interviews with six experts in the field of sustainability in fashion. There was a general consensus that VSS align with the principles of the CE, and there is significant opportunity to leverage VSS to further promote circularity in the fashion industry. An overwhelming majority of participants identified that CE holds a lot of potential for impact in the fashion industry, making it an important area of exploration. It was further confirmed that there is still significant opportunity for the improvement of both the conceptualization and application of CE as well as the effectiveness of VSS in the fashion industry. However, leveraging data, improving transparency, and integrating VSS into other systems and structures – among others – were all identified by participants as ways that VSS can be improved. The interviews thus confirmed the findings of this study, as well as highlighted new considerations that improve the overall results and integrity of this study by adding a layer of nuance and relevancy to the contributions made through the literature review and analysis.

7.0 Conclusion

This study has (1) reviewed three streams of literature and synthesized them in a novel fashion; (2) integrated the findings of this review into a framework used to analyze three prominent VSS standards

and their approaches to circularity; and (3) validated and expanded on those findings regarding the effectiveness of VSS and their potential role for implementing a CE in six expert interviews. From the results summarized above, VSS can be understood as a first step towards implementing a CE, as well as a way to disrupt the current destructive patterns and value systems by providing an effective means to begin shifting the trajectory of current production practices. Thus, these incremental changes can be argued to be necessary as they provide a foundation for eventual revenue stream redesign on the basis of long-term economic development and innovation (Mutingi, 2013). While VSS systems may be critiqued for their superficiality, adopting circular principles encourages a move beyond the status quo, improving the impact and value of sustainability efforts.

Elucidating the effectiveness of achieving sustainability outcomes through VSS is important not only for the fashion industry but for all sectors of industry and development. Indeed, sustainable development is a core theme in development literature, and its importance is only due to increase. CE approaches are important new aspects of this broader discourse as they are intimately connected with the broader sustainability agenda (Schöggl et al., 2020). In addition, the integration of CE values and ethics into sustainability approaches could have significant positive development outcomes as CE adopts a broader, more holistic perspective on sustainability and ecological impact, which can help mitigate negative externalities that result from more narrow sustainability definitions and methods (Jia et al., 2020). The development literature could thus benefit from greater considerations of how the CE would benefit development practice due to the potential extent and nature of its impact, which this study has sought to exemplify.

However, VSS lack the scope and regulatory power needed to achieve the paradigmatic shift required, independent of other initiatives and regulatory mechanisms. For example, policy intervention is necessary to balance costs of unsustainable production as consumer conscientiousness is insufficient to make sustainable products competitive (Andersen, 2017). Local governments, international agencies, businesses, and consumers all have a role to play to advance more sustainable business practices (Ikram et

al., 2021). In the fashion industry, VSS are the ones pushing the boundary of sustainability initiatives and providing a foundation for other forms of regulation (Li et al., 2014). However, there is a need to regulate and coordinate VSS systems in order to align, synergize, and compound these efforts (Jia et al., 2020).

While VSS served as the system of focus for this present study, the intent of this research is also to motivate the consideration of potential of other existing forms of sustainability regulation in the transition towards greater circularity. Thus, this research can be used as a reference for others doing research on sustainability in the textile industry, as well as a resource for decision-makers, corporations and policy makers, in exploring if and how preexisting sustainability mechanisms can be leveraged in promoting a circular textile economy. Circularity in any industry, but for fashion in particular, necessitates collaboration between many different stakeholders and requires significant investment and innovation; ultimately, it will demand greater transparency and traceability, along with significant shifts in the way we treat, value, and understand clothing.

Appendix A: Experts Consulted

Kevin Myette, Director, Global Brand Services, Bluesign

Lori Wyman, Representative, North America, GOTS

Nienke Steen, Lead Apparel, Textiles and Footwear, Cradle to Cradle

Laura Hohmann, Associate Director, CDP

Priya Patel, Program Manager, Environment and Climate Change, CSA Group

Appendix B: Interview Guide

Voluntary Sustainability Standards and the Fashion Industry: Opportunities and Challenges for Building a Circular Textile Economy

Kiana Klassen,
(Department of International Development and Globalization – University of Ottawa)

Preface: This interview is being conducted as a part of the analysis of my Master's Major Research Project looking at how current voluntary sustainability standards in the fashion industry align with the principles of the circular economy. This interview will be recorded and transcribed, and will take a maximum of one hour. Interviews will be one-to-one and questions will be open-ended as to encourage your own professional reflections, thoughts, and expertise.

Background on the Circular Economy: An alternative to the take-make-waste system is what has come to be known as the Circular Economy (CE). The CE takes a holistic, industry-focused approach to decoupling economic prosperity from environmental exploitation that makes it unique from traditional approaches to sustainable production and makes up its unique value proposition. The Ellen MacArthur Foundation (EMF) outlines three core principles of the CE: i) waste is designed out of the economy; ii) products and materials are kept in use infinitely; iii) natural systems are regenerated (EMF, 2017). In this way, economies are made resilient and prosperous, while emissions, waste and pollution are concurrently reduced and ultimately eliminated.

1. **What is your present familiarity with the concept of the 'Circular Economy'?**
    a. **FOLLOW UP PROMPT: What is your initial impression of the importance of the Circular Economy for the fashion industry?**
2. **What voluntary sustainability standards (VSS systems) are you currently engaging with (or familiar with as leading initiatives in the sector)?**
    a. **FOLLOW UP PROMPT: How effective do you find existing VSS systems in advancing sustainability in the fashion industry?**
3. **How do you see the Circular Economy currently reflected in voluntary sustainability standards in the fashion industry? (Perhaps you can speak to your own standard and what moves you are making (if any) towards circularity?)**
    a. **FOLLOW UP PROMPT: How do circularity standards differ from other voluntary sustainability standards?**
4. **To what extent have VSS systems been able to enact meaningful change towards a more circular fashion economy?**
    a. **FOLLOW UP PROMPT: Where is the greatest opportunity for circularity in the mobilization of voluntary sustainability standards?**
5. **Where is there still room for improvement in the current voluntary sustainability standards' approaches to circularity?**
    a. **FOLLOW UP PROMPT: Where is it most challenging to operationalize these standards?**

   b. **FOLLOW UP PROMPT: What are the common barriers brands who are looking to become certified under these standards systems face?**

6. **In your opinion, does the voluntary sustainability standard approach align with the principles of the Circular Economy? Why or why not?**
7. **Besides voluntary sustainability standards, how else do you think circularity should be promoted in the fashion industry?**
8. **To what extent does Canada require its own circular VSS system?**
9. (For Standards Representatives:) **By what processes were the current standards developed? By what measure were they determined to be the most effective ones?**
10. **Is there something significant that we have not yet touched on during this conversation? Any last insights you would like to share?**

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