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Sustainability and Supply Chain Management in the New Zealand Fashion Industry

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Abstract

The fashion industry has become increasingly dominated by the fast fashion model. With accelerated production and consumption of fashion, there are increasing social and environmental impacts. The nature of capitalism has meant many brands, particularly fast fashion, focus on profit maximisation. This often leads them to "cut corners" to increase profits usually at the expense of the environment and the workers. The purpose of this research is to support existing supply chain research and builds on this by looking at New Zealand fashion industry's supply chains. This thesis concludes with solutions and frameworks that may help the New Zealand fashion industry take steps to improve the sustainability of its supply chain.

This thesis conducts a thematic analysis of relevant publicly available materials to examine five New Zealand fashion brands and their sustainability efforts regarding social and environmental issues. It looks for common concepts and themes in how these companies talk about their sustainability performance, while also analysing the issues that they aren't addressing and the importance of these issues/impacts in the supply chain. This analysis uses white organic cotton t-shirts as a point of comparison looking at the different certifications regarding the brands' sustainability efforts. The thesis then goes on to look at the best practices approaches of four global brands in addressing some of these environmental and social issues.

The main findings of this thesis are that many New Zealand brands engage in greenwashing by using eco-certifications that can confuse consumers. Greenwashing also happens through the brands advertising their sustainability efforts on certain issues, such as plastic pollution, to distract from other issues they aren't addressing. Fashion brands need to shift to a circular economy for a greener supply chain. Processes to move towards this include 'slow fashion', having fewer collections per year, sustainable materials, and using different recycling methods such as chemical and water recycling.

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Claudia Giles

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Ethics Approval

No Ethics approval was needed for this thesis.

Chapter 1- Introduction

1.1. Fashion and Sustainability

The fashion industry generates many negative social and environmental consequences. Some of these consequences include water usage, water pollution, carbon emissions and worker exploitation, to name a few (Ashby et al., 2012). Fast fashion exacerbates these problems by speeding up production. Generally, for many fast fashion brands to stay 'trendy', their design and manufacturing processes are accelerated so the clothes can be mass-produced and distributed as fast as possible, with a quick turnover. This means that often corners are cut, and exploitation occurs (Fung et al., 2019). Sustainability in the fashion industry has increasingly become a topic of interest for consumers and fashion brands trying to keep up with the demand for sustainable fashion. Much attention regarding sustainability in the fashion industry focuses on using more natural materials such as organic cotton, buying second-hand clothes, or buying from brands that promote their environmental credentials (Kim & Hall, 2015). Public knowledge regarding sustainability issues in the fashion industry is enhanced through increasing media and NGO attention, such as the regular Ethical Tearfund Fashion Report (Tearfund, 2021). Because of this, companies are responding to the sustainability issues largely from consumer demand. This is positive, but there remains a need for greater awareness, by consumers and by fashion brands, of the environmental and social harms associated with the full range of issues within global fashion supply chains (Kim & Hall, 2015). This thesis will analyse the sustainability efforts of New Zealand fashion companies to assess how meaningfully they address the sustainability problems associated with the industry. It will also look at global best practices addressing these issues.

1.2. Sustainability issues and supply chains

Many fashion brands are currently promoting the steps they claim to be taking to address plastic pollution. However, they are often silent on the many other social and environmental issues associated with the supply chain that have substantial negative impacts. Supply chains are complicated as they can span over several countries and factories and involve many different processes (Jabbour et al., 2017). The more complex a company's supply chain, the harder it is to find what issues are occurring, who is responsible

for them and how to fix them. Supply chains start from the raw materials like cotton being grown, or polyester being woven, to the finished product on the shop floor. Fashion brands in developed countries, especially larger companies such as Glassons, typically situate their manufacturing overseas. These supply chains often cross several international borders in developing countries (including China, India and Bangladesh), where labour costs and environmental standards are lower (Sarker et al., 2019). The small size of the New Zealand fashion industry means that New Zealand brands rely especially heavily on overseas manufacturing (Finn, 2008).

With clothing production and consumption increasing every year, the consumer demand also creates environmental and social damage due to the added pressure of speeding up clothing production. This rise of fast fashion has also contributed to this as it relies on overconsumption, creating a throw-away culture. Approximately 30,000kgs of clothes are discarded annually (Geissdoerfer et al., 2017; Sarker, 2019). Eight hundred billion new garments are made, and by 2030, it is estimated that 16kgs of clothes will be consumed annually per person (Mcfall-Johnsen, 2019).

A lot of previous literature regarding sustainability in supply chain management focuses on other countries and fashion brands with more extensive supply chains. Still, there is a lack of research on the sustainability in the New Zealand fashion industry. More research needs to be done on supply chain management issues concerning New Zealand fashion brands to start making changes sooner than later (Kim & Hall, 2015; Sarker et al., 2019).

1.3. Barriers to progress

Increasing globalisation has meant clothes can get made overseas at lower costs, and the final product is accessible to customers worldwide. This undoubtedly creates some benefits for producers (who can get their goods more cheaply) and consumers (who can access a greater variety of cheap products). However, globalisation and the massive scale and speed of production of cheap clothes generate severe social and environmental harm throughout the supply chain (Fung et al., 2019). Companies also make a lot of money from the lower cost. Therefore, they may resist changing their supply chain processes (Sarker,

2019). Often clothing production occurs in many developing countries that don't have the infrastructure or technology to address environmental or social problems. For example, these countries struggle to monitor and control the different chemicals used to dye clothes, reduce the high levels of water used in production or stop the exploitation of employees' working excessive overtime for little pay, often in unsafe work environments. The lack of transparency in supply chains causes these issues to continue, and genuine transparency is essential for supply chains to become sustainable (Jabbour et al., 2017; Sarker et al., 2019).

1.4. Eco certifications and eco-labels

Eco-labels are a common theme in this thesis. These are certifications regarding brands and their products meeting specific environmental or social standards and should be verified by a third party (Maze et al., 2016). Certifications help provide consumers with information regarding environmental or social standards when trying to purchase responsibly. They can also be an incentive for brands to build a positive reputation, doing their part to help social or environmental sustainability issues. However, they can also be problematic. Often, certifications can confuse consumers as they don't understand the eco-label and may believe they are buying something 'sustainable' when the product has a minimal impact (Ostermann et al., 2021). Consumers cannot quickly determine what these eco-labels mean, and which ones are credible. However, because there is an eco-label on the product, this gives them confidence about the clothes' sustainability. The certifications that are not as credible can sometimes be seen as a greenwashing marketing scheme when the brand focuses on one issue while ignoring other significant ones (Bowen, 2015).

1.5. Companies promoting their sustainability efforts

The environmental and social issues associated with the fashion industry are well documented; however, they continue to occur for several reasons discussed in this thesis. Sustainability in the fashion industry is left largely to self-regulation, voluntary reporting (for example, sustainability reports), and promotion from brands. If left up to specific brands, particularly fast fashion ones, they may be less likely to address serious issues or may promote the efforts they are engaging in to distract from the problems they are not addressing (Ostermann et al., 2021). This is where third parties are essential for conducting audits on fashion companies to find the issues within the supply chains and address them.

Meaningful change may also require some government regulations (United Nations, 2021). This could be through creating regulations around throwing out clothes and reusing the materials by making compulsory take-back schemes for brands to either repair, resell or reuse old garments or banning specific chemical use. Government intervention and regulation will hold brands responsible who otherwise would not be addressing environmental and social issues (Patwa et al., 2021; United Nations, 2021).

1.6. Circular economy

The circular economy is a well-known framework that can be applied to many businesses and industries, including fashion. The idea is that little to no waste will be generated from clothing production. This includes both environmental and social sustainability. To achieve this, fashion brands need to make changes to the processes in the supply chain to become sustainable. This is also called closed-loop production and to be truly sustainable, the fashion industry's supply chains need to shift to this framework (Geissdoerfer et al., 2017). For supply chains to change to a circular framework, there needs to be little to no negative impact on the environment and employees in the supply chain and consumers. This can be done through different practices described in this thesis, such as chemical recycling, material recycling, natural materials, fewer collections (slow fashion), living wages to help social sustainability and better waste management (Patwa et al., 2021).

Life cycle assessment and cradle to cradle can be used to help implement the circular economy framework. In a linear model at the end of life cycle the clothes are often thrown out (NZmanufacturer.com, 2022). Life cycle assessment examines the environmental impact of the materials used in an item of clothing across the whole life cycle, from raw materials to when/if the product is thrown out (end of its life). This can help identify what needs changing and improving at what stage of manufacturing. Then cradle to cradle helps to ensure that the materials being used throughout manufacturing can be reused either as a nutrient that will not harm the environment if discarded, or that it can be reutilised for another item. These help to create a circular framework as both can assess the materials in an item of clothing and can find different ways the materials can be reused so there is little to no waste (NZmanufacturer.com, 2022).

There are gaps in previous literature specifically regarding the New Zealand fashion industry's supply chains and how New Zealand fashion brands address the issues that arise in their supply chains. This thesis will fill that gap and provide possible solutions and frameworks from best global practices for fashion brands wanting to shift to a greener supply chain.

1.7. Research Objectives/Questions

This thesis addresses two research questions: research question 1 is how are some of these environmental and social issues being addressed by New Zealand companies? Research question 2 is what are the key solutions and frameworks for greener supply chain management that the New Zealand fashion industry can learn from global best practices? In exploring these guiding questions, the thesis answers other questions, including what are the social issues in the supply chain? What are environmental issues in the supply chain? How are some of these environmental and social issues being addressed by New Zealand companies? What are global best practices and solutions? How are some of these environmental and social issues being addressed by global companies? What recommendations can be made for anyone wanting to research the New Zealand fashion industry's supply chains?

The research conducted for this study will increase knowledge of New Zealand brands, which have not been researched within the existing literature. This information will help consumers to make more informed decisions when buying clothes. It can also highlight the greenwashing that can happen with certifications with clothing brands so consumers can be more aware when trying to purchase responsibly. This research will contribute to and support current research on fashion supply chain issues and provides specific context to New Zealand's supply chains.

The New Zealand Fashion industry is unique as it serves a very small population and is geographically isolated from other major markets. Given these factors, it does not have the consumer or production base to support a sizeable domestic industry. Therefore, most manufacturing is done overseas. There is a lot of previous research on the fashion industry, its supply chains, and its impacts. However, there is not as much information on the New

Zealand fashion industry specifically. There is an increasing interest for fashion companies to go ‘greener’, evidenced by many New Zealand companies now offering seemingly sustainable basics such as organic t-shirts. Therefore, consumers and retailers need to be educated on the impacts of such products versus other (seemingly non-sustainable) options. Arguably, most of these companies' sustainability issues are in the supply chain. It is also vital for them to learn the most impactful changes they can make when trying to shift to a green supply chain and products.

The findings of this thesis could help New Zealand fashion brands understand the reality of their supply chain and the critical environmental and social issues happening and encourage them to make changes. This could also provide knowledge to consumers to make informed decisions when buying clothes and possibly support more sustainable brands. It can also highlight the greenwashing that can happen with certifications with clothing brands so consumers can be more aware when trying to purchase responsibly. This can be seen by looking at one product, organic cotton t-shirts, and analysing the meaning of the certifications surrounding it.

My findings can also show businesses different frameworks and solutions for issues they may be currently trying to fix. Or for brands wanting to shift from an unsustainable framework to a sustainable one. The issues and solutions discussed could also be used to create new frameworks or enforce new regulations for fashion brands.

1.8. Research Outline

This thesis consists of 6 chapters: Chapter 1: Introduction to the thesis topic, summaries of supply chain sustainability issues, the motivation for this thesis, research objectives and questions and the outline of the thesis. Chapter 2: A literature review that focuses on existing research on environmental and social issues and best practices. Chapter 3: The methodology chapter looks at the methodological framework, how information was gathered and analysed and background information. Chapter 4: Analysis of findings for research question 1. Chapter 5: Analysis of findings for research question 2. Chapter 6: A discussion of the findings and recommendations for future research and practices. Lastly, Chapter 7: Conclusions for the thesis.

Chapter 2- Literature review

This literature review will focus on key areas covered in previous research addressing fashion sustainability and supply chain management. These areas include sustainability, fast fashion, environmental issues in the fashion industry, social issues in the fashion industry, drivers and barriers to a sustainable fashion industry, greenwashing, circular economy, supply-chain management and transparency and traceability.

The fashion industry generates many negative social and environmental consequences through the production process. Some key environmental and social issues include water usage and pollution, carbon emissions, plastic and land pollution (Ertekin et al., 2020). Lack of transparency and traceability, poor working conditions, poor treatment of workers, low wages and more (Rashidi-Sabet & Madhavaram, 2022). The fashion industry grows every year; on its current trajectory, the fashion industry will continue to generate many negative social and environmental issues, particularly in the supply chain (Ashby et al., 2012). The increasing trend of fast fashion exacerbates these issues with its speed of production and turnover by generating more waste and using more resources (Ertekin et al., 2020).

Global supply chains are a feature in the fashion industry. Firms increase their profits by using cheap labour and materials (Ashby et al., 2012). New Zealand is quite a small and isolated country far away from the rest of the world. This means it often does not have the right tools or manufacturing within the country. Therefore, the New Zealand fashion industry particularly relies on global supply chains. However, this means the problems occurring in the global supply chains during production can be more challenging to address, being further away from the country of origin and the brands' eye (Rashidi-Sabet & Madhavaram, 2022).

2.1.1. Sustainability

Sustainability refers to the capacity of a system to operate indefinitely without breaking down or degrading (Moore et al., 2017; University of Canterbury, 2021). To achieve sustainability, resources can only be taken at a rate the earth can replenish, and waste can

only be created at a rate that the planet can absorb (Moore et al., 2017). Humans need to use some resources to meet basic needs such as food and shelter. However, the planet's current state is unsustainable, with human activity and overconsumption largely contributing to, and worsening, sustainability issues (Ruskin, 2015; Watson, 2019). People are using too many resources and are polluting the planet (Moore et al., 2017). Some pressing concerns regarding unsustainability include climate breakdown caused by high carbon emissions, and waste and poverty among garment workers in supply chains, due to extremely low wages (Rashidi-Sabet & Madhavaram, 2022). Rising sea levels from increasing temperatures and declining freshwater quality from business activities such as chemicals used in the fashion industry (Moore et al., 2017; Watts, 2021). If this continues, humans will not help sustain the earth for future generations. The planet, life on it and business activity will deteriorate as it cannot continue without a healthy environment (Ruskin, 2015).

2.1.2. Sustainable development

"Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). The Brundtland commission was a sub-organisation of the United Nations which created the concept of sustainable development. Sustainable development is a concept that focuses on the environmental and social consequences that are caused by modes of economic development and how these will negatively impact future generations (Yeshchenko et al., 2020; YİĞİT, 2020). It looks at what global innovations can improve or eradicate these negative impacts through different processes/products, generally through technology and infrastructure. These innovations are crucial for future environmental sustainability.

The main goals for sustainable development are to support and educate on the three main pillars of sustainable development: environmental, economic, and social sustainability (Singh et al., 2020; Yeshchenko et al., 2020; YİĞİT, 2020). Economic sustainability focuses on healthy economies which provide safe and high-quality living standards for the citizens without negative long-term impacts on ecological sustainability (Singh et al., 2020; YİĞİT, 2020). Economic sustainability suggests activities and different businesses can provide

ongoing economic benefits (Yeshchenko et al., 2020). This is different from the current global economy, where many activities can only be conducted in the short term, for example, overfishing (O'Gorman, 2016). Some short term economic growth and activities (overfishing, for instance) undermine long term activity by taking more resources than can be replenished. As a result, business and economic growth will not continue (O'Gormon, 2016; Yeshchenko et al., 2020). Social sustainability involves a stable society that fulfils basic human needs in the long term. It attempts to address different cultures and values around the globe (O'Gorman, 2016). There can be some challenges trying to achieve all three of these goals simultaneously. For example, the government may encourage and subsidize electric vehicles. This is a step that can help achieve environmental and economic sustainability. However, due to income inequality and lack of savings, many families may not be able to afford the up-front investment in an electric car and continue to use their second-hand cars (O'Gorman, 2016).

Economic growth is important for countries and economies; however, it may not represent their well-being (Ozbekler & Ozturkoglu, 2020). Most countries measure economic growth through their gross domestic product. This measures the monetary value of goods and services produced by a country (Aguado & Martinez, 2012). The fashion industry accounts for 2% of the global gross domestic product (Aguado & Martinez, 2012). The more a country is spending on these goods and services, the higher the gross domestic product; this is considered positive by many governments and politicians. However, it is not necessarily a good indicator of a country's well-being. Gross domestic product fails to account for the natural environment, resources, social well-being, inequality, and only focuses on money flow (Aguado & Martinez, 2012). A framework that includes addressing these social and environmental issues may be a better indicator of the overall wellbeing of a country (YİĞİT, 2020). An example of a better framework that could be used is the Human Development Index, created by the United Nations which assesses basic human needs to live a healthy life, such as a decent standard of living (United Nations, 2022).

For sustainable development to succeed, current institutional structures and mindsets need to change at multiple levels (individual, business, governments) regarding social and environmental issues in every country (Weiland et al., 2021). In 2015, the United

Nations created an agenda that addresses 17 different sustainable development goals (Biermann et al., 2017). These goals focus on addressing environmental damage, poverty, gender equality and more. The year 2030 is a global reference point for when these goals should be achieved (Biermann et al., 2017; Weiland et al., 2021). Many previous studies agree that sustainable development goals provide guidelines for people and companies making decisions concerning economic, environmental, and social sustainability for the future (Ozbekler & Ozturkoglu, 2020). However, some commentators criticise sustainable development for prioritising 'economic' development as the primary objective (O'Gorman, 2016; Ozbekler & Ozturkoglu, 2020).

2.1.3. Critiques of sustainable development

A critique of sustainable development is that it prioritizes continuing development (continuing economic activity), but pays less attention to social and environmental impacts. This is so economic development can continue without adverse side effects. The issue with this is that the current rate of economic development is unsustainable, as humans are taking more from the earth than it can replenish (Yeshchenko et al., 2020). Therefore, it cannot continue how it is without the negative side effects. Resources will deplete, and then economic growth cannot continue. Social and environmental issues should be the primary goals that will support economic growth (Mukendi et al., 2020). A nested concentric model (also known as the nested dependencies model) shows that the economy (smallest circle) and society are based on the environment (Dragicevic, 2020; Willard, 2010). This model shows that the economy cannot function without a healthy society, and society cannot function without a healthy environment (Skingar et al., 2013). Therefore, the planet's health and sustainability should be the primary focus (Yeshchenko et al., 2020).

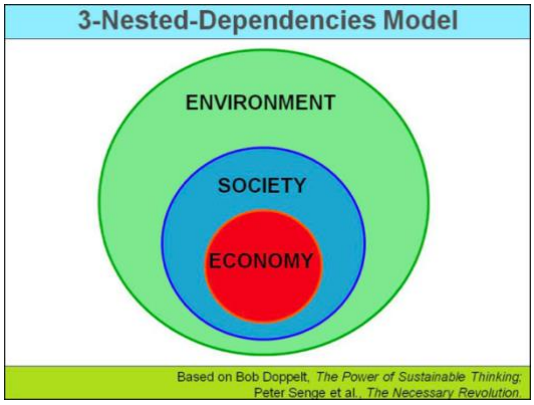

Figure 1. Nested dependencies model. (Willard, 2010).

Effective sustainable development goals and initiatives can lead to sustainability; however, this depends on how committed different countries and governments are to the goals. The goals may be global; however, they may be translated differently in different national contexts (Weiland et al., 2021). Sustainable development goals might not be as transformative as planned in some countries due to the prioritisation of different issues within the country. For example, high-income countries have more money to spend on sustainable innovations than low-income countries. Another challenge is integrating new systems and frameworks within different governments globally that support these transformative changes if achieved (Davis, 2020; Tikly, 2019). A lot of the time, governments believe they win elections based on economic performance (due to a capitalist economy) as opposed to sustainability; therefore, may spend little on sustainable development. (Lawrence & Wong, 2017).

When it comes to implementing sustainable development innovations and technologies, mobilizing these can be an issue in developing countries. These countries feel a valid need to prioritise economic growth; however, they lack the resources to do this in an environmentally responsible way (Singh et al., 2020; Weiland et al., 2021). Technology and other innovations can be costly, especially if these solutions are implemented globally. This can be more difficult for developing countries as they may not have the money to implement these changes (Weiland et al., 2021). This is difficult as each country needs to have a realistic budget for what they can afford to invest in sustainable development effectively and efficiently (Singh et al., 2020; Tikly, 2019).

2.1.4. Environmental management

Environmental management, in business terms, is a type of corporate strategy that monitors and helps implement environmental policies and practices within an organisation (Shoaib et al., 2020). Like sustainable development, environmental management aims to try to minimize environmental damage concerning marine, land, and atmospheric conditions of the earth. Also, to find the most effective solutions to these environmental problems (Shoaib et al., 2020). This is different from environmental performance, which is a way of measuring environmental impacts. For example, how much water is consumed? This helps

companies measure the environmental performance of their policies and practices (Shoaib et al., 2020).

Sustainability requires a system to operate indefinitely without breaking down (Moore et al., 2017). Sustainable development focuses on environmental and social issues caused by economic development. However, because this focuses on economic development, it does not guarantee sustainability (Mukendi et al., 2020). Environmental management is a subset of sustainable development utilized by companies. The fashion industry creates many sustainability issues such as water pollution, carbon emissions, worker exploitation and more. (Aguado & Martinez, 2012). However, many brands engage in environmental management, particularly within the supply chain. Some examples include using sustainable/natural materials and water treatment plants at factories that do wet processing (for example, dyeing clothes). Many brands also measure their carbon footprints by doing life-cycle assessments to see what processes are most damaging to the environment and how they can reduce this (Shoaib et al., 2020). A critique of these kinds of environmental management efforts is that they may help or lessen negative environmental impacts; however, it does not always solve the issues. It also does not mean that the brands are sustainable or that these processes ensure sustainability, as rules and processes may not always be followed correctly, or other issues may be ignored (Tregidga et al., 2019).

2.2. Fashion

Previous research demonstrates that the fashion industry has significant unethical/negative impacts, including animal cruelty, environmental damage, and worker exploitation (Achabou & Dekhili, 2015). Environmental issues include carbon emissions, vast amounts of waste, water usage, pollution and more. Social issues include low wages, poor worker treatment, working conditions and more (Aguado & Martinez, 2012; Fung, Choi & Liu, 2019).

Fast fashion has increased in popularity in recent decades (Fung, Choi & Liu, 2019). Fast fashion clothes are generally launched within a few weeks from the design stage to the final product. This is a significant demand on production, increasing carbon emissions (Fung,

Choi & Liu, 2019). In recent years, brands have grown their clothing collections, due to the rise of fast fashion, creating pressure for consumers to keep up with these trends (Kalambura et al., 2020). This has caused clothing production to double since 2000. Some fast fashion brands include Zara and H&M, producing roughly 12-24 collections per year (Mcfall-Johnsen, 2019). Because of this, people are buying more clothes, wearing the clothes they have less, and throwing more clothes out (Davis, 2020). More broadly, the fast fashion model relies on and further entrenches a 'throw-away culture' of mass consumption (Kalambura et al., 2020; McFall-Johnsen, 2019). While fast fashion produces low-cost goods for consumers and creates jobs, the focus on high-volume production exacerbates the social and environmental issues associated with the fashion industry (Kalambura et al., 2020).

Supply chains in the fashion industry can cause considerable environmental damage. Assessing what materials are used and how they are made throughout the supply chain is essential (Shafique et al., 2017). In 2019 only 38% of New Zealand and Australian brands had assessed their environmental impact. Only 5% of these companies had 100% of their products made with sustainable fibres (Baptist World Australia, 2019).

2.3. Sustainability issues in the fashion industry

2.3.1. Pollution created by the fashion industry

Pollution is when harmful materials or chemicals are introduced into the environment. Pollutants can be natural, like volcanic ash, or human-made, for example, the chemicals and dyes used to colour materials in the fashion industry (McFall-Johnsen, 2019; National Geographic, 2021). Fashion products that create convenience for humans as they are cheap to make and purchase, for example, synthetic fibres like polyester, tend to damage the environment when disposed of or washed (Young, 2019). Pollution from the fashion industry is a global problem because it involves using many resources such as water to grow cotton and pesticides for natural materials. It uses a lot of energy to produce clothes, therefore, contributing to global climate change (National Geographic, 2021).

2.3.2. Climate change

The fashion industry contributes to climate change by producing 10% of all human CO^2 emissions (Mcfall-Johnsen, 2019). Because of globalisation, fashion is now an international industry. This means that clothing is regularly bought online and sent overseas. This clothing production and global distribution contribute to the fashion industry's carbon footprint (Kalambura et al., 2020). When clothes are discarded, they are often burned which releases chemicals (including carbon) into the atmosphere (Mcfall-Johnsen, 2019). Suppose the fashion industry continues the current production rate. In that case, the emissions from the fashion industry will continue to rise at the very time that global society needs to be reducing emissions, as per the Paris Agreement that states the need to maintain a livable climate (United Nations, 2021).

Many clothes in the fashion industry rely on unsustainable materials such as polyester. This material is made from fossil fuels, contributing to carbon emissions. The use of polyester continues to grow in the fashion industry, with the production of this material emitting 282 billion kgs of CO^2 in 2015 (Greenpeace, 2018). The vast amounts of energy it takes to grow certain materials, such as cotton (the huge amounts of energy usage come from the irrigation to water and helps grow the cotton) (Cottoninfo.com, 2022). This contributes to greenhouse gas emissions, with 98 billion kgs of CO^2 emitted in 2015 (Greenpeace, 2018).

2.3.3. Land pollution

Pollution can be found in most urban areas where much production and distribution are happening. Many clothes use cheap materials made from plastic which is found in 60% of all clothing (McFall-Johnsen, 2019). The fashion industry is currently on a trajectory to double its use of polyester (plastic material) by 2030 but claims it is sustainable since it will be recycled. However, recycling materials does not necessarily fix clothing/textile waste. It is a type of open-loop recycling (mixing new raw materials and waste materials). Much of the waste materials come from plastic bottles and containers instead of clothing (Greenpeace, 2018; McFall-Johnsen, 2019; United Nations, 2021). One garbage truck of clothes is either burned or dumped in a landfill every second, contributing to carbon emissions and more plastic pollution (McFall-Johnsen, 2019). Roughly 85% of all textiles go into landfills each

year; this is a massive waste of material and is unsustainable. It is an example of how the supply chain could use its materials more carefully to reduce this (McFall-Johnsen, 2019).

2.3.4. Water pollution

Water pollution is a global issue, particularly for countries with host apparel factories overseas. This could be from plastic; however, chemical usage is arguably a bigger problem. Chemical pesticides used to grow materials such as cotton can be swept by winds and currents into waterways and across land, with some pesticides even being found in sea ice in Antarctica (Greenpeace, 2019; National Geographic, 2021; United Nations, 2021). Organic materials use fewer pesticides and can reduce their water pollution by up to 98%. 70% of China's lakes, rivers and other water sources are badly polluted by many industries, including the fashion industry (Mcfall-Johnsen, 2019). The textile industry is one of the most significant sources of water pollution due to 'wet processing', which involves washing, dyeing, and putting prints on clothes. This creates enormous amounts of wastewater with toxic chemicals (Greenpeace, 2019).

The fashion industry supply chains use hazardous chemicals which degrade water quality for humans to drink and for crop irrigation (United Nations, 2021). This build-up of chemicals has already had long term adverse effects on people and the environment. China does not have strict regulations about chemical usage in supply chains, and despite safer alternatives, dangerous chemicals continue to be used due to cost (United Nations, 2021). Greenpeace (2019) also discovered that despite factories having wastewater treatment plants, hazardous chemicals can still be present in the treated water. Therefore, the elimination of these chemicals is the best option. Fashion brands using overseas factories need to implement solutions such as alternative dyes and safer chemicals (Common Objective, 2018; Greenpeace, 2019).

Washing clothes made of plastic materials releases roughly 500,000 microplastics into the ocean every year, equivalent to 50 billion plastic bottles (McFall-Johnsen, 2019). Plastic does not break down in the sea; it becomes microplastics and releases two to three times more carbon emissions than cotton (Kalambura et al., 2020). Plastic pollution from humans is dangerous to people because once it is disposed of in landfills or littered, animals

may have access to it, mistaking it for food and eating it (Kalambura et al., 2020; National Geographic, 2021). Roughly 20% of global wastewater comes from the fashion industry; this could be from dying different clothing or other chemicals leaking or being dumped into various waterways. The dyeing of these fabrics is also the second-largest polluter of water worldwide. It is not just damaging to freshwater but is a health hazard for anyone consuming, swimming or around those water sources (McFall-Johnsen, 2019).

2.3.5. Water usage:

A survey was done involving 15,000 people by Greenpeace across 15 countries (Greenpeace, 2019). It found that water pollution and water scarcity were the top two environmental concerns for the sample. Globally, the fashion industry is the third-largest water user, with 2 billion people living in water-stressed areas (Greenpeace, 2019). The industry uses roughly 79 million cubic meters of water per year, about 2% of all freshwater use globally. This water usage is due to dyeing and growing materials such as cotton (Greenpeace, 2019). For example, processing, which includes spinning, dyeing, and finishing, just a kilo of any fibre, from polyester to cotton, requires roughly 100 to 150 litres of water. Some certifications that reduce their water usage footprint are Better Cotton Initiative, Fairtrade and Organic (Common Objective, 2018). The continuation of this water usage will put current and future generations of people and animals at risk of not having enough water to survive (Common Objective, 2018; Greenpeace, 2019).

2.4. Social issues

2.4.1. Worker empowerment

Worker empowerment means companies allow agency and power to their workers. This is important for labour rights systems to make sure that workers' concerns are being addressed; it gives the workers a voice (Baptist World Aid Australia, 2019; Williams, 2020). Companies should be providing necessities to the employees to live a dignified life. This means avoiding child, slave or forced labour, ensuring gender equality, addressing different kinds of harassment, creating a safe work environment, and providing fair wages that are suitable for employees to live off (United Nations, 2021; Williams, 2020). Many companies pay a minimum wage, but a living wage is better. A recent report from the International

Labour Organisation (2021) stated that over 4 billion people have no 'social protection'. Social protection includes income security relating to old age, maternity or sickness and access to health care. Social protection is vital for garment workers as it provides them with a sustainable future and decent work conditions (International Labour Organisation, 2021). Garment and textile workers are some of the lowest-paid workers globally and often have no social protection (Williams, 2020). These workers are constantly exposed to harmful chemicals, work in environments with a lack of health and safety measures, and can be exposed to workplace-based violence, harassment, and discrimination (International Labour Organisation, 2021). This is problematic as garment workers receive such little pay that it keeps them in a poverty cycle and negative work environment (Williams, 2020).

Worker empowerment means providing opportunities and supporting the workers through upskilling, education, and training activities. This also means supporting employees, through organisations such as unions to make sure issues/needs are addressed in the workplace. In some countries where a lot of clothing production happens, such as China, unions are banned; this is an issue as it increases the likelihood of worker exploitation (Williams, 2020). Many companies have programs to promote worker empowerment. However, worker exploitation is well-documented in the apparel industry and continues. Women are at risk of exploitation as globally, 68% of garment workers and 48% of textile workers are women (Business for Social Responsibility, 2017). Most of these women are low-skilled and low-wage workers. Therefore, women's empowerment is also an essential aspect of worker empowerment (Business for Social Responsibility, 2017).

2.4.2. Worker exploitation and safety

Fashion production in developing countries, mainly in the Asia Pacific, has huge amounts of child labour and slavery. As well as extremely poor environmental management experienced first-hand by the workers (Achabou & Dekhili, 2015). The substances used in the production processes of clothing, chemicals like bleach and different dyes negatively impact the worker's health who are working with these materials every day (Young, 2019).

An example of worker exploitation and factory conditions was the collapse of a garment factory in Bangladesh, the Rana Plaza, in 2013, killing over 1000 people (Burke,

2013). Several employees had already raised concerns over the cracks in the building. However, these complaints were ignored, and they were made to continue working or else they wouldn't be paid (Burke, 2013). Despite the danger, long hours, poor pay, and abuse, sewing clothes is preferable to other jobs in Bangladesh such as construction (Burke, 2013). This health and safety negligence for these garment factory workers meant that many of them lost their lives. Worker health and safety in the supply chain should be a priority to lead sustainable lives (Burke, 2013).

2.5. Drivers towards sustainability in the fashion industry

Companies in a competitive profit-driven system have often been resistant to change. However, many factors support the move towards sustainability. Some relate to potential advantages for sustainable firms; external forces impose others. Drivers towards sustainability include; cost minimisation, consumers, desire for a positive reputation, NGO's and public pressure.

2.5.1. Cost minimisation

Being a sustainable company can save money; it may cost money to become sustainable initially. However, sustainability will help a company run more efficiently long term (Degraeve & Vandebroek, 1998; Mukendi et al., 2020). It is a smarter use of resources with fewer costs involved as fewer resources will need to be taken. Trends in the fashion industry are constantly changing. Therefore, brands want to produce their products quickly so they sell while they are on-trend (Degraeve & Vandebroek, 1998; Mukendi et al., 2020). An example of one of the most costly activities is cutting the fabric for clothes. The cutting is also very time consuming; however, brands will try and get through this process quickly to get the product out to retailers (Degraeve & Vandebroek, 1998). Before the fabric is cut, a pattern is stencilled onto the material; it would be inefficient to cut these individually, so machines are used. This process, however, has a lot of waste. A study done by Degraeve and Vandebroek (1998) found that this stencilling process was inefficient as stencils had to be created for each size product. Mixing up different templates of parts of the clothing, creates much better fabric utilization. This also saves money as less fabric is needed and wasted (Degraeve & Vandebroek, 1998).

2.5.2. Consumers and desire for positive reputation

Clothes sell based on supply and demand from consumers. Consumer demand shapes different strategies companies use to show what is important to the customer. People also drive trends in and out of season (Lundblad & Davies, 2015; Munier, 2005). An example of this in the fashion industry was the push to ban fur. People started discovering the terrible conditions the animals were put in to be harvested for their fur. Therefore, it became frowned upon to own them, wear them, and create products with fur (Lundblad & Davies, 2015). Many studies agree that there has been an increase in concern regarding ethical and sustainable fashion, and more people are trying to shop sustainably (Mukendi et al., 2020). If fashion brands do not keep up with sustainable practices, they risk losing customers. Customers can put social pressure on fashion brands to change (Lundblad & Davies, 2015; Mukendi et al., 2020). People generally do not like to support things that have negative associations with them. For example, Nike's worker exploitation meant that Nike lost a lot of sales once this became public (Nisen, 2013). When consumers discover something negative about a company, trust is lost. This creates a tarnished reputation making it hard to gain back the trust of consumers (Nisen, 2013). Often, consumers will go elsewhere/stop buying the company's products. (Alon & Vidovic, 2015; Nisen, 2013).

Sustainable fashion brands tend to be more transparent about systems and processes within their company. These brands have clear goals and are open with how the company functions to support a more sustainable industry/planet (Alon & Vidovic, 2015). This makes it easier for consumers to trust the company, and customers know they are supporting a good cause. This creates a positive reputation for the company and can create a positive culture within the company (Alon & Vidovic, 2015; Enright, 2013). Consumers' growing desire for a sustainable fashion industry also means they are more likely to shop at sustainable places (Alon & Vidovic, 2015).

2.5.3. NGOs, public pressure and brand image

The Tearfund Ethical Fashion Report is an NGO charity group that works with 50 developing countries. The charity aims to reduce injustice and poverty through sustainable development (Baptist World Aid Australia, 2019). This report looks at environmental management and labour rights in the fashion industry. It then grades the 130 companies

(representing 470 brands) on a scale of A+, which is the best score to an F (Baptist World Aid Australia, 2019). The Tearfund Ethical Fashion Report acknowledges that for any of these companies to be 'truly ethical', they will need to have good management of their carbon footprint to help keep the atmosphere, water, and earth clean. Companies also need to pay workers properly and take care of them within the supply chain (Baptist World Aid Australia, 2019). This report is easily accessed and is public information. This helps transparency and promotes the companies acting ethically. It also holds the unsustainable ones accountable by making the information public which could pressure them to implement 'greener' practices (Baptist World Aid Australia, 2019).

Many other NGOs also focus on a sustainable future and fixing problems within the fashion industry, such as the Clean Clothes Campaign and Fashion Act Now (Clean Clothes Campaign, 2021; Fashion Act Now, 2021). NGOs are influential as they help shed light on these sustainability issues, spreading awareness and pushing for companies to make positive changes. They are also considered a voice for the preferences of many consumers (Baptist World Aid Australia, 2019; Nisen, 2013). Businesses taking accountability for their pollution and carbon footprint is an important step to becoming sustainable. Accountability means that the businesses understand their social and environmental impact and try to make their practices 'greener'. This can set an example for other businesses wanting to change, too (Baptist World Aid Australia, 2019).

Public pressure helps companies take accountability and change their practices (Alon & Vidovic, 2015). An example is Nike, after consumers discovered worker exploitation in their supply chain. Nike created a Fair Labour Association, which started trying to fix the major issues such as unsafe work environments, minimum wages, and maximum hours (Nisen, 2013).

The living wage is also a way for companies to enhance their reputation regarding social sustainability. The living wage is calculated so it is the minimum income for an individual to meet their basic needs, for example, food, shelter, and clothing. This is a priority as many garment workers in supply chains, particularly overseas in developing countries, are paid well below a living wage (Baptist World Aid Australia, 2019). If brands

implement living wages, they would be able to help lift families out of poverty (Baptist World Aid Australia, 2019). The living wage is calculated by the actual cost of living in a particular country and varies depending on the country (Living Wage Foundation, 2021). Despite a global living wage concept, there continues to be a struggle for many people to meet their basic needs (Living Wage Movement Aotearoa New Zealand, 2021). Despite being employed this does not ensure financial security in low-income countries. In 2015, around 858 million workers were in moderate to extreme poverty.

New Zealand's living wage is $22.75 hourly, or $3,280.10 NZD per month (after tax) (Living Wage Foundation, 2021). In Shanghai, China, where many clothes are manufactured, the living wage is ¥4,502 per month, which is about $976 NZD per month (Global Living Wage Coalition, 2021). It has been estimated that in Bangladesh, where many brands manufacture their clothing, the living wage is roughly 2.8 times their current minimum wage. In Vietnam, the living wage is roughly double the minimum wage (Baptist World Aid Australia, 2019; Global Living Wage Coalition, 2021; United Nations, 2021).

2.5.4. Government action

The Paris Agreement is a legally binding international climate treaty involving 189 countries, including New Zealand. The Paris agreement aims to reduce greenhouse gas emissions globally whilst limiting temperature increases by 2 degrees Celsius, ideally, 1.5 degrees Celsius (United Nations, 2021). All countries joined with this agreement have committed to work together to reduce emissions (United Nations, 2021). This also involves helping developing countries with climate problems and reporting back on progress within each country. If humans continue current operations, there will be a series of events that could jeopardize human life on the planet. It is crucial to stop this before it happens; therefore, governments of all the countries involved must intervene (United Nations, 2021).

There is 'soft law' involved in the Paris agreement, also known as 'non-binding'. This means that the countries involved are not legally obligated to carry out the processes and innovations that lead to reduced emissions, despite the agreement being a legal document (Lawrence & Wong, 2017). However, soft laws may not be the best for changes that are

needed sooner rather than later. Researchers have suggested that harder obligations may be more efficient in meeting the targets (Lawrence & Wong, 2017 (United Nations, 2021).

It is important to note that different countries are taking different actions to work towards the goals of the Paris Climate Agreement (United Nations, 2021). More of the action happens at a national/state level. Developed countries tend to have more stringent environmental regulations. Whereas developing countries where many clothes are manufactured tend to have fewer regulations/they may be harder to implement (United Nations, 2021).

In countries like New Zealand, the government has created a minimum wage, among other laws, that keep labour standards high (Employment New Zealand, 2021). New Zealand also has a smaller population and fewer textile factories; therefore, waste management systems are easier to manage (Alsco NZ, 2021). Bangladesh is a developing country with far lower minimum wages of about ৳6580BTD per month, roughly $108.21NZD (Salary Explorer, 2021). In Bangladesh, there are environmental laws about textile wastewater going through treatment plants before going into waterways. However, there are so many factories, making it difficult to monitor and enforce laws. Therefore, pollution is harder to manage (Water Integrity Network, 2021).

2.6. Barriers to sustainability in the fashion industry

2.6.1. Materials

Sustainable materials tend to take longer for a company to obtain, for example, cotton needs to be grown. Natural materials also tend to cost more than materials made from plastic/synthetic fibres, such as polyester, nylon, spandex, acrylic and rayon (Young, 2019). Therefore, supply chains can make synthetic materials quickly and distribute them to be made into fabrics used for clothes. However, they are not biodegradable and rely on fossil fuels to be created. This is the current norm in the fashion industry, so it is easier to make and buy plastic materials than natural (Young, 2019).

Plastic fabrics are harmful to the environment as they do not break down and release microplastics when washed (Young, 2019). Cotton can be seen as a sustainable fabric because it is natural and tends to be better for humans. It biodegrades at the end of its life. However, it uses a substantial amount of freshwater (Davis, 2020; McFall-Johnsen, 2019). To make one cotton t-shirt, it can take up to 2,700 litres of water. Making a pair of jeans can take from 10,000 to 20,000 gallons of water (Muslu, 2012; Young, 2019). Cotton production also uses many pesticides to grow that release chemicals into the surrounding environment, unless it is organic cotton (Muslu, 2012). Cotton fields, on average use roughly 10% of chemical pesticides and 25% of fertilisers (Muslu, 2012; Hulum & Domesian, 2008). Businesses need to use organic materials, such as organic cotton, as these are rain-fed and use little to no pesticides, making the fabric more environmentally friendly (Young, 2019).

2.6.2. Cost

In the short term, for many fashion brands, there is a cost involved from changing their current practices and supply-chain systems to sustainable ones (Achabou & Dekhili, 2015). This cost could deter some fashion companies from making this change; some smaller businesses might not be able to afford the cost of becoming sustainable (Mukendi et al., 2020). Plastic is also commonly used in the fashion industry because it is cheap (Achabou & Dekhili, 2015). Generally, more sustainable materials such as linen and cotton are more expensive making brands reluctant to switch. Fast fashion brands would struggle to change to a sustainable business model. The fast fashion models rely on unsustainable practices and materials (Achabou & Dekhili, 2015). The clothes are also made as quickly and cheaply as possible, meaning cheap labour and materials, like polyester. Because fast fashion relies on cutting costs to make money, a fast fashion brand would have to change its whole model. This would cost them a lot of money and is not as desirable when they are already maximising their profits through a fast fashion model (Achabou & Dekhili, 2015; Mukendi et al., 2020).

Fashion manufacturers are reluctant to encourage progressive action to help solve these environmental and social issues, caused by the fashion industry because it will cost them money. With the way the fashion industry is currently operating, workers as seen as a cost that can be minimized (Berzau, 2011). Many overseas workers are paid very little, if

fashion manufacturers decide to pay all their employees a living wage and provide support for upskilling it would mean less profit. This is because expenses increase with paying their employees more and providing upskilling and training services (Berzau, 2011). Companies are more concerned about how it will negatively impact their finances instead of positively impacting their workers. Another issue is that if the products are made at a higher cost, this can increase prices for consumers, which may make the product less attractive to them (Berzau, 2011).

2.6.3. Mainstream business practices (capitalist context)

Capitalism emerged in Europe in the early nineteenth century, quickly spreading globally, and it is widely used today (McFall-Johnsen, 2019). Most mainstream business practices in many developing and developed countries derive from a capitalist economic market. The fast fashion industry model produces huge amounts of waste and pollution, negatively impacting workers, and the natural environment throughout the supply chain (McFall-Johnsen, 2019). In the short term, fast production and turnover create a lot of money for the shareholders and the brands in the fashion industry. However, even though many brands follow this model, it is unsustainable. Other sustainable models may not support particular fashion brands' way of making money (such as fast turnover rates in fast fashion), so they may be unwilling to change (McFall-Johnsen, 2019). The idea of capitalism is that an economic system operates mostly with private production and distribution, operating under a profit or market system (Shaw et al., 2016). The New Zealand economy operates under a capitalist system, where most businesses are privately owned (Shaw et al., 2016).

The nature of capitalism means businesses (including the fashion industry) focus on profit maximisation (Shaw et al., 2016). Profits guide businesses in the sense that companies will try to meet consumer demands and find prices consumers are willing to pay (Ozbekler & Ozturkoglu, 2020). Businesses have developed a culture of profit maximisation at all costs (Ozbekler & Ozturkoglu, 2020; Shaw et al., 2016). This can be at the expense of the environment and people working within the business; they can be treated as 'costs' to be minimized instead of someone the company is responsible for (Ozbekler & Ozturkoglu, 2020). An example of this occurring is the Swedish brand H&M. People were made to work

in factories for twelve-hour days, with some of the staff being as young as thirteen years old (Hitchings-Hales, 2018). In many of H&M's factories across the globe, employees were forced to work overtime with extremely low wages and even suffered abuse in some factories. In 2018, there were around 500 alleged cases of abuse in the factories in Bangladesh, India, Sri Lanka and more (Hitchings-Hales, 2018).

Capitalism is also driven by competition; companies produce these goods and services in a competitive market, in which the companies attempt to dominate as much of the market as possible (Shaw et al., 2016). Competition means that companies cannot just price products at whatever price they desire; it means that the company has to compare its prices to other companies and have similar pricing. However, competition can prevent companies from acting sustainably as they cut costs to drive down their prices to appeal to customers. If firms continue to do this, it will also make sustainable companies' goods and services less competitive unless consumers are willing to pay more (Shaw et al., 2016; Ozbekler & Ozturkoglu, 2020).

2.6.4. Greenwashing

Greenwashing is when businesses market their goods and services as environmentally friendly when they are not as environmentally friendly as they are stating (Bowen, 2015). Companies may spend more money marketing their products as 'green' than implementing environmentally friendly practices. Because consumers are starting to become more environmentally conscious, it puts pressure on companies to become more eco-friendly. This can lead to greenwashing so the companies can still appeal to customers (Corporate Finance Institute, 2021). This can be through 'ecolabelling' when companies use certifications meant to help their transparency by being more environmentally friendly or addressing specific social issues (Bowen, 2015, Tregidga et al., 2019). However, this can sometimes confuse consumers, creating false trust in the brands as they have a certification that is meant to be an ethical credential. Some certifications obscure what the brand is doing (Tregidga et al., 2019). Certifications may make a product look 'greener' than it is, therefore, not solving the issues of environmental or social damage. For example, a recycling certification called the GRS makes a product look more eco-friendly since it has used recycled materials. However, often it is not mentioned that to gain the certification,

the product only has to be made up of 20% recycled materials, not 100%; this is greenwashing with certifications (Greenpeace, 2021; Tregidga et al., 2019). A certification is credible and useful when there is enough change to make a positive impact.

2.7. The global nature of supply chain management

Globalisation has changed the fashion industry, with many stakeholders in the supply chain shifting overseas (Achabou & Dekhili, 2015). For a supply chain to become sustainable, companies need to have good management of all processes that go into the entire network of the supply chain (Ahi & Searcy, 2013; Ashby et al., 2012).

Supply chains in the fashion industry tend to be complicated because of the many different processes that are involved. Many different stakeholders are involved in a fashion company, such as designers, manufacturers, distributors, owners, regulators, retailers, consumers and more. Therefore, communication between stakeholders is essential (Achabou & Dekhili, 2015). If companies fully understand the issues that arise in the supply chain, then they can develop strategies to make it more efficient (Achabou & Dekhili, 2015; Ahi & Searcy, 2013; Ashby et al., 2012).

Supply-chain management in the fashion industry is arguably one of the biggest issues regarding negative social and environmental impacts. This is because so many processes currently being used are not sustainable (Ahi & Searcy, 2013; Ashby et al., 2012). The globalisation of the supply chain creates huge carbon emissions, with many parts of the supply chain needing transportation around the globe (Ahi & Searcy, 2013; Ashby et al., 2012).

Studies suggest firms can hold themselves accountable and start moving towards more sustainable practices by focusing on transparency and traceability within their supply chains (Young, 2019). One study suggested that stakeholder collaboration and engagement can help sustainable innovations and improve corporate social responsibility (Todeschini, Cortimiglia & de Medeiros, 2020). Existing academic and practitioner literature agree that effective policies, good auditing and supplier relationships, worker empowerment, environmental management and transparency and traceability are key points of best

practice within the global fashion supply chain (Ashby et al., 2012; Albino et al., 2009; Baptist World Aid Australia, 2019).

Frequent and thorough auditing ensures these practices are efficient in terms of money and resources. It also can help suppliers adjust practices if and when necessary and mean high levels of monitoring policies/regulations are being followed (International Labour Organisation, 2017; Yeshchenko et al., 2020). Good supplier relationships ensure the company and suppliers are on the same page and that there is good communication along the supply chain if issues arise (Ashby et al., 2012; Albino et al., 2009). Lastly, policies help regulate and guide companies' practices in the supply chain to become more ethical and sustainable (Singh et al., 2020).

2.8. Brands' sustainability reporting

Sustainability reporting is a non-financial disclosure of a brand's environmental and social impacts. Reporting on sustainability efforts shows transparency and helps provide the trust with stakeholders if it is done honestly. The information needs to be clear and accessible to the public; this can be done through their websites and sustainability reports (Diouf & Bioral, 2017). The Global Reporting Initiative (GRI) was established to create standardized guidelines for companies to follow when disclosing sustainability impacts. These can be reported through sustainability reports and the company's websites (GRI, 2015). Some issues/impacts in these guidelines are water consumption, raw material sourcing, carbon emissions, chemical management, and life-cycle assessment. Factory audits, lists of suppliers, policies and more are also included in these guidelines of what companies need to include. These issues should be addressed with sustainability mitigation plans and goals for the company to achieve (GRI, 2015).

In a study done by Jestratijevic et al. (2022), traceability was the least addressed issue in sustainability reporting in the fashion industry. They found the companies that made the most effort on transparency were more likely to improve their sustainability efforts and goals over time as it meant they were reporting more information to the public, holding the companies accountable. Brands that did not disclose as much regarding transparency and traceability had limited improvements in other sustainable reporting

areas. These brands often provided a lot of self-selected information about the issues they were addressing stopping stakeholders from questioning issues they were not addressing (Jestratijevic et al., 2022). Their study found some brands examined that focused solely on business-related policies, ignoring transparency and supply chain issues. This means stakeholders cannot see processes within the supply chains and whether the policies are being enforced (Jestratijevic et al., 2022). Some brands had zero commitment to transparency and did not discuss any information regarding social and environmental issues in supply chains. Lack of transparency and traceability prevents stakeholders from knowing whether the brand's initiatives are being followed through in everyday operations (Jestratijevic et al., 2022).

A standard set of criteria has not yet been implemented globally for all brands to follow (GRI, 2015). Another study by Gonçalves and Silva (2021) found that many fashion brands don't necessarily follow GRI but create their own measurements or follow others in the industry. For example, the transparency index, and social codes of conduct. Transparency in the fashion industry is still limited, and there is a need for improvement as this will likely improve other sustainability efforts. Withholding important supply-chain information creates a lack of trust, accountability and knowledge from the brands who choose not to disclose transparency and traceability information (Jestratijevic et al., 2022).

2.8.1. Transparency and traceability

Transparency is vital for companies assessing the risks in the supply chain. High transparency and traceability can help to ensure workers' rights are being respected. Unfortunately, high transparency and traceability in the fashion industry can be difficult as many products are manufactured overseas. This is where exploitation is likely to be at its highest, far away from the brand and public eye. Lack of transparency and traceability can make it difficult to get sustainable and ethical materials and create negative social impacts (Business for Social Responsibility, 2017; International Labour Organisation, 2017). Transparency is not impossible, though; regular auditing and credible certifications can help ensure regulations and rules are being followed. Transparency involves making a supply chain visible; this includes suppliers' names, certifications, and the location of the facilities. The more transparent a supply chain is, the better. High visibility means companies and

consumers can check that factories comply with regulations and rules regarding products and worker safety (Shafique et al., 2017). Traceability refers to specific components in the supply chain, such as materials and operational information. It looks at the journey of the products and their inputs from the start to the end of the supply chain. For example, cotton, does it use pesticides, is it organic, and how fast was it harvested? This can help with efficiency in the supply chain and helps calculate environmental impacts (Business for Social Responsibility, 2017; Shafique et al., 2017).

According to the Tearfund Ethical Fashion Report (2019), despite New Zealand having strong Health, Safety and Employment legislation, risks are lower in New Zealand, but exploitation still occurs. Often it is the same category of workers exploited overseas, migrant workers and younger people (Baptist World Aid Australia, 2019). Most large fashion chains in NZ manufacture offshore; even if some parts of production are in New Zealand, many steps of production tend to be overseas. There is less transparency when third parties are involved in the supply chain. Therefore, there is more risk of exploitation as the brands have less control over worker health and safety issues (Kelly & Davis, 2020). The increased time pressure in the fast fashion industry results in a lot of unethical employee treatment and manufacturing sites, with most of this happening in less developed countries (Burke, 2013; Kelly & Davis, 2020; Turker & Altuntas, 2014).

2.9. Sustainable fashion model; the circular economy

The circular economy is a popular model discussed in previous literature (Patwa et al., 2021). In more recent business practices, many companies globally have a linear model of production and consumption. A linear business model includes exploiting resources and materials and producing a product with minimal costs, hoping to maximize profits. Then once the products are consumed, they are likely to be thrown away. This is also known as the take, make, waste model (Patwa et al., 2021).

Due to this business exploitation over many years and linear model, resources are depleting quickly. Resources are harder to get, prices are increasing, and more risk is involved in supply chains (Patwa et al., 2021; Shaw et al., 2016). The linear economy

negatively impacts people as it ruins resources that future generations need and pollutes the environment (Patwa et al., 2021).

Some businesses are starting to turn to more efficient models that involve more environmentally friendly options. A circular economy is a regenerative model that focuses on minimizing the negative impacts of production and consumption and incorporating existing ideas and economic activities, so they do not harm the environment (Patwa et al., 2021). It is about reusing or fixing materials that already exist. An example of this is recycling plastic bottles to be reused for other products where plastic is used, so the plastic does not just go into landfills or the ocean adding to pollution (Patwa et al., 2021). Alternative business models and strategies such as a circular economy can help significantly reduce greenhouse gas emissions (Patwa et al., 2021). If most businesses in all industries, particularly involving manufacturing and production, switch to a circular economy, this will help countries reach sustainable development goals involved in the Paris Agreement (Patwa et al., 2021; United Nations, 2021). It is important to note that some scholars defined a circular economy as more profit-focused as a way to minimize waste with sustainability as an alternative goal. This, indeed, could help influence profit-driven businesses to steer toward a circular economy (Mentink, 2014; Aras, 2009). However, the main goal focused on in this thesis is sustainability.

Much of the literature involving circular economies agrees on six business actions which are guidelines for businesses shifting to a circular economic system; share, regenerate, loop, optimize, virtualize and exchange (Patwa et al., 2021; Todeschini et al., 2020; Zhang, 2019). Share means for companies to cooperate and share services, products and information that can help all of the parties involved financially as costs will be split. This will also support environmental sustainability in the long run as resources will be shared (Patwa et al., 2021). Optimize is using the best innovations and manufacturing resources that are the most efficient and adaptable when it comes to manufacturing. Therefore, fewer costs will be involved long term as well as minimal waste (Patwa et al., 2021). Loop means using a closed-loop circular economy, recycling or fixing existing materials so something that may have been discarded, can be reused as the same or a different product. This reduces the need for further extraction of resources and eliminates waste (Patwa et al., 2021).

Virtualise means shifting physical products and services to virtual ones; this can also be cost-efficient as it uses fewer materials (Patwa et al., 2021). Exchange alludes to exchanging resources, including materials, manufacturing capacities and technology, with people and businesses in the same industry (Patwa et al., 2021).

An example of a sustainable and circular fashion brand is the New Zealand brand Kowtow. Kowtow focuses on fair trade practices, using organic cotton and other organic materials from New Zealand that are non-toxic (Kowtow, 2021). They make multipurpose garments with limited waste as well. Kowtow also encourages customers to bring their old kowtow clothes back if they are faulty, and Kowtow will repair them. Otherwise, if the customer wants to throw the product away, Kowtow will take it back to recycle. Certified factories in India make these garments. These manufacturers have worked for the company since 2006 and are visited twice a year to ensure transparency (Kowtow, 2021).

2.10. Research questions

Fashion companies are one of the main producers of pollution due to the many manufacturing processes involved in supply chain management. Fashion generally has a short life cycle, as trends come in and go out (Todeschini, 2020). With fast fashion, consumers go through more trends quicker, leading to massive environmental and social harm. Many New Zealand fashion retailers and other global brands, manufacture offshore because it tends to be cheaper. However, New Zealand being a smaller country that is less populated, may face different challenges than bigger countries such as the United States or Europe. Leading to research question 1: How are representative firms in the New Zealand fashion industry addressing the sustainability issues that arise in their supply chains?

Existing research stresses the importance of supply-chain issues in the fashion industry. This is where most of the environmental damage and social problems arise and (therefore) where many positive changes can be made (Da Giau et al., 2019). Some fashion companies are adopting ‘greener’ practices. These practices tend to focus on supply-chain management innovations. Companies wanting to shift to a sustainable supply chain could learn from other fashion brands/companies already involved in these

sustainable practices. Many fashion companies are trying out ‘greener’ practices. However, there was a research gap in many previous studies for guidelines on how fashion companies create more sustainable and efficient supply chains.

This leads to research question 2: What are the key solutions and frameworks for greener supply-chain management that the New Zealand fashion industry can learn from global best practices?

Chapter 3- Methodology

This thesis analyses relevant qualitative data to address the two research questions. More specifically, the thesis uses thematic analysis to examine and categorize the data. The ontological approach for this thesis is critical realism, while the epistemology is objectivism.

3.1. Research paradigm, ontology and epistemology

This thesis takes on an ontological position of critical realism. Realism is a more western approach based on science that there is one true reality (Standford Encyclopedia of Philosophy, 2002). Realism holds that the world is full of discoverable facts. Applying this ontological position to this thesis, the fashion industry creates negative social and environmental impacts (Lundblad & Davies, 2015). For instance, it is a provable fact that the fashion industry causes environmental and social issues (Assoune, 2021; Ashby & Hudson Smith, 2012). The negative environmental impacts include increasing waste due to the throwaway culture of fast fashion and carbon emissions due to the production of garments, transport, and the globalisation of the supply chain. There are many negative social issues within the supply chain, such as neglecting health and safety, which can be seen through events such as the Rana Plaza collapse (Burke, 2013).

The critical part of 'critical realism' is the assumption that people's beliefs and actions are shaped by their position in the world, which includes ideologies and material interests (Fryer, 2020). Therefore, what is known may depend on the person and their position in the world. For example, an environmentalist would understand that the fashion industry creates enormous amounts of water pollution due to wet processing practices. However, consumers might not understand what damage the fashion industry creates. Therefore, they may not think it is as bad. This thesis will look deeper into the facts of these severe social and environmental issues and the possible solutions to a greener supply chain that the New Zealand fashion industry could adopt (Buch-Hansen & Nielson, 2020; Goertz & Mahoney, 2012).

A qualitative approach was the most appropriate methodology for this thesis. This is because qualitative approaches are better for understanding concepts and ideas than

quantitative which are based on measurable data (Daniel, 2016). This thesis is interested in the claims that companies and other actors, like Tearfund, make. Qualitative research helps to understand how people experience and interpret the world. Data can be collected through observations, surveys, interviews, and secondary research. This thesis examines secondary data from websites, reports, articles and more to understand different key concepts and build different ideas and themes regarding sustainability issues and best practices to solve these, found within this data (Daniel, 2016). It also analyses each brand's organic cotton t-shirts examining their claims for this specific product.

3.2. Sample

The New Zealand fashion industry was chosen as the focus of this thesis because there is a gap in the existing literature specifically regarding the New Zealand fashion industry's sustainability issues. To answer research question 1: how are representative firms in the New Zealand fashion industry addressing the sustainability issues that arise in their supply chains, five representative New Zealand fashion brands were chosen. The examined brands were Glassons, Farmers, Max, Barkers, and Ruby. To answer research question two: what are key solutions and frameworks for greener supply-chain management that the New Zealand fashion industry can learn from global best practices? Four representative global fashion brands were chosen: Patagonia, Outland Denim, Country Road, and Stella McCartney, these brands were from the United States of America, Australia, and the United Kingdom. These brands were selected mostly through the Tearfund Report. The Ethical Tearfund Fashion Report is a report that looks at environmental management and labour rights within the fashion industry. It grades roughly 130 companies on a scale of A+ being the best and F being the worst. It has different categories, such as policies, supplier relationships, environmental management and more that the brands are graded against. The five different brands were chosen for research question 1 based on different grades to see a diverse range of sustainability efforts.

Bigger brand names were also chosen as there tended to be more information on these brands. Even though Ruby was not in the recent Tearfund Report, it was picked as the last brand of the five because they have a lot of marketing regarding sustainable fashion, for

example, its repair program and recycled materials. Then for research question 2, the Australian brands (Outland Denim and Country Road) were chosen from the Ethical Tearfund report with A range grades because these brands should have best practices considering they scored well in most of the categories. The other two brands were picked from their reputation on fashion blogs discussing sustainability and their marketing of being 'sustainable' brands.

3.3. Procedure

After the brands were chosen, the research proceeded by gathering as much publicly available information as possible relating to these brands' sustainability performance. Data were drawn from the brands' websites and published reports to see what the brands were advertising regarding their sustainability efforts, what issues they were addressing, how they were addressing them, what they were showing the public and what issues they did not discuss. Certifications and pricing around their clothing were also looked at, focusing on one common fashion item: organic cotton t-shirts. Organic cotton t-shirts were chosen as they are a common clothing item that each fashion brand would likely stock. All the brands in research questions 1 and 2 had white organic cotton t-shirts. If there were multiple organic cotton t-shirts, the cheapest one was examined. The organic cotton shirts were also examined and photographed in-store for the New Zealand brands in research question 2. Data were drawn from how the brands advertised their organic cotton t-shirts, eco-certifications, and any information about how the product was made.

Then brands' sustainability reports were examined (if they had them), looking at their goals from previous reports 2019-2022, whether they had improved and made progress on issues they said they would or were not following through. Third-party articles sourced from places such as the guardian and academic journal articles such as corporate social responsibility and environmental management were examined. These either praised and/or discussed practices the brand was doing or critiqued issues in their supply chains. These were then compared to what the brands had written about themselves. The certifications that brands had listed on their products, websites, or sustainability reports, particularly cotton t-shirts, were discussed and then examined through the certification websites and third-party websites such as the guardian critiquing the certifications

(particularly the organic certifications). The same process occurred for research question 2; however, out of the issues discussed in research question 1, it focused on what they were addressing well and what practices or frameworks were used to help or solve these issues. Sustainability reports were looked at, their websites and third-party articles/websites looking at the different technology, for example, E-flow technology, to see what exactly it does. Although none of the brands was perfect at addressing every issue for research question 2, their best practices were examined for what issues they were addressing well and what were producing the best results when addressing specific issues.

3.4. Analysis

Thematic analysis is a qualitative research technique where themes and patterns are identified and interpreted (Ozuem et al., 2022). It is a descriptive technique for building concepts and theories to understand a topic; it is not a static technique that can be measured but rather is flexible depending on what the researcher finds (Ozuem et al., 2022). Thematic analysis is meant to find and understand the reoccurring themes and draw conclusions based on these.

The six steps involved in conducting a thematic analysis include 1. Familiarising yourself with the data; reading a lot of data from websites, research articles and brands sustainability reports and noting down initial ideas. The Ethical Tearfund reports from 2019-2022 were examined, and many notes regarding the different sustainability issues were gathered from this. Also, certain brands were noted as possible brands to be examined in the thesis. 2. Generating initial codes; identifying the important information and coding it (more specific than themes). This started with a list of the significant issues associated with the New Zealand industry based on previous literature and the data generated for each brand being analysed. The sources for this consisted of academic articles and news articles that were compared. 3. Searching for themes; interpreting the codes and putting relevant data into different themes. For example, the theme of water issues; started with codes being characterised as either a social or environmental issue (S or E). The environmental codes are put together; these may include water usage, plastic pollution, and chemical usage. This list was then organised into broader themes, such as, water issues, as all these categories negatively impact water.

4. Reviewing themes; looking at the themes identified and refining/editing them to be clear and identifiable. Some issues were taken off the list of possible themes if they were more minor or did not seem to relate to the research question well. For example, changing consumer preferences was mentioned; however, it was not included as it did not clearly align with the research questions. 5. Defining and naming the themes, looking at subthemes, and providing clear names for each theme. The environmental themes/issues that were examined in research question 1 were carbon emissions, water pollution/chemical use, water usage and plastic/land pollution. Greenwashing and certifications were an added theme as research was done. The social themes and issues were worker empowerment, living wages, auditing and supplier relationships, transparency and traceability and policies. 6. Producing the report; producing a finished report in which all the data has been interpreted (Braun & Clarke, 2006). The codes and themes are summarised in table form and then more fully discussed in the sections below.

An example of a theme that emerged through this process of thematic analysis was that of the living wage. In the analysis, low wages were a common issue that came up within supply- chains. This was put in coded as 'wages', a social sustainability issue; it came up in the Ethical Tearfund report and many third-party websites and articles discussing issues within the fashion industry's supply chains. Any article discussing anything to do with wages was written down and coded as a social sustainability issue. Initially, the theme was called 'low wages' or 'wages'. However, this theme then evolved slightly and was renamed 'living wage' as the lack of a living wage was a theme prevalent among New Zealand fashion brands. The idea of a living wage proposed a solution for this social sustainability issue. It emerges as part of both research questions 1 and 2. This theme was then changed again in research question 2 as it became joint with worker empowerment as worker empowerment was a broader umbrella discussing social sustainability.

When looking at best practices, the themes for research question 2 included carbon emissions, water usage, water pollution and plastic pollution regarding the environmental issues and then for social worker empowerment and living wage were put into one theme, auditing and supplier relationships and transparency and traceability. Policies were not

discussed for research question 2 since the analysis showed that most brands generally had well-written policies.

This is an appropriate analysis for this thesis as both research questions require an interpretation and identification of the key themes in relevant practitioner and academic literature. This thematic analysis methodology is based on different New Zealand and international fashion brands' sustainability efforts in their supply chains. It provides real-life examples of fashion brands and interprets what key issues they are addressing well, what needs to be improved upon, and what best practices can be drawn upon (Smith, 2014). It also looks at their different products, such as cotton t-shirts, the various certifications and processes they are using regarding organic materials and their pricing. Looking for common themes to conclude on and compare the claims each brand was making regarding the cotton t-shirts and the certifications they had.

Chapter 4- Findings question 1

4.1. Research question 1: How are representative firms in the New Zealand fashion industry addressing the sustainability issues that arise in their supply chains?

The findings for research question 1 look at how the five representative New Zealand firms address sustainability issues that arise in their supply chains. The environmental and social issues are well-known and discussed in the literature review section. To understand what New Zealand brands are doing to address these issues (research question 1), this research draws on existing evaluations and sustainability records of major New Zealand fashion retailers and brands. The key sources used include media coverage and the 2019 and 2021 Ethical Fashion Tearfund Report. The 2020 report was more limited due to covid. However, covid did make many of the issues discussed worse, such as worker mistreatment, because it was harder to monitor. Analysing these sources (by identifying the measures by which New Zealand fashion companies perform the worst) helps this research establish the significant sustainability issues facing the New Zealand fashion industry, also clarifying where in the supply chain these issues arise.

To understand how New Zealand fashion companies respond to these challenges (research question 2), the research examines a representative sample of five major New Zealand fashion companies (Glassons/Hallensteins, Farmers, Max, Barkers and Ruby) and how they attempt to manage their supply chains. It does this by tracing the production of one representative fashion item: the cotton t-shirt. The research analyses the cost of the t-shirts sold by each company, sustainability claims relating to the product through them in publicly available material (websites, in-store information, sustainability reports, other sources), and whether their public claims are supported by evidence or are verified by third-party organisations.

4.1.2. Measuring NZ fashion brands sustainability progress

Environmental issues	Carbon emissions	Water pollution/chemical use	Water usage	Plastic/land pollution
Glassons	2	4	4	4
Farmers	1	2	2	2
Max	3	2	1	4
Barkers	4	4	4	4
Ruby	3	1	1	4

Table 1. Brands addressing environmental issues.

Social issues	Worker Empowerment	Living Wage	Auditing + Supplier relationships	Transparency + Traceability (social+enviro)	Policies
Glassons	4	3	4	4	4
Farmers	1	1	1	1	4
Max	3	1	4	4	4
Barkers	2	4	1	4	4
Ruby	1	1	1	4	4

Table 2. Brands addressing social issues.

Key for framework:

4-Green: Good, brand making active progress to improve the issue
3-Blue: Fair, some progress is being made/plans are in place to address the issue
2-Yellow: Minimal progress and/or not much information provided
1-Red: No/Poor effort, the brand has not addressed

The companies were assessed based on these criteria, which were put together through different reports and information looking at the top social and environmental issues in the fashion industry. A note, just because the company is graded 4 (green), it does not mean it is a sustainable company/supply chain; it means the company is making

progress in addressing the issue. The criteria taken from the Tearfund Report were policies, transparency and traceability, auditing and supplier relationships and worker empowerment. Then the living wage was added based on research; this was all put into the section of 'social issues'. There was an environmental management section in the Tearfund report. However, instead of using this, it was split into different sections.

The research done for research question 1 found several different categories for both environmental and social issues. The categories for the environmental issues were carbon emissions, water pollution/chemical use, water usage, and plastic/land pollution. The five fashion companies least addressed the environmental issues of water usage, then carbon emissions and water pollution. The environmental issue that the companies best addressed was plastic and land pollution.

The different categories found for the social issues were worker empowerment, a living wage, auditing and supplier relationships, transparency and traceability and policies. The social issues that the five companies best addressed were policies and transparency and traceability. The companies' social issues addressed the least were living wages and auditing and supplier relationships. Social issues were addressed less than environmental ones. The NZ fashion retailers tended to focus on single-use plastics and packaging as the leading environmental issue and focused more on social issues. However, many of the social issues being addressed, such as wages, had little evidence or detail. Another common theme was certifications; most brands had some certifications around their clothes. However, it did not explain/clarify what the certification meant or used certifications that seemed to be more 'greenwashing'.

4.1.3. Information on the representative brands' cotton t-shirts

Cotton T-shirts	Price range	Certifications	Claims the brand makes
Glassons	$19.90-$29.90	OCS, OCS100	Glassons does not state the difference between these two organic certifications.
Farmers	$39.90-$79.99	GOTS	Farmers carried brands (such as Calvin Klein) that had organic cotton that was 'eco-dyed'.
Max	$30-$59.90	Organic cotton-certification not specified	Max does not accept cotton from Uzbekistan (known for forced/child labour).
Barkers	$39.90 +	Better Cotton initiative	55% certified organic cotton, 34% responsibly sourced.
Ruby	$149-$199	Organic cotton-certification not specified	

Table 3. Brands' cotton t-shirts

4.2. Glassons (and Hallensteins)

4.2.1. Tearfund Ethical Fashion Report and cotton T-shirts

On the Tearfund Ethical Fashion report, Glassons/Hallensteins got a rating of A overall, A+ for policies, A for transparency and traceability, A for auditing and supplier relationships, A+ for environmental management and B for worker empowerment (Baptist World Aid Australia, 2021). Glassons sells organic cotton tank tops for $19.90NZD, which uses fewer pesticides (Glassons, 2021). Hallensteins also sells their men's organic cotton t-shirts for $19.90NZD. This is verified by OCS certification, which third-party auditors do at every stage of the supply chain (Organic Content Standard). The organic content standard is a global and voluntary standard to help verify organically grown products from the farming stage to the finished product (textileexchange.org, 2021). This organic cotton certification was less commonly used with NZ fashion brands, with many using the GOTS certification and better cotton instead (discussed later). Glassons/Hallensteins have various cotton tops with either the OCS 100 or OCS verification. The OSC 100 certification means these tops contain 95-100% of the organic material stated (Icea.bio, 2021). However, many Glassons tops are just OCS verification, which means that any clothing item containing at least 5% of organic material can be classified as organic (Icea.bio, 2021). This could be seen as 'greenwashing'. Many customers may not know the difference between the two certifications (Corporate Finance Institute, 2021). Both certifications guarantee the traceability of the organic material through the supply-chain though (Glassons, 2021).

Figure 2. Glassons organic cotton t-shirt.

4.2.2. Environmental concerns

Since the Tearfund Ethical Fashion Report in 2019, Glassons has increased its sustainability efforts over the past two and a half years (Baptist World Aid Australia, 2021). Glassons discusses its initiatives which look at materials, labelling/packaging, certifications, ethical responsibility, and environmental responsibility. Some of the information involves recycling their materials, including cotton and polyester, which are also traceable. According to Glassons/Hallensteins sustainability report (2020), Glassons have been trying to gain transparency within the supply chain (Glassons, 2021). Their denim is now 50% recycled cotton, and they are using eco-friendly dyes. These processes save vast amounts of water and create less wastewater (Glassons, 2021). Reducing water and wastewater is verified through some of the certifications used by Glassons/Hallensteins, such as LENZING (to be discussed).

Textile waste (including plastic materials) going into landfills and the ocean is Glassons/Hallenstein's main environmental concern (Hallenstein Glasson Holdings, 2021). They upcycle leftover materials from garments, recycle fibres, and reuse/repurpose vintage Glassons pieces. Glassons also have certifications to do with their materials showing they are traceable and trying to be more environmentally conscious. However, their certifications have some flaws and limitations with how meaningful they are (Glassons, 2021).

Some other certifications that Glassons is using include Global Recycled Standard (GRS), Organic Content Standard (OCS), Global Organic Textile Standard (GOTS), LENZING and ECOVERO and European Flax.

The GOTS certification guarantees that textile products contain at least 70% natural organic fibres. All the chemicals (like dyes for example) must meet certain toxicological and environmental criteria, following a list of approved chemicals. A wastewater plant is also mandatory for wet processing (Icea.bio, 2021). 70% is a relatively large percentage; however, it means there is room for 30% of the product to not be organic. Of the other 30%, 10% can be synthetic fibres. Certain chemicals can also still be used, which may harm the environment (Assoune, 2021).

The GRS certification guarantees that at least 20% of products are made from recycled material. It verifies the recycled material and supports responsible social, chemical and environmental practices in producing these products. It provides traceability from the recycled to the final product. The standard ensures workers are treated ethically according to international labour standards. It states that they have introduced tools in its supply chain management to help prevent damaging environmental practices, such as chemical restrictions. A critique is that 20% is quite a low percentage, meaning that most of the product could be made from new raw material, which creates more waste if discarded. This certification seems to be 'greenwashing', as the standards are minimal (Assoune, 2021).

The European flax certification ensures that the flax/linen used is from the following countries in Europe; France, Belgium and Netherlands. The certification ensures there are no genetic modifications to the flax, no irrigation is used, and there is no waste, meaning the material has a lower impact on the environment. This certification requires that the flax/linen content is 100% certified. However, a downside to this certification is that an item of clothing can still have a mix of materials and have the certification. The mixture needs to contain 50% of the certified linen/flax. Therefore, the rest of the garment could be another fabric, such as polyester (European Flax Standard, 2019).

Lenzing and Ecovero are viscose fibres that come from wood sourced from sustainable forests. It is suggested that this generates 50% lower emissions than generic viscose and is arguably the ‘most sustainable’ viscose fibre (LENZING™, ECOVERO™, 2021). This certification seems to be the only thing Glassons has used to address the reduction of carbon emissions. The certification ensures transparency through the supply chain to the final product. However, the production of Ecovero involves a lot of toxic solvents such as sulfuric acid, carbon disulphide, caustic soda and more (Assoune, 2021). These chemicals can burn skin and eyes and cause lung damage if inhaled at high concentrations. If not handled carefully, the manufacturing process can cause severe harm to workers. The microfibres from ecovero can also be transported to oceans and lakes, polluting them. Ecovero also is not certified by internationally recognised health and safety standards (Assoune, 2021). Lenzing is associated with making lyocell; both are more eco-friendly

versions of viscose. However, Lenzing is better as it has a closed-loop production process that does not require the highly toxic chemicals that ecovero does. It reuses water and solvents at a rate of 99% (LENZING™, ECOVERO™, 2021).

Regarding environmental concerns, Glassons is open about the changes they have made to the business to become more environmentally friendly. Being a fast-fashion company, Glassons has used a lot of plastic in the past. Therefore, they have focused on reducing single-use plastics within the business/supply chain. It seems to be the most obvious move for the company to become less unsustainable. Glassons/Hallensteins removed roughly 90% of all single-use plastics throughout the supply chain in 2021, as this is related to the issue of increasing textile waste in landfills (Hallenstein Glasson Holdings, 2021). This was done by changing their plastic packaging, such as courier bags, to compostable ones, which has saved roughly 2 million polybags in the past year—also changing to paper bags for customers in the store. They make their kimbles (plastic toggle connecting price tag to clothing) out of recycled plastic. Glassons/Hallensteins also use recycled bottles to make clothes, such as Hallensteins puffer jackets (Hallenstein Glasson Holdings, 2021).

A code of conduct mentioned regarding environmental responsibility discusses how suppliers need to have action plans to minimise and control the following: hazardous chemicals use/disposal, solid waste disposal, air and water emissions, and adequate training for workers for handling chemicals. However, there are no targets or plans for how these will be minimised. It is just a general directive for suppliers to follow. It is stated that the factories are audited to make sure they all have environmental action plans. Still, it is not stated whether these audits are planned or unannounced and how the environmental action plans are monitored (Glassons, 2021). There is no extra information on these 'environmental plans' in the Glassons/Hallensteins sustainability report (2020).

4.2.3. Ethical/social concerns

While Glassons/Hallensteins highlights what they claim to be doing regarding environmental issues, they offer less information regarding social sustainability. Glassons/Hallensteins has many products from factories overseas in developing countries.

These factories had poor working conditions and environmental standards that have since come under scrutiny (Hallenstein Glasson Holdings Limited, 2020).

The certifications mostly addressed 'greener' materials; none involved factories or other social issues. Transparency is mentioned as an essential issue in the industry and subcontracting. They mention where their factories are located (China, India, Bangladesh, Vietnam, Turkey) and state that they have good transparency. They say, 'suppliers must disclose all information on where our product is being made'. However, they do not precisely state how they check this. Glassons mostly list their codes of conduct, such as labour rights, gender equality, health and safety, and states how the factories should follow these codes of conduct (Glassons, 2021). The codes of conduct are not repeated in the Glassons/Hallenstein sustainability report (2020).

Glassons currently pay a 'fair' wage, which is above minimum wage and includes regular employment. However, it is not a living wage, and many of Glassons' factories are in countries that have very low minimum wages. They state that they have started a project researching barriers to achieving living wages and that this is their priority for 2021 (Glassons, 2021). There are only brief statements and descriptions on their website regarding this issue. There are no links or other information regarding the project in work for reaching a living wage. They also state that their factories have management and representatives they communicate with, and those factory standards comply with the laws. However, there is no real way of making sure workers' rights are not abused in these factories overseas/that codes of conduct are being followed. One code of conduct discusses how Glassons has the right to make unannounced visits to any of the suppliers/factories (Glassons, 2021). The Hallensteins sustainability report (2020) states that they meet with their 'main' suppliers up to 10 times a year and with their 'other' suppliers 3-4 times a year. With covid-19, they keep in touch with their suppliers through digital platforms, making transparency harder (Ashby et al., 2012).

They have put their supplier relationships in 'tiered' groups, Tier 1, 2 and 3. Tier 1 is the factories that make the products that they import and sell. These are the 'main' factories they visit/audit. Tier 2 suppliers involve textile processing facilities, such as dye

houses, laundries, and mills. Then Tier 3 is the supplier of the raw materials. Tiers 2 and 3 are the 'other' suppliers visited less.

Glassons (2020) took action in all 6 COVID-19 fashion commitments, which included the following:

- Support workers' wages, honouring supplier commitments.
- Identify workers at the greatest risk.
- Listen to the voices and experiences of workers.
- Ensure workers' rights and safety are respected.
- Collaborate with others to protect venerable workers.
- Build back better for workers and the world.

However, specifics were not mentioned regarding these actions/improvements.

Glassons/Hallensteins sustainability issues discussed included factories (particularly in China) that were not paying their mandatory social benefits, for example, maternity and accidents. The aisles in many factories were obstructed, which is a health and safety issue for fires. Overtime for their workers in the factories is 36 hours a month. However, this is being surpassed, with most workers doing 37-60 hours of overtime a month. There is not enough PPE for the workers in the factories, such as gloves and dust masks. There is also a lack of worker safety processes, for example, a lack of training for machines and poor record-keeping (Glassons, 2021; Hallenstein Glasson Holdings, 2021).

The Glassons/Hallensteins sustainability report (2021) mentions how they are trying to address these problems. They state they are supporting and promoting the Responsible Sourcing Network, a programme focusing on stopping forced labour and human rights abuses associated with raw materials. They support this by eliminating the use of Uzbekistan cotton (as it is associated with slave/forced labour) in the supply chain and using more ethically sourced materials. They are also promoting Inno Community Development Organisation, a Chinese non-governmental organisation. It is a hotline that workers can use to communicate issues with INNO employees. Glassons/Hallensteins has implemented a 'Handshake Workers Programme', supporting worker voices and grievances (Glassons, 2020). Because unions are illegal in many countries where clothes are manufactured, Glassons/Hallensteins makes sure the factories have democratically

elected worker representatives (ILO, 2021). In 2020 they did not do too many audits due to the covid-19 pandemic, but out of the 37 audits across China, Bangladesh and India, 35 had democratically elected worker representatives (Glassons, 2020).

4.2.4. Glassons addressing environmental issues:

Glassons addresses the water usage issue through the Lenzing certification, which reuses water. Also, they are trying to use organic cotton and recycle denim, which saves water. The European Flax certification also ensures no irrigation is used to reduce water consumption. However, the organic certification is relatively weak in sustainability as only 5% of the product needs to be organic. With Glasson's cotton t-shirts being relatively cheap, too, it could be likely that the organic content is quite small *(Table 1; Table 3)*.

Glassons are also using eco-friendly dyes for their denim. Other certifications such as GOTS mean that only limited chemicals are used on certain products, and a water treatment plant is used. However, these certifications aren't on every product, and chemicals are still being used within the supply chains. Also, wastewater treatment plants are not a perfect solution as chemicals can still get through waterways *(Table 1)*.

Glassons mentions addressing the reduction of carbon emissions through Lenzing and ecovero certifications, which reduce up to 50% fewer emissions than normal viscose (Glassons, 2021). However, this was not a top priority *(Table 1)*.

Glassons most significant focus seemed to be on plastic pollution, with considerable reductions in single-use plastics and recycling plastics. Single-use plastic is a very publicised issue; therefore, it seems to be an easy or obvious issue for companies to address, which Glassons has done. In Glassons/Hallensteins sustainability report, they mentioned focused groups they had in 2019/2020 who stated that removing plastic from supply chains and reducing packaging/waste was the most important sustainability issue. Plastic pollution is emphasised in their sustainability report, which could be because it is most important to their stakeholders; their employees and customers (Hallenstein Glasson Holdings Limited, 2020). However, plastic is still in their supply chain in their materials. It may be recycled plastic, but it still has the same negative effects when it is washed. For example,

microplastics going into the ocean, or if the garments are thrown out, it still contributes to plastic pollution *(Table 1)*.

4.2.5. Glassons addressing social issues:

Glassons got an A+ for policies from the Tearfund report and had good codes of conduct. Glassons seemed to have good transparency with where their factories were and the things they were working on, and it was easy to find information about Glassons. They also had a good tiered system of which factories to visit the most frequently. However, this has become more difficult with covid. Glassons did not pay a living wage. However, they did pay above minimum wage and are working towards a living wage.

Worker empowerment got a B on the Tearfund report, and Glassons had programs and elected representatives in factories. However, manufacturing overseas makes it hard to keep tabs on and implement changes. The company can only do minimal things from a different country. As well, issues such as excessive overtime were still occurring. Glassons seems to be actively addressing most of these issues, though. Achieving a living wage is one that needs to be worked on more; this could also help worker empowerment *(Table 2).*

4.3. Farmers

4.3.1. Tearfund Ethical Fashion Report and cotton T-shirts

In the Tearfund Ethical Fashion Report, Farmer's overall grades were; C for their policies, and then all Fs for Transparency & Traceability, Auditing and supplier relationships, Worker empowerment and environmental management. However, the Tearfund report stated that they did not respond, so they received F grades for the other categories (Baptist World Aid Australia, 2021).

As for cotton t-shirts, Farmers carry other brands, not their own, so the prices vary depending on the brand. For example, under the '100% cotton' category, a Farmer's brand called 'Ella' has cotton t-shirts priced at $39.90NZD, and Levi's t-shirts are $65NZD (Farmers, 2021). They also have an 'Organic cotton' category where a Calvin Klein organic t-shirt is 'eco-dyed', which is priced at $79.99NZD. Another brand called 'Zest' has an organic cotton t-shirt priced at $49.99NZD; it also has a certification displayed on the preview and in the pictures; the Global Organic Textile Standard (described in the Glassons section). There were only two cotton t-shirts, both from the brand Zest, with any verification regarding the organic cotton. Pictured below is a Farmer's brand cotton t-shirt; there were no organic ones in the store.

Figure 3. Farmers cotton t-shirt.

Farmers did not have a sustainability report- they only had a page called 'Ethical Sourcing Policy'. The purpose of this policy is as follows: "Farmers operates all of its business in an ethical manner and is committed to improving social, ethical and environmental standards throughout our supply chain and in all aspects of our operations. The purpose of this ethical sourcing policy is to set out Farmers' expectations of how suppliers will behave and how Farmers will manage the relationships. This policy applies to all suppliers of goods and services to Farmers. The policy is in addition to all local laws and regulations that may apply to a supplier." (Farmers, 2021).

4.3.2. Ethical/social concerns

They then discuss different policies that their suppliers should follow such as labour rights, no discrimination, and following environmental laws in the country of the supplier. However, there is no mention of whether these are followed or not. There is also a lack of information when it comes to social issues, for example, whether they pay living wages. Farmers do not mention specifics on ways they improve their standards through their supply chains (Farmers, 2021).

4.3.3. Environmental concerns

Regarding the environment, Farmers use paper bags at all their stores instead of plastic. Farmers' stores are also using energy-efficient LED lighting in their stores. There is no mention of whether the fabrics from their clothes are organic or sustainably sourced. Out of all the fashion retailers, Farmers had the least information regarding the social and environmental issues they face (Farmers, 2021).

4.3.4. Farmers addressing environmental issues

There was limited information on Farmers. Regarding environmental issues, they seemed to be doing minimal actions. Looking at their cotton t-shirts, they did stock some that were organic, and a t-shirt was even eco-dyed. Both processes address water usage and water pollution/chemical use. However, they are not even Farmer's brand, which is very

minimal environmental action. Farmers discussed switching their plastic bags to paper bags which addresses plastic and land pollution. In saying this, Farmers have plenty of plastic products, so this is the bare minimum. Farmers were barely addressing any environmental issues. Instead, they only make changes in stores where customers can see sustainability efforts, such as paper bags and LED lights. They are not doing anything regarding the supply chain *(Table 1)*.

4.3.5. Farmers addressing social issues:

Farmers did have codes of conduct and policies; however, there is barely any information on these. Therefore, it is not evident that Farmers are addressing any social issues *(Table 2)*.

4.4. Max

4.4.1. Tearfund Ethical Fashion Report and cotton T-shirts

Max's overall grades from the Tearfund Ethical Fashion Report were A+ for policies, B for transparency and traceability, C for Auditing and Supplier relationships, D for worker empowerment and D for environmental management (Baptist World Aid Australia, 2021). Max has a variety of cotton t-shirts. They have organic cotton tops ranging from $30-$59.90. However, no specific certifications were mentioned. Then there were just plain cotton t-shirts for about $49.90 that were 'polished cotton', but it has no certification around this being organic (Max, 2021). Polished cotton is just regular cotton; however, the finish has a shine on it from either the weaving of the fabric or pressing between cylinders during the manufacturing process (Burch, 2021).

Figure 4. Max organic cotton t-shirt.

4.4.2. Environmental concerns

Max states that they make sure all the chemicals used in the supply chain comply with NZ and Australian standards. They also mention that China has set targets for 2030 that all factories (including Max's production factories) must comply with, which involves reducing water pollution. They state that Max factories are working towards these. However, they have not mentioned their specific plans of action to ensure these rules are followed or what the factories are doing to implement these changes (Max, 2021). They

have reduced a considerable amount of plastic in their production. As of 2017, they don't put each item of clothing in plastic, meaning they have removed roughly 660,000 plastic bags from the supply chain (Max, 2021).

Max is now using paper bags in stores that are FSC certified. This certification means their paper bags are made from the trees involved in eco-friendly forest management programs. The certification issued lasts five years and is monitored regularly; however, it is not stated how often (FSC, 2021). Ten principles are required for forest managers to gain this certification. The most important ones to note are complying with laws, regulations, treaties, and other agreements. They conserve ecosystems and mitigate negative impacts, and the organisation will enhance the economic and social well-being of local communities and the well-being of their workers (FSC, 2021). A critique of this is that these principles are broad and probably need to be more specific. For example, regarding the economic well-being of their workers, does this mean the workers get at least a living wage? It does not specify. It also looks at social well-being but does not discuss if this is particular health and safety measures or something else. The certification also is reevaluated every five years; this seems like a lot of time considering the potential of increasing environmental damage (Conniff, 2018). Other certifications are reassessed yearly, and this seems to be more appropriate.

There has also been scrutiny about the FSC certification being misused over the years around the globe (Conniff, 2018). From 2015 to 2017, in the U.S, Peru and Austria, to name a few countries, there were instances of misuse of the FSC certification. There were instances of illegal logging in national parks or from other illicit origins sold/given to companies with the FSC certification (Conniff, 2018). Of course, these are overseas countries, but this is a global certification, which suggests this certification does not have rigorous regulations or is not monitored correctly (Conniff, 2018).

Max donates their clothes that do not sell to women's refuge to reduce landfill waste (Max, 2021). This seems to be a common theme with fashion retailers; as previously mentioned regarding Glassons, it seems like the most obvious problem these fashion companies address. However, many other issues in the supply chain go unmentioned. There

is also no mention of reducing synthetic fabrics or water usage and wastewater within the supply chain. Many brands seem to focus solely on waste reduction and the elimination of plastic.

Max discusses what they do in the offices in New Zealand; they have a worm farm for food waste, use LED light in the offices, and all their photocopying paper is carbon neutral and sustainably produced. They also mention how they 'encourage' their suppliers to use the biggest carton allowed when shipping the garments to New Zealand so they can try to reduce the number of cartons they need to send to New Zealand. This is encouraged, though, not enforced (Max, 2021).

Recently, Max has started rebranding to focus more on ‘people and the planet’. Max has now partnered with a New Zealand Merino company launching a ZQ merino range that is sustainable and traceable (Rae, 2021). Max partnering with ZQ is a positive change for the company as this is a very sustainable material compared to other materials, such as polyester. ZQ focuses on regenerative agriculture, animal welfare and social/environmental standards (Rae, 2021; ZQ Natural Fibre, 2021). ZQ is the world’s leading ethical wool, and they use a 'regenerative index' (ZQRX) to measure how well they are offsetting carbon, restoring waterways, and protecting native species. The farmers get their wool through sustainable/regenerative farming, which focuses on giving more than taking. Some farms suggest they are carbon neutral (ZQ Natural Fibre, 2021).

There is a bit of controversy around regenerative farming. The United Nations stated that we only have 60 years of agriculture left before the topsoil nutrients deplete so much that they become useless (Newton et al., 2020). Regenerative agriculture claims to prevent this as livestock manure increases its nutrients and organic matter and other practices such as using no-till soil, which kills weeds. However, critiques suggest a lack of evidence for regenerative agriculture being a massive solution to climate change (Giller et al., 2021). Yes, the ground absorbs carbon dioxide. However, sheep emit methane into the atmosphere, contributing to climate change. Therefore, this seems to be weak sustainability (Giller et al., 2021). This is an improvement for Max regarding their more environmentally friendly materials, and it is positive they are using a New Zealand company to provide the wool.

However, regenerative agriculture makes a lot of claims about how eco-friendly it is without a lot of evidence (Giller et al., 2021; Newton et al., 2020).

4.4.3. Ethical/social concerns

Regarding Max's rebrand, partnering with ZQ, ZQ provides sustainable price points for their customers. This protects customers (brands like Max), supply chains and brand partners from "market volatility at auction". ZQ give customers like Max certainty of traceability and production standards (Max, 2021; ZQ Natural Fibre, 2021).

Max fashion discusses with their rebranding that having a positive impact on communities and the environment is very important to them and that social responsibility is a key pillar for the business. They believe transparency in the supply chain is their best approach to improving their sourcing. They have stopped third-party sourcing and not using suppliers on a one-off basis. Max states they are focusing on building relationships with their suppliers to help address the issues they find in their audits. They have listed all their factories and the locations, the gender of workers, the auditors and how long suppliers have worked with Max. All the factories are in China and pay minimum wage at least; four of the factories also allow for collective bargaining (negotiation of pay). They have discussed allowing extra time for factories to work on the garments when the factories Max uses have too much workload as this avoids subcontracting other factories. They state that regular visits are made to the factories by the production team. However, it is not stated how often or when the last one was. They mention again, not adding pressure to the factories and having an 'ethical design' team that figures out costs and reasonable time frames that the clothes can be produced—providing a lead-up time of roughly 90-125 days (Max, 2021).

Max mentions they do not accept any cotton from Uzbekistan. However, it is not stated where they get their cotton from; there are no certifications. Max also interviews workers in the factories as part of their audits to hear what they have to say about wages, and overtime (Max, 2021).

An issue in most of Max's audits is excessive overtime from the staff in the factories; they are meant to have at least one day off every seven days. The minimum wage in China

has increased roughly 33% over the past five years; however, this excessive overtime has continued. When looking at China's minimum wages, Shanghai has the highest minimum wage per month at $400USD (RMB 2,590), and Beijing has the highest hourly minimum wage at $3.90 USD (RMB 25.3) (Zhou & Zhang, 2021). In Shanghai, the living wage is about ¥4,502, which is about $641 USD per month (Global Living Wage Coalition, 2021). When they discuss the workers' rights, Max mainly lists the codes of conduct the factories need to follow. Max mentions they do have a Hong Kong-based audit manager who has been doing the auditing in China for the last 20 years. They also have a China-based Quality controller; both have completed training courses and visit the factories 'regularly', though it is not stated how often this occurs (Max, 2021).

4.4.4. Max addressing environmental issues

Since the 2019 Tearfund report, Max has improved its environmental management. Max focuses mostly on the plastic pollution issue. They have made a considerable effort to reduce plastic bags in the supply chain and use paper bags. They also partnered with ZQ merino meaning they are using fewer plastic materials in their clothing. Max also states they do not throw any clothes out and donate them. However, this is not a perfect solution to plastic pollution as those charities may still throw some clothes out. As well as people that buy them may eventually throw the clothes out *(Table 1)*.

ZQ merino also helps them offset their carbon emissions through an index that helps them figure out how much to offset. This is also a local supplier meaning fewer emissions are emitted. They also discuss using bigger shipping containers and having some carbon-neutral products in their offices. There is room for improvement. However, Max is thinking and starting to address carbon emissions *(Table 1)*.

Although Max has not directly addressed water usage, using ZQ merino more than cotton would reduce water consumption in the supply chain *(Table 1)*.

Max states their factories comply with NZ and Australian chemical standards and that the factories have plans to reduce water pollution. There is limited information about this. However, they do have some organic t-shirts that use fewer pesticides *(Table 1)*.

4.4.5. Max addressing social issues

Max has good policies and codes of conduct. They have stopped third-party sourcing and have been very transparent about where the factories are and detail about them. Many of the factories have worked with Max for many years, and they value their relationships with them *(Table 2)*.

Max has started addressing the issues of worker empowerment too. They have reasonable time frames for the workers and don't support Uzbekistan cotton. All the factories pay minimum wage with room for bargaining; however, there is no mention of a living wage. Therefore, this is what Max could improve on *(Table 2)*. There was more information on the environmental issues they were addressing instead of the social issues.

4.5. Barkers

4.5.1. Tearfund Ethical Fashion Report and cotton t-shirts

On the Tearfund Ethical Fashion Report, Barkers got an A+ on policies, B on Transparency and Traceability, C on Auditing and Supplier relationships, D on Worker Empowerment, and B on Environmental Management (Baptist World Aid Australia, 2021). They have several cotton t-shirts, with the cheapest being $39.90. It states on all the t-shirts that they are made from organic cotton. Their Transparency report (2019) states that 55% of their cotton is certified organic cotton, 34% is responsibly sourced, and 45% is from the Better Cotton initiative. They also state that their products come in sustainable packaging when you are looking at their products (Barkers, 2021).

Figure 5. Barkers organic cotton t-shirt.

4.5.2. Environmental concerns

Barkers has Traceable, Ethical Merino and the 'World's Cleanest Denim', which they have heavily advertised. Jeans create denim waste called sludge, which is usually discarded, but Barkers combines theirs with concrete to make bricks for more affordable housing. They state, "Other jeans use 80L of production water per pair. Ours use 1.5L per pair after water recycling" (Barkers, 2021). Their Transparency report (2020) states that they are the first New Zealand company to partner with Saitex denim, who are very social and environmentally conscious. They are a fair trade leed and Bluesign certified (traceable) manufacturer. Barker's goals are "to be sustainable, ethical and environmentally low impact" (Barkers, 2021). They also pose the message 'Made for Life' describing their

commitment to good quality products that last, listing the different materials they use, such as ZQ merino and organic cotton. Barkers uses primarily natural materials, with only 3% of their range having polyester in it; even so, roughly half of it is recycled materials. They are attempting to find solutions that align with a circular economy (Barkers, 2021).

The Barkers Material Truth Report (2019) mentions goals and progress with their supply chain, products, carbon emissions and packaging. Their goal is to have 100% of it visible/transparent by 2023; they then mention their current progress with the goals. They state that in 2019 they worked with a new audit partner who focuses on ethical sourcing and worker welfare. For their products, they aimed for 75% of the fabrics to be environmentally sustainable and 100% by 2023. It was at 58% in 2019. Barkers is aiming to be Carbon neutral by 2023. For packaging, Barkers was aiming to have environmentally responsible packaging. From 2018 onwards, the retail bags have been compostable (Barkers Material Truth Report, 2019).

They mention that all their stores have LED lighting in them; they use paper bags that are FSC certified. They also mention that when bringing their stock over to New Zealand from the factories, they try to avoid air freight as much as possible and use shipping as an alternative. They also compile the stock from the different suppliers at their distribution center, so they have fewer shipments, therefore, reducing their carbon footprint. In 2019, they were also creating reusable cartons for shipping instead of single-use cardboard boxes- there have not been updates on this, though. Excess stock that is not sold is donated to charities; Barkers does not send clothes to landfills (Barkers Material Truth Report, 2019).

4.5.3. Ethical/social concerns

Barkers states they visit the factories several times a year. It is not noted who does these visits and if visits have been made during the COVID-19 pandemic. However, they listed what each of their six factories does, how many people work in them, where they are located and provided pictures of the factories showing transparency. Four out of the six factories pay a living wage for the region of the factory. Many of these factories have

technological innovations to become more environmentally friendly, too (Barkers Material Truth Report, 2019).

4.5.4. Certifications

They have a list of certifications down the side of the page for each factory. These include certifications such as all factories except for one in Vietnam are certified as Child Labour Free. This certification ensures that there is no child labour under 15 throughout the manufacturing process, as 15 is when many complete compulsory schooling (International Labour Organisation, 2021).

The Woolmark certification ensures that the clothing item is made from 100% merino wool. It also ensures traceability through the supply chain and has a global quality fibre assurance (Woolmark.com., 2021). Wool is a natural material, which is far better for the environment than synthetic materials. However, a minor critique of this certification is that these animals contribute to methane emissions, so it still impacts the environment. If merino wool increases in popularity, more sheep may be needed, which could contribute to more methane emissions. Therefore, this material stops the use of plastic materials; however, not without a potential cost to climate change (Rae, 2021).

OEKO-TEX Certification is a textile and leather production certification that ensures traceability through the supply chain (Hohenstein.us., 2021). However, this certification has several variations, and Barkers does not specify which one they have. Generally, it means that the product being made is free of certain toxic chemicals, colourants and auxiliaries (Hohenstein.us., 2021; Srivastava, 2021). The leather Standard ensures that the textile products used in leather production are harmless to humans and legally compliant. It tests for harmful substances and chemicals at all stages of production (Hohenstein.us., 2021). The certification given to companies lasts one year. After the year is up, they will need to reapply for the certification to ensure standards are being maintained. The general OEKO-TEX certification also has 4 product classes' depending on how close the product is to the skin. The closer it is to the skin, the stricter the limit is for chemicals (Hohenstein.us., 2021). However, this does not mean that there are no chemicals in the clothes or leather. This certification has more to do with human health than ecological health, as there are still chemicals used that pollute the environment (Srivastava, 2021).

Business Social Compliance Initiative (BCSI) certification promotes factory conditions in compliance with human rights and national labour laws. It ensures that suppliers do regular audits to ensure protocols are being followed. This includes prohibited forced labour, workplace health and safety and legal compliance (Global Standards, 2021). This certification is slightly weak/passive, as it mostly ensures that the factories do audits. However, some factories may not follow all the regulations, but still maintain the certification (Berzau, 2011). All that occurs if the factory is not complying with BSCI is that corrective actions must be agreed upon. Previous research suggests that BSCI facilitates an improvement in the implementation and monitoring of labour standards in factories; however, not verification of these standards. In other words, making sure these standards are carried out/followed properly (Berzau, 2011).

ISO is the international organisation for standardisation which is specific industrial and commercial standards that a company/factory meets. Barker's website lists this as ISO Certification 9001, 12001, 18001. However, the ISO website (2021) states that ISO does not perform certifications. These are all health and safety standards and different factory management standardisations to which the factory adheres (ISO, 2021). These were some of the common certifications from the factories (that have not already been mentioned in this chapter). Not all of them have the same certifications, but all have certifications (Barkers Material Truth Report, 2019).

4.5.5. Barkers addressing environmental issues

Barkers is actively addressing all the environmental concerns mentioned. They have the cleanest denim globally, considering water consumption and chemical use. Their cotton t-shirts were all certified organic at a reasonable price. They also talk about becoming carbon neutral. Barkers has compostable courier bags and other responsible packaging that is not plastic, and only 3% of their fabrics are polyester. Of course, Barkers is not perfect and have room to improve, but they are transparent about and are working towards new sustainable goals *(Table 1).*

4.5.6. Barkers addressing social issues

Barkers has good policies and codes of conduct in place. They also had good transparency and traceability through their supply chain. They were the only company to have a living wage in some (the majority) of its factories. However, they did not have much information or focus on worker empowerment and auditing and supplier relationships. They did audits, but this is probably where more of their focus needs to go *(Table 2)*.

4.6. Ruby

4.6.1. Tearfund Ethical Fashion Report and Cotton t-shirts

On the Tearfund Ethical Fashion Report (2019), Ruby got an A+ for policies, C for Transparency and Traceability, C- in Auditing and supplier relationships, D+ for worker empowerment, and C- for environmental management (Baptist World Aid Australia, 2019). Ruby currently only has cotton shirts/blouses, which range from $149NZD to $199NZD, but no cotton t-shirts. They also have no certifications around the cotton, whether it can be traced or is organic (RUBY, 2021).

Figure 6. Ruby organic cotton top.

4.6.2. Environmental concerns

Ruby does not have a sustainability report, but on Ruby's website, they state their goals which are: Shifting from a linear to a circular economy, building skills in the local manufacturing industry, working in accordance with the Paris Agreement to reduce the company's emissions and manufacture their products responsibly (RUBY, 2021).

They mention using Global recycle standard- certified polyester instead of new polyester; this helps divert plastic bottles from landfills. The fabrics that are made from this are Triacetate and Acetate and can be 100% traced back to responsible sourcing. They stated that in 2020, 30% of their linen could be traced back to the source and they were

working up to 100% traceability. 90% of their silk can be traced back to its source as of February 2020. They list all the different materials they use and state that they donated their offcuts to their apprenticeship program to repurpose the fabric. Ruby started a Carbon emissions reduction program in 2021. However, there are very minimal details on what they are doing. They state that employees are doing more work-from-home days, but nothing specifically related to this program (RUBY, 2021).

40% of their products are shipped from overseas by sea freight, and their goal is to achieve 70% sea freight. Ruby emphasises their packaging. Their care cards and shoeboxes are FSC-certified, meaning they are made of recycled paper. For in-store and online orders, they use recyclable and compostable packaging. Their reusable garment bags are also Global Recycle Standard (GRS) certified. They also state that their care labels and garment labels are GOTS 5.0 certified organic cotton or used to make cast-off polyester (recycled polyester) (RUBY, 2021).

They have also created a Ruby repair program where you can go into any Ruby store, and they can repair any clothes you have bought from Ruby from any previous season. They also sell guppy bags which are washing bags that catch microfibers that come off synthetic clothes when you wash them. This means that 86% fewer fibres are shed and go out into the ocean, which helps reduce water pollution. They also have a website rental service for their clothes (RUBY, 2021).

4.6.3. Ethical/social concerns

Ruby states they manufacture most of their collections in New Zealand, and since covid-19, there has been discussion about increasing local manufacturing even more. Twelve of their factories are in New Zealand, and 6 of them are in China. They do have some details of their overseas factories, stating where they are in China and what the factory does. They have a chart of their factories saying how many workers are in each one, the percentage of women and the youngest employees in each factory. They do not disclose, however, how often these factories are visited. In their code of conduct, they state that wages are expected to meet the basic needs of their employees relative to their location. This is unclear whether they pay minimum wage or a living wage. In their code of conduct,

they state that there should be no child labour and no excess of 60-hour working weeks (overtime). There is no mention of how Ruby checks up on these, though, whether they are in contact with factory managers or visit (RUBY, 2021).

Ruby states what obstacles they face by trying to move all their manufacturing locally; this includes: unemployment increasing in the factories they use overseas. New Zealand lacks skilled cutters, machinists, and patternmakers compared to overseas; many of them here are close to retirement age. Wastage during production, for example, offcuts. They want to have apprentices learn these skills. However, it is risky to do production with people who are learning in case they make mistakes on an item for a customer (RUBY, 2021).

In 2019 Ruby co-founded Mindful Fashion NZ with Kate Sylvester, where they collaborated on different positive projects. They run their local production workshops and have created a universal code of conduct together. They also have created a full circle cotton t-shirt made from 100% certified organic cotton. However, there is no mention of whether the cotton t-shirts on their websites are certified organic cotton. They work with 70 local manufacturing companies and are working on a plan for 2021. They have linked a separate website for Mindful Fashion NZ (Mindful Fashion NZ, 2021).

4.6.4. Ruby addressing environmental issues

Ruby's focus seems to be on reducing plastic pollution, and they focus on what materials they use. They use recycled polyester, and many of their linens and silk can be traced back to responsible sourcing. They also have a repair program that stops clothes from being thrown away. They also talk a lot about sustainable packaging and have guppy bags for customers to stop plastic fibres from coming off their clothes when washed *(Table 1)*.

Ruby also mentions carbon emissions through using sea freight and that they have a carbon emissions program. However, there is little information on this *(Table 1)*. Ruby has not mentioned directly addressed issues around water usage and water pollution/chemical

use. However, Mindful Fashion NZ has organic cotton t-shirts, which means less water and chemicals. Ruby probably needs to be more proactive in these areas *(Table 1)*.

4.6.5. Ruby addressing social issues

Ruby had good policies and codes of conduct; they also had good transparency involving their factories and where a lot of their materials came from. They have only really addressed issues involving transparency and traceability, and policies. There was minimal information about worker empowerment, living wages, auditing, and supplier relationships. This could be worked on *(Table 2)*.

4.7. Overall findings and comparisons between companies

These New Zealand fashion retailers' environmental and social challenges were all related to the supply chain. All of them had factories overseas which make the issues harder to address. This is the same with many other fashion retailers in New Zealand *(Table 1; Table 2)*. The major theme the fashion retailers tended to focus on was single-use plastic as the major environmental issue. The fashion retailers looked at the least living wage and auditing and supplier relationships the least. Another key theme was that social issues were focused on more than the environment.

Barkers and Glassons were the only companies with sustainability reports out of the five companies examined. Barkers and Ruby were the only ones to mention moving towards a circular economy. All the companies got relatively good grades on policies, transparency, and traceability *(Table 2)*. However, they all had lower grades for worker empowerment, living wages, auditing and supplier relationships, water usage and carbon emissions *(Table 1; Table 2)*. Glassons had the cheapest cotton t-shirts out of the retailers examined. This is likely because they have a fast fashion model with a high turnover of clothes at a low price. The other fashion retailers tend to bring out fewer collections per year. Glassons has an organic cotton certification; however, it could be possible that the low price of Glassons organic t-shirts relates to the low content of the organic fabric. As some of the certifications that brands used, seem to be greenwashing. Putting the certification on the brand/item of clothing makes it seem sustainable. However, an example is the OCS certification, where

only 5% of the product needs to be organic (ICEA OCS Certification, 2021). The certification makes it seem like brands are doing more than they are.

The most common environmental challenges these retailers focused on were plastic/land pollution in the supply chain and in-store. Every retailer had mentioned something about reducing plastic waste, eliminating single-use plastics, plastic bags, or recycling plastic materials *(Table 1)*. Plastic is very prevalent in fast fashion brands, whether it is the material of the clothes being polyester or the tags that are attached to the price. It is used widely in fast fashion because of how cheap it is. Because plastic is so prevalent in fashion, decreasing plastic was something all of them addressed. It is also a publicised issue to their customers; therefore, it is also the easiest issue for brands to address to look 'greener', which is more 'weak sustainability'. None of the companies discussed reducing the number of clothes they were making, though. Most companies mentioned carbon emissions, but there was little detail on how this was being addressed. Carbon emissions are particularly important for the New Zealand fashion industry and its supply chain is overseas. This increases carbon emissions with the transportation of materials and products. Carbon emissions, water usage and water pollution were the least addressed problems of these fashion retailers *(Figure 1)*. This could be because water pollution and usage are far worse overseas than in New Zealand. Therefore, the brands feel removed from the issue as they don't see it (Shafique et al., 2017). Another common theme was brands greenwashing with some certifications.

As previously mentioned, all the brands had well-written policies that seemed to address many social and environmental issues. All of them except farmers were trying to be more transparent and increase traceability *(Table 2)*. Many of them stopped using third-party suppliers and had traceable materials. Glassons and Max were actively working on supplier relationships as this helps the company gain transparency through the supply chain and build trust. More visits need to be made to the factories to ensure exploitation does not occur and worker safety and environmental regulations are followed (Ahi & Searcy, 2013; Ashby et al., 2012). However, this is difficult since the covid-19 pandemic; Ruby and Barkers were the only retailers to mention the difficulties of covid. This highlighted the need for

more local manufacturing, as having factories overseas is not ideal at a time when companies are unable to visit them *(Table 2)*.

Worker empowerment, living wages, auditing, and supplier relationships were the two social issues that were addressed the least *(Figure 2)*. However, transparency and traceability remain essential for a sustainable supply chain. Labour issues continue within the supply chain, which may include excessive overtime, low wages, and unsafe working conditions. Barkers was the only brand that paid a living wage. These are the issues that these brands need to work on the most. This will help workers overseas have a better working life and lift some of them out of poverty *(Table 2)*.

Chapter 5- Findings question 2

5.1. Research question 2: What are the key solutions and frameworks for greener supply-chain management that the New Zealand fashion industry can learn from global best practices?

The findings for research question 2 look at key solutions and frameworks for greener supply-chain management, specifically different global companies that show these best practices. It is worth noting that no fashion brand is perfectly sustainable. However, there are better frameworks and solutions than others. The brands that were chosen for research question 2 were selected from the Tearfund Ethical Fashion Report and had at least an overall grade of 'A', or brands that have had a lot of publicity for their sustainable practices. These global brands included Patagonia, Outland Denim, Country Road and Stella McCartney. Outland Denim and Country Road are Australian brands, while Patagonia and Stella McCartney are American brands. Policies were not included for research question 2; generally, most companies seemed to do well in this area. Two of the brands examined discussed or mentioned working towards a circular framework and closed-loop production. Bluesign technology was also an important tool to gain transparency in the supply chain and help brands make improvements. All companies also discussed the importance of organic and natural materials and repurposing waste to create other products. The environmental sustainability categories examined for research question 2 are; water usage/chemical pollution, carbon emissions, plastic pollution, greenwashing and certifications. The social sustainability categories discussed are; living wages/worker empowerment, auditing/supplier relationships and transparency and traceability.

5.2. The brand's Tearfund scores and cotton t-shirts

Patagonia is an American brand; on the Tearfund Ethical Fashion Report (2021), Patagonia got A+ for policies, A+ for transparency and traceability, A for auditing and supplier relationships, C for worker empowerment, and A+ for environmental management; overall it received an A grade. Patagonia's cotton t-shirts are all organic and Fair Trade,

ranging from $35 to $40. The t-shirts also use 16% less CO2 and 84% less water. They also mention that 87% of their line is Fairtrade (Patagonia.com., 2022).

Outland is an Australian brand with an A+ rating for all categories, policies, transparency and traceability, auditing and supplier relations, worker empowerment and environmental management (Tearfund, 2021). Outland's cotton t-shirts range from $79 and up. They are all organic cotton; however, it does not state what certification this is. In the description of the t-shirts, it states that zero agrochemicals (plant fertilisers/pesticides) are used, zero animal products and that the t-shirt is made for 'longevity' (CABB Chemicals, 2022; Outlanddenim.com, 2022).

The Country Road group includes the brands Country Road, Mimco, Plitix, Trenery, and Witchery. The name country road will just be used for this. Country road received an A+ for policies, A+ for transparency and traceability, A for auditing and supplier relationships, C for worker empowerment and A for environmental sustainability (Tearfund, 2021). Their cotton t-shirts start from $44.90 minimum and increase from there. However, it does not state the certification around the cotton t-shirt in all the t-shirt descriptions. One t-shirt was 30% recycled cotton, which was $64.90 (Country Road, 2022).

Stella McCartney was not on the Ethical Tearfund Fashion Report; however, the brand name came up on several websites when discussing sustainable fashion. There are also many media titles raving about this sustainable brand. The brand also advertises itself online as sustainable luxury fashion. Because it is considered a luxury brand, its t-shirts are more expensive than the other brands examined, ranging from $245 and up. All the cotton t-shirts (and other products on their website) have a description of the exact composition of the materials. All the cotton t-shirts were 100% organic cotton (Stella McCartney, 2022).

5.3. Environmental issues

5.3.1. Water usage, water pollution and chemicals

Patagonia uses chemical recycling; this is where the chemicals break down synthetic fibres such as polyester into their basic building blocks. Therefore, it removes any colours and other contaminants (Bluesign.com 2022; Patagonia, 2022). This makes the products

recyclable and can be repurposed into other products. Patagonia believes that chemical recycling needs to be adopted by more companies globally. However, there needs to be a recollection infrastructure, for example, brands need a bring back/recycle program for old garments that can be repurposed. Or clothing bins provided by local governments that are then given to clothing companies to use chemical recycling to repurpose the clothes (Vermum, 2021; Wold, 2021). It is important to note, though, that certain blends of materials can be challenging to use in the chemical recycling process. Patagonia also uses Bluesign through their supply chain to monitor their chemical use and help with product transparency and traceability. This is also a type of 'clean production' involving different technologies such as chemical recycling to reduce chemical waste (discussed further in transparency and traceability)(Bluesign.com, 2022; Patagonia, 2022).

Patagonia still uses synthetic fabrics, but they are recycled materials. However, they use natural fibres, such as lyocell and REFIBRA (made from cotton and wood fibres). This was created based on the idea of the circular economy, as it upcycles scraps, meaning there is no waste (Tencel, 2022). These materials and the processes involved in making them, Lenzing, recycles up to 95% of the chemicals used in the processes, so it is more eco-friendly and produces less chemical waste. Patagonia has not mentioned water pollution specifically (Tencel, 2022; Patagonia, 2022).

For Patagonia's outdoor wear, such as raincoats, they need chemicals to make the material waterproof. They used to use durable water repellent (DWR). However, the bi-product of this is toxic and has been banned by governments around the globe (Vermum, 2021; Wolf, 2021). Patagonia is now using a fluro-carbon-based treatment, which many other global manufacturers have also adopted. Even though this is far less toxic to humans, wildlife and the environment, this is not as long-lasting as the DWR. Therefore, they are still searching for solutions for chemicals that will provide durability with a lesser environmental impact (Vermum, 2021). Patagonia has created a chemical and environmental program that helps set goals for suppliers to improve their environmental management involving water/energy usage and chemical management (Patagonia.com, 2022).

Outland denim uses E-flow technology which ensures the right amount of chemicals goes into the garment and not in the water. This means the chemical processes are efficient, and there is less chemical waste (Eflow, 2022). Outland also uses another technology called Ozone, a type of treatment that helps sanitise water and air, getting rid of any dangerous chemicals or bacteria (Mellifiq, 2022). Due to the use of these technologies, up to 83% fewer chemicals are used in the production process of Outland's clothes, and as previously mentioned, they use zero agrochemicals (CABB chemicals, 2022). The chemicals used for Outland's clothes all meet at least one of the following certification requirements: Bluesign, Green-screen, Standard 100 by OEKO-TEX (Outland Denim, 2020). This adheres to the ZDHC manufacturing substance restricted list (MRSL), which prohibits the intentional use of certain chemicals and substances (ZDHC MRSL V2.0., 2022). For Outland's denim, they use natural dyes from a plant called Indigofrea (Outland Denim, 2020).

Outland denim uses Ozone and E-flow, which helps significantly reduce water usage during the production process. With these processes, up to 86% of water can be saved. They aim to use 100% recycled water in a closed-loop water filtration system (Eflow, 2022). Saveblue dye is also used for Outland's denim which can save up to 87.5% of water during the production process founded by Cukurova University (Outland Denim, 2020).

Country Road uses Better Cotton Initiative, a large cotton sustainability program that works to make cotton farming sustainable for farmers, communities, and the environment (Better Cotton Initiative, 2020). It is a certification that means the cotton harvested is far less water-intensive and does not use as many fertilisers and pesticides; it also does not have child or forced labour. As of 2020, Country Road used Better Cotton Initiative for 80% of its clothing range (Better Cotton, 2022). Country Road uses Tencel and Refibra fibres to make their sateen jeans. These are blended from cotton scraps and wood pulp from responsibly managed fibres. This fabric uses 95% less water than virgin cotton. This also reduces waste by making it closed-loop production and using fewer chemicals (Country Road, 2022; Tencel, 2022).

5.3.2. Carbon emissions

Patagonia then mentions how they are reducing its carbon footprint and pollution. 64% of their current seasons' clothes are made out of recycled materials. This has saved 3000 metric tonnes of CO2 (Patagonia.com, 2022). They grow all of their cottons organically (without harmful chemicals) and have done so since 1996. Organic cotton saves about 45% of emissions compared to conventional cotton which uses pesticides. (Better Cotton, 2022). Patagonia also aims to be carbon neutral by 2025 and source its energy from 100% renewable sources. They also used recycled fibres such as recycled wool for their jackets and pullovers, saving up to 44% of CO2 emissions compared to virgin wool. Patagonia also uses chemical recycling (discussed above) to reduce emissions by 35%.To reduce energy use in the supply chain, they invest in renewable energy projects to try and balance their carbon footprint (Patagonia.com 2022; Wolf, 2021).

Patagonia also discusses using regenerative agriculture for their wool, as this is meant to help repair topsoil and capture carbon from the atmosphere (discussed in research question 1). Shipping also only accounts for 8% of Patagonia's total emissions. They use a lot of 'drop-shipping', where products are directly sent from factories to the distribution centres, cutting down on the amount of transport needed (Patagonia.com, 2022).

Outland Denim is very energy efficient using new technologies (laser, e-flow, Ozone-discussed above) that can save up to 57% more energy throughout the washing and finishing processes (Eflow, 2022; Nayak, Padhye, 2016). They have also started using biodegradable cassava bags to replace poly bags for clothes shipping. Outland's limited use of synthetic materials will also mean fewer carbon emissions are emitted (Outland Denim, 2020).

Stella McCartney mentions they use recycled materials such as recycled polyester, which has 75% fewer carbon emissions than virgin polyester (Aviram, 2022). All Stella McCartney locations in the UK use renewable energy, and in 2010, they started carbon offsetting to offset some of their other emissions (Stella McCartney, 2022). Stella McCartney is a voice in the fashion industry, encouraging other fashion brands to become 'greener'. As

well as 'begging' governments to start regulating how fashion brands are run to attempt to reduce the fashion industry's massive carbon footprint (Klerk, 2021)

5.3.3. Land/plastic pollution

This is an issue that most fashion brands generally address as it is regularly publicised, and it is an issue that needs fixing. The New Zealand brands in research question 1 all addressed this issue, even if it was very weak, for example, Farmers using paper bags instead of plastic. Therefore, this is not the biggest issue that needs addressing compared to the categories above. This is because it seems to be the issue most brands address first. Companies should not just focus on plastic pollution/waste as they neglect to look at the other harmful processes within the supply chain (Dissanayake, Weerasinghe, 2021). However, this remains an issue, partly due to the nature of the fashion industry itself, with many fast fashion brands creating a throw-away culture, as discussed in research question 1. Therefore, it is still worth addressing the best practices shown by these global brands. (Slow fashion is discussed further down) (Dissanayake, Weerasinghe, 2021).

Patagonia has been trying to solve the issue of its products that cannot be resold to stop them from going to landfills. They do so by making their production a closed loop, meaning there is no waste leftover from products. In 2017 they launched WornWear.com, which was used as a platform to sell repurposed old Patagonia gear that was traded in (Patagonia.com, 2022). Patagonia also works on making its clothes durable, so they are meant to last a lifetime. However, the WornWear.com platform helps solve the issue of their clothes possibly going into landfills. In 2019, Reno Service Centre repaired over 56,000 garments for the WornWear platform to be sold. They also have 72 product repair centres globally (Vermum, 2021). Patagonia is currently installing composting systems in all its facilities as well they are recycling all their polybags used for shipping. Patagonia is trying to move to zero waste, meaning single-use plastics are no longer used, and they are making a massive push to recycle and repurpose them (Patagonia, 2022; Wolf, 2021).

Outland uses Laser technology for cutting fabrics. This technology has more precision and means that material fraying is less likely, which is an issue with the more traditional knife cutting of fabrics; this also means less waste. They also use this laser

technology to create detail/character on the denim (Nayak & Padhye, 2016). Outland uses mostly organic materials: organic cotton makes up 79% of their material consumption, 1% better cotton initiative, and 1% recycled cotton. Then the synthetic materials include only 4% virgin polyester, 2% elastane, 7% recycled polyester and 5% metalware. This means if the clothing is ever thrown out, most of it is natural, not adding to plastic pollution/landfill waste (Nguyen, 2020; Outland Denim, 2020).

Like the other brands, Country Road works on using sustainable materials in its supply chains, such as organic cotton, recycled materials, like recycled polyester and cotton (to stop from going to landfills), and responsible wool. They still have synthetic materials on their website; however, most are natural materials (Country Road Group, 2022). They use recycled synthetic fibres such as recycled nylon for selected ranges, which they get from factory leftovers. They also use recycled ocean plastic, turning waste into a valuable resource. Country Road also sells guppy bags to catch the microfibers coming off synthetic clothes when they are washed. They also use upcycled brass to stop the brass from going to landfills; it uses less energy to make (Country Road Group, 2022; Lewis, 2022).

Country Road has a lot of recycling programs. For example, they partner with Red Cross to pass on pre-loved country road clothes. They have also partnered with Save our Soles to recycle shoes and repurpose rubber soles. The rubber is then used in gyms and different sporting surfaces. They mentioned that their goal for 2022 is for all their packaging and labelling to be 100% recyclable or reusable (Lewis, 2020).

Stella McCartney focuses a lot on the raw materials they use and their impact on the planet. For example, in 2014, 42% of their 'total environmental footprint' was from cashmere. However, only 0.1% of the materials they used in their line were cashmere. They cut this impact down to 11% in 2016 by using recycled cashmere (Christine, 2019). In 2017 Stella McCartney started using Econyl, which is made from recycled nylon waste such as fishing nets. They also use biodegradable rubber called Apinat. The brand is also PVC free; this is a type of plastic that has been named the most damaging to the environment by Greenpeace (Klerk, 2021; Stella McCartney, 2022).

5.4. Social issues

5.4.1. Worker empowerment and living wages

Patagonia and Outland Denim were two companies that had significant progress with worker empowerment and living wages. Firstly, Patagonia mentions that they don't own any of the factories where their clothes are made, so it is limited to what they can do regarding employees' wages. They can, however, use Fair Trade to make sure the workers still get benefits. They have more Fairtrade clothes than any other apparel company, and Patagonia's Fair-trade program has helped roughly 72,000 employees in 10 different countries globally (Fairtrade, 2022; Patagonia.com, 2022, Vermum, 2021).

Patagonia has a Fairtrade label sewn into their clothes, and the extra money from these clothes that are sold goes to the workers in the factories (Fairtrade, 2022). There is then a committee that represents the workers, and collectively they decide what to do with the extra money. So far, this money has been used towards health care programs and childcare centers for communities in the local areas where the factories are located, among other positive things. The Fairtrade program also promotes environmental and social compliance and worker safety (Patagonia.com, 2022; Bischoff, Staufenberg,2021).

Patagonia states they make sure their partnered factories pay their workers the legal minimum wage for that area. The local government sets the minimum wage. However, they recognise that this is not enough and continue working towards a living wage. They recognise that a living wage is fundamental in this pandemic when people may not be working as much or have had their wages reduced. As currently, many workers in the apparel industry do not have a decent standard of living (Global Living Wage Coalition, 2022). The United Nations has stated that a living wage should be a basic human right, and Patagonia supports this (United Nations, 2022). In 2019 11 out of 31 of Patagonia's factories were paying their workers a living wage. However, due to Covid-19, significant amounts of workers were losing jobs. They are currently looking into ways that their suppliers can maintain their workforce through Patagonia's Responsible Purchasing Practices Program (Wolf, 2021). They have been working with Fair Trade Labour Association to try and figure out living wages for the countries where their factories are. Patagonia is also trying to create

baseline tools to gather details about wages in their current factories. Patagonia's goal is to be paying living wages to all its workers by 2025 (Patagonia.com, 2022).

Outland Denim has a significant focus on worker empowerment through education and upskilling. Many of the Outland staff working in the supply chain get the opportunity to improve their education. In many cut-and-sew facilities overseas, roughly 42% of staff do not even have a primary school level education (year 6). The topics covered are financial management, human trafficking awareness, English and health and more (Outland Denim, 2020). Outland believes that education is an integral part of combating modern slavery. It is important to note that COVID-19 has disrupted education programs as some facilities have had to close. The staff in Outland's factories receive cross-training and are enrolled in a two-year course. This helps them upskill, learning all areas of the jean-making process, and some even progress their careers to more senior roles (Outland Denim, 2020).

Outland provides 100% of its staff living wage. This is a priority for Outland denim as 35%-40% of garment workers are not even paid minimum wage. Outland's Cambodian staff are also trained in financial management and budgeting, which has helped 17% of staff reduce their debt (Outland Denim, 2020). Outland uses local surveys and cost of living data and the Anker method, which helps improve wage gaps and support living wages by helping calculate food, housing, looking at the number of staff, transport, and education. (Global Living Wage Coalition, 2022).

5.4.2. Auditing

Auditing is related to transparency, traceability, and worker empowerment and is an essential part of managing supply chains and suppliers. Audits provide unbiased opinions that can help figure out what is not running smoothly within a supply chain and factories and then improve these social and environmental issues. Auditing helps improve transparency and, if issues are addressed, can also uphold social standards for workers. The fewer suppliers a brand has, the easier it is to audit them and solve any sustainability issues (Shafique et al., 2017).

Outland works with suppliers that score at least 80% on the following ethics criteria: adhere to Outland's ethical trading policy (no child labour, slave labour and excessive hours). Name and address of supplier as well as have it publicly available. Evidence of employee wages, adhering to the restricted substance list (MRSL), provided a list of raw materials. The factory has been visited by an outland auditor and an external certified auditor (ZDHC MRSL V2.0., 2022). These strict criteria for suppliers mean that they can ensure better transparency and traceability throughout the supply chain. The garments are also made in Outlands' own finishing facilities, providing security with transparency and traceability (Outland Denim, 2020).

Many of Stella McCartney's suppliers and manufacturers in their supply chain are in Europe. Italy, Hungary, Portugal, and Spain are some locations, with 76% of the manufacturing factories being in Italy. They have worked with many of their suppliers since the brand was founded in 2001. They have 77 manufacturing suppliers and 400 tier 2 product suppliers globally. They perform planned and unannounced audits by the Kering team (a mother brand owning Gucci and other high-end brands) to ensure suppliers adhere to ethical standards (Stella McCartney, 2022). Before Stella McCartney starts working with a new supplier, they visit the factory to assess their practices against their ethics and standards. They then decide whether to work with them and may immediately address/fix some issues (Christine, 2019). They do not rely on social compliance assessments but do use them to help gather data and identify issues. If suppliers do not work to fix issues, they state they consider terminating their business partnership with them (Christine, 2019; Stella McCartney, 2022).

5.4.3. Transparency and Traceability

Transparency and traceability are related to the supply chain, the materials, and their quality. Patagonia works with Bluesign technologies, an independent verifier ensuring transparency and traceability, tracing textile production at every stage. This helps the companies involved improve throughout the supply chain to reduce environmental damage. It also ensures safer and improved environments for people to work in (Bluesign.com, 2022). Patagonia states in the description of all their clothing items where they are made,

showing their effort to be transparent with customers. They also have a list of all their factories, mills, and farms, mostly in Asia, America, and Mexico (Patagonia, 2022).

Outland Denim developed a traceability score where a minimum of 75% of the raw materials must be able to be traced back to their origins. This score is created from each supplier's transparency with raw material breakdown, the origin country, business name and location, third-party social standard verification, and environmental certification. 94% of Outland's direct supply chains meet these criteria (Outland Denim, 2020).

Outland has a tiered system that helps them with their traceability scoring. Each tier has details about what material/product is made there, where the facility is, what kind of facility it is, and the certifications around it (Outland Denim, 2020). Tier 1 is manufacturing and has 100% achieved traceability. Tier 2 is material production, such as buttons, zippers and denim and has reached 100% traceability. Tier 3 is primary raw material processing which involves organic cotton processing and is 100% traceable. Tier 4 is primary raw material extraction and is only 60% traceable. However, to achieve 100%, Outland is working on finding the exact locations for the organic cotton farms (Outland Denim, 2020).

Stella McCartney has hugely promoted cruelty-free and ethical practices regarding the use of leather and feathers for their clothes. Out of the researched brands, many did not mention animal welfare. However, this is an issue Stella McCartney is passionate about. They state that they do not accept wool from farms that perform 'mulesing' on their sheep. To elaborate, merino sheep have wrinkled skin and often flies lay their eggs in the wrinkles, but this means the maggots that are hatched can eat the sheep alive. To stop this, farmers cut strips of skin off the sheep's legs, tails, and backs to create smooth skin. However, this often does not stop this from happening, and the animals still suffer. They do not provide any more information on where they get their wool from, though (Stella McCartney, 2022).

Stella McCartney is also an advocate against animal testing; therefore, many of their products, such as perfumes, are vegan. The brand is very transparent about trying to invest money into moving towards circularity, meaning zero waste. They discuss the size of their factories, stating the average number of workers in their facilities in Italy is 37 (Stella

McCartney, 2022). However, there was not much information on the factories that weren't in Europe. They are more transparent about the materials they use. However, not as transparent when it comes to social issues. Stella McCartney does not use cotton from Syria, Turkmenistan, or Uzbekistan, countries with a high risk of forced and child labour. They are 'working to get traceability back to farm level' (Stella McCartney, 2022).

5.4.4. Greenwashing with certifications

Many fashion brands use certifications these days. However, as previously mentioned, many of these, including the New Zealand brands examined in research question 1, are considered 'greenwashing'. This can mislead customers to think a brand is making more effort to become sustainable than they are, when they may be putting in minimal effort, this is seen as weak sustainability (Corporate Finance Institute, 2021). Some certifications are more reliable than others, as they have more transparency and are more challenging for a brand to earn. If a brand can earn these certifications, it shows that they are genuinely trying sustainable practices, and it is associated with strong sustainability. It is about choosing and addressing the issues that will have the most positive impact on social and environmental sustainability (Bischoff, Staufenberg, 2021). For example, fashion brands like Patagonia and Outland denim have the B Corp certification. Companies can voluntarily apply to get this certification, but you must meet the highest environmental and social performance. It is a third-party verification where the brand agrees to legally commits itself to be socially and environmentally responsible for its products and production processes. It is a very difficult criterion for brands to meet; therefore, the B-corps brands are actively trying to be/become sustainable (Bcorporation, 2022).

A certification Patagonia has is the Fairtrade certification. This is helpful for worker empowerment as it means workers and growers in the supply chains are working in a safe environment and have sustainable relationships. Brands that have the Fairtrade certification also tend to provide better wages than those that don’t. The living wage or a ‘fairer’ pay is often related to this, where workers can afford necessities (Fairtrade, 2022; Patagonia.com., 2022).

Organic certifications for materials are good for fashion brands as fewer chemicals, pesticides and water was used; however, the certification needs to be one where it is a high percentage of organic material. For example, OSC 100 (discussed in research question 1) is 95-100% organic material, supporting strong sustainability. As opposed to just the OSC certification, where it only needs to contain a minimum of 5% organic material (Icea.bio, 2021). Glassons in research question 1, used the OSC certification for their products, meaning they used minimal organic material (5% minimum) in some of their clothes, representing weak sustainability. However, these global brands had strong sustainability certifications and had promising information regarding how 'sustainable' their products and practices were. Organic materials tend to have a smaller carbon footprint and use little to no chemicals. All four brands had organic cotton that had 95-100% organic materials. Country Road, for example, was big on organic cotton and used recycled cotton, as this reduces carbon footprint, too (Country Road, 2022). They were a part of the Better Cotton Initiative which sources cotton responsibly from places that don't use child/slave labour and use organic cotton (Better Cotton Initiative, 2020). These are some examples of brands choosing certifications that have more weight to them and are more likely to positively impact social and environmental issues.

5.4.5. Circular economy

These four brands examined show many best practices and refer to the circular economy in some way or closed-loop production. This is a type of strong sustainability, where fashion brands are shifting to a framework where their brand is not producing waste or producing little waste, and no more than the earth can absorb. It also means the maximum efficiency of resources is being used (Bischoff, Staufenberg, 2021). Many brands start with life-cycle assessments to figure out the carbon emissions/footprints of garments and then attempt to reduce them. Designing garments to have longevity is important, too, as then clothing is an investment and is less likely to be thrown out. Another factor of the circular economy is 'slow fashion'; many Swedish brands have stopped doing seasonal collections and have continuous/permanent collections (Brydges, 2021). This makes it easier to design quality clothes with good fabrics and sustainable supply-chain management. Fewer suppliers will also help brands shift to a circular framework. This is because fewer factories to transport clothes from and therefore fewer emissions. It will also be easier to

identify and address sustainability issues as the brands' attention won't be as divided between so many factories (Brydges, 2021; Dissanayake, Weerasinghe, 2021).

Brands are decreasing their carbon footprint and waste through processes such as repurposing waste and recycling materials used in the supply chain, like recycled cotton. This includes reducing water and chemical consumption through water and chemical recycling processes (Buesign.com., 2022). For example, Outland denim recycles water, so there is far less water pollution and chemicals getting into waterways (Outland Denim, 2022).

As well, transportation processes, packaging and reducing energy during manufacturing is an issue, seeing as fashion is a global market and supply-chains span across countries (Patwa et al., 2021). The less transportation, the lesser the carbon footprint; drop shipping is a way to cut down transportation and manufacture closer to the destination, as Stella McCartney does (Stella McCartney, 2022). This, of course, is harder to do in New Zealand, where many clothes are manufactured quite far away; however, carbon emissions can be reduced through the raw materials used in the supply chains. Many brands use recycled polyesters or other plastic waste products and turn them into clothes to avoid more waste going into landfills. Laser fabric-cutting processes can also reduce waste and increase the efficiency of how the fabric is used (Nayak & Padhye, 2016; Patwa et al., 2021).

Shifting to sustainable materials is an obvious change for fashion brands when moving to a circular model (Patwa et al., 2021). All the brands discussed recycled materials which mean fewer raw resources are used and fewer emissions are emitted. The brands also use certified organic materials, like organic cotton, for their t-shirts and other clothing. Hemp, made from plant fibres, is a material with a small carbon footprint and lower water consumption than cotton (Young, 2019). These organic and natural materials are important to a circular economy as many of them are biodegradable. Therefore, if they ever are thrown out, they can decompose instead of plastic material that does not. Also, using fewer fabric blends makes it easier to recycle the fabrics if they are to be upcycled (Patwa et al., 2021; Todeschini et al., 2020). The environmental side of sustainability and a shift to a circular economy seems to be the most commonly known/best framework. Bluesign

technology was a widely used technology to help with efficiency within the supply chain, which helps with transparency and traceability (Buesign.com., 2022).

The most important part of social sustainability includes worker empowerment and a living wage. This means the opportunity for workers to educate themselves and upskill and be in a supportive and safe environment (Lundbland & Davies, 2015). The living wage is the most critical social issue. It means workers throughout the supply chain can meet basic living standards, which stops the cycle of poverty, therefore creating social sustainability (Ruskin, 2015). This is harder to do the bigger the companies are. However, brands need to choose suppliers carefully and work with those who pay at least a minimum and are willing to shift to a living wage (Ruskin, 2015).

Most of the brands examined are taking steps to shift to a circular economy. Patagonia and Outland have made the most effort in pursuing steps towards this framework.

5.6. Conclusions for RQ#2

All brands had links regarding sustainability on their websites, showing it was a central part of their brand. All the brands also had a lot of press regarding their sustainability practices. Of course, this also included critiques on them, but as previously stated, it is difficult for a brand to be 'perfectly sustainable'. The brands focused on environmental sustainability, but even some of the brands with the 'best practices' still lacked social sustainability, particularly regarding worker empowerment and living wages. Brands need to use frameworks and technologies in supply chains that represent strong sustainability instead of weak sustainability. All the brands examined were engaged in sustainable practices, and some were shifting to a circular framework. Closed loop-production processes are a type of strong sustainability. This will create the least amount of waste and emissions and is what is needed for fashion brands to become sustainable.

The following are some key solutions that will help companies shift to a circular framework/closed-loop production. Bluesign technology allows transparency and traceability throughout their supply chains and life cycle assessments to figure out garments' carbon footprints. Brands use organic materials such as cotton and wool. As well as recycling materials, so fewer raw materials are used in the supply chain, reducing emissions. Garment takeback programs and repair services for fashion brands so they can resell the clothes or upcycle them to make new ones. Recycling chemicals and water through Ozone and E-flow technologies reduces water pollution and chemical usage. Slow fashion is also a way for brands to shift to a more sustainable framework and move from seasonal collections to continuous collections. Lastly, worker empowerment and living wages are needed to help lift workers out of poverty regarding social sustainability. Audits are also necessary to ensure worker health and safety.

Chapter 6- Discussion

The purpose of this study was twofold. It aimed, first, to assess how representative firms in the New Zealand fashion industry are addressing the sustainability issues that arise in their supply chain. Secondly, it explores key solutions and frameworks for better supply chain management that the New Zealand fashion industry could learn and possibly implement from global best practices/companies. This research aims to contribute to existing research discussing the issues within the fashion industry's supply chains. Sustainability challenges and responses within the fashion industry have been well covered in the existing literature (Rinaldi, 2019). Still, no studies have so far focused on the experience of the New Zealand fashion sector. More practically, the thesis also suggests various solutions for New Zealand brands that want to shift to a sustainable fashion model.

In research question 1, the main issues identified regarding New Zealand brand's supply chains were those that the company may not have addressed well. However, they were the issues that caused the most damage. The literature identifies the following as the key sustainability issues with global fashion production. For environmental issues, carbon emissions, water usage, water pollution, and plastic pollution and discusses fast fashion accelerating these issues. The issue of greenwashing and eco-labelling also was established after seeing it from all the representative New Zealand brands. Social issues included lack of worker empowerment, lack of living wages, lack of transparency and traceability, and insufficient auditing. Transparency and traceability come under environmental and social issues; however, it was put into the social issue category for this thesis.

New Zealand fashion brands tend to focus most heavily on the issue of plastic pollution and getting rid of single-use plastics in supply chains. This is important, but it is noted that they say very little about other issues, particularly social sustainability issues, water usage and pollution problems, and carbon emissions. This thesis suggests that companies may focus on plastic pollution as it is easier to address than other issues in the supply chain. It is also an issue that consumers know about and understand. This thesis situates this practice in the literature on greenwashing. It also makes suggestions based on international best practices of what companies should do.

Sustainability policies got the best scores for all the New Zealand brands, and most global brands had solid policies too. However, there was an apparent disconnect between policies and actions/processes in the supply chain. Policies are standards the brand is meant to adhere to, and they are important for companies to have them as goals to strive towards. However, brands often did not meet the standards of their policies. Farmers were a perfect example of this; having a section on sustainable policies discussing different codes of conduct, they received an A for policies in the Tearfund Report. However, Farmers fell short in all other categories. Therefore, policies were not focused on as they did not provide much information on what companies were doing.

6.1. Greenwashing

Greenwashing is when a company spends time and money making its brand look sustainable rather than engaging in practices to minimise its environmental impact (Bowen, 2015). This can be done through a company marketing itself as being sustainable or overemphasising certain sustainability efforts, to distract consumers from the issues the company is not addressing (Delmas & Burbano, 2011). Materiality is a concept that can be applied to different businesses about how and why specific issues are or are not important to companies. It is "a measure of how important a piece of information is when making a decision" (Cambridge English Dictionary, 2022). For example, many fashion brands examined looked at reducing plastic pollution and eliminating single-use plastic, particularly in-store or where it is most visible to customers, who are becoming increasingly aware of plastic pollution issues. Brands placed importance on this to appeal to their customers and help their reputation. It makes brands look as though they are actively making progress to become 'greener' (Bowen, 2015; Delmas & Burbano, 2011).

All five companies examined addressed plastic/land pollution the best or devoted the most time to promoting these efforts to reduce plastic. However, many companies emphasised their efforts to reduce plastic pollution sometimes to overcompensate for the issues they were not addressing. This is a type of weak sustainability and can be seen as greenwashing (Bowen, 2015).

For example, Ruby emphasises reducing single-use plastic by not having plastic bags in store and biodegradable shipping bags. They also mention using recycled polyesters and selling guppy bags to stop microfibers. Ruby also has a repair program to prevent clothes from being thrown out. While steps to reduce plastic can be seen as positive, there was very minimal information regarding the issues of water usage, chemical pollution, and carbon emissions. All of which have substantial negative environmental impacts (Robinson, 2021). This is greenwashing where yes; the company is making some sustainability efforts. However, they are overemphasising the plastic issue to divert attention from the other environmental problems they are not addressing (Bowen, 2015). If fashion brands want to have green supply chains, they need to be responsible for adopting practices that will best address the obvious issues and the issues away from the public eye, too (Robinson, 2021).

6.2. Eco-labelling/certifications

Eco-labels and certifications are a type of regulation where companies and their products meet specific environmental and social standards. Certifications have come about from a push for transparency and trust within a company and its product (Ellen MacArthur Foundation, 2022). The rationales are a good reputation, information about the product, providing transparency and remaining competitive in a market where consumers are more conscious about their impact (Baldassare & Campo, 2016; Ostermann et al., 2021). Certifications are meant to help consumers concerned with purchasing clothes responsibly and help push brands to adopt sustainable practices. Eco-labels are meant to be a positive reinforcement for brands trying to be more responsible for their social and environmental impact. However, they can also be used to confuse consumers (Ostermann et al., 2021). People who are purchasing clothes online or in-store may see an eco-label or certification and believe that because there is a certification connected to the product, they are doing their part to shop sustainably. However, consumers often do not investigate what the certifications really mean and their requirements. Some certifications could be seen as greenwashing (Ostermann et al., 2021; Robinson, 2021).

Eco-labels that are seen as more credible are ones that drastically reduce their negative impact. Have a big enough impact on improving social and environmental conditions and are independently certified by a third party (Maze et al., 2016). However, it is

possible to receive a certification for initiatives that do not deliver a significant positive impact, for example, the certification has no guarantee about the scale of impact. This is problematic with the increase in eco-labelling as this provides a chance for further confusion (Bowen, 2015). The findings from this thesis support this idea regarding eco-labels causing consumer confusion. As mentioned in research question 1, an example of this is Glassons, which uses the GRS certification, which is to do with recycled materials. This could lead consumers to believe they may be buying a product made from 100% recycled material, or they might very well not know what the certification is unless they did a lot of research. If consumers investigated the certification, they would find that the product only needs to be a minimum of 20% recycled material, and the rest of the product can be made from new raw materials (Assoune, 2021). An example of a credible eco-label or certification would be the OCS100, where the product contains 95-100% organic material (Baldassarre & Campo, 2016; ICEA OCS Certification, 2021).

A common theme among all the five brands examined in research question 1 was that they all had some form of eco-labelling or certifications on their clothes or their processes. They advertised these eco-labels either in-store or online. Glassons listed certifications on their website. These certifications looked positive, and it looks like Glassons has made many changes to make its products sustainable. However, looking deeper into the certifications, many could be described as 'greenwashing' (Ostermann et al., 2021; Robinson, 2021). There are many organic certifications that can be confusing for consumers who often don't understand what the eco-label means. For example, Glassons had the OCS certification, where the product is organic. However, there is a difference between OCS and OCS100 mentioned above. OCS is where only 5% of the product needs to be organic. This means all the other materials in the product could be non-organic cotton or even synthetic such as polyester, but it still has an organic certification (ICEA OCS Certification, 2021). This can be confusing for consumers who may be trying to buy a t-shirt that is 100% organic. Organic cotton t-shirts and their certifications were looked at in this thesis to provide an example of eco-labelling and whether they were greenwashing. Glassons had both OCS and OCS100 certifications on their different organic cotton t-shirts. However, consumers who do not know or want to investigate these certifications could believe these are the same. There are plenty of organic certifications, and they vary among the brands examined in research

questions 1 and 2, showing how easy it is for consumers to be misled by the eco-labels and what they are buying.

6.3. Environmental issues

The key environmental issues which seemed to be the least addressed by the fashion companies examined were water usage, chemical pollution, and carbon emissions in the supply chain.

The environmental issue that was easily addressed most by the brands examined was to do with plastic (discussed in greenwashing section). Plastic and land pollution was generally the issue that was best addressed (or well-advertised) by the fashion companies in research question 1. It was still important to include brands' best practices regarding plastic for research question 2. If a company wants to shift to a sustainable model, figuring out how to have little to no waste is an important part of the process. These processes are an important part of the circular economy/closed-loop production (Ellen MacArthur Foundation, 2022) (as discussed in the circular economy section). However, the plastic issue seemed to be addressed the best by the New Zealand companies examined as it is an issue that is most visible to consumers. Companies believe this is the most straightforward and obvious issue to address as it is an issue that is well-known to the public (Delmas et al., 2011). Therefore, when companies adopt processes to reduce or eliminate plastic usage, the brand looks good. When other serious issues are being ignored, they overcompensate through their efforts with plastic (Bowen, 2015). The brands examined in both research questions 1 and 2 had a big focus on reducing single-use plastic in stores, and many brands stated throughout the supply chains (however, this was hard to verify, particularly for brands in research question 1) as well as using natural or recycled materials. However, many more 'fast fashion' brands, such as Glassons, still had plenty of synthetic materials. Few brands in research question 1 addressed the other substantial environmental issues in the fashion industry, such as water usage, chemical pollution, and carbon emissions.

It is well documented that the fashion industry has vast negative impacts on water usage and pollution due to 'wet processing', which is the washing and dyeing of clothes (Madhav et al., 2018; Sarayu et al., 2012). Water is essential for human survival, and

chemical pollution in water is dangerous for the environment, wildlife, and humans dealing with wastewater (Acquaye et al., 2017). This is supported by the companies examined in research question 1. Many of these companies did not address the issue of water usage or pollution. Or they would address these issues but more indirectly. For example, Glassons has started incorporating organic materials, which use less water due to better soil health and water retention for the crops from using fewer chemicals/pesticides (Rigg, 2021). However, they did not directly address or discuss the issue of water usage and chemical use like other brands in research question 2 (Acquaye et al., 2017).

In research question 2, Outland Denim directly addresses water usage and chemical issues through different technologies and techniques, such as Ozone, which claims to reduce water usage by up to 86%. Outland also uses E-flow to monitor chemical usage and Ozone, eliminating the more dangerous chemicals in the garments. Patagonia uses technologies to directly reduce chemical pollution, such as Bluesign, which helps brands with transparency and traceability as well as chemical usage (Buesign, 2022; Madhav et al., 2018)

Carbon emissions remain an issue because of the supply chains being spread across countries, creating a huge carbon footprint. As previously mentioned, moving supply chains closer to/within New Zealand would be a way of reducing emissions and reducing or eliminating the use of plastic materials that contribute to emissions (Ghosh et al., 2020). Patagonia has reduced emissions by using recycled materials and organic ones, which many businesses can do. As per the Paris Climate Agreement, the emissions from this industry (and others too) need to be significantly reduced to stop the planet warming past the threshold of 2^{o} (United Nations, 2021). Fast fashion models often use air freight because the clothes are generally meant to be made and delivered quickly, which increases the fashion industry's emissions (Ghosh et al., 2020). However, brands could use sea freight for shipping as this transport has a lesser carbon footprint. Life-cycle assessments are also a good way for brands to gauge what a garment's carbon footprint is. Once the brand does this, they can then figure out what they can do differently to reduce this (Ghosh et al., 2020).

Due to the norms of capitalism, most businesses focus on profit maximisation and staying competitive in their industry; this often leads to brands cutting costs. However, this is usually at the expense of the environment or social sustainability (Shaw et al., 2016). This occurs particularly with fast fashion, where there is a fast production, turnover rate and clothes quickly reach customers. The nature of capitalism is a barrier to sustainability as many fashion brands, particularly fast fashion, may be reluctant to switch to 'slower' fashion. Using sea freights instead of airlines to transport clothes is not as appealing when competitors are still getting their clothes out quickly. Also, because of this idea of profit maximisation at all costs, companies may not want to pay higher wages throughout their supply chains when cheap production is what hugely increases their profits (Ozbekler & Ozturkoglu, 2020).

6.4. Social issues

The key social issues that were identified in the literature were worker empowerment and living wages. These were the social issues that were addressed the least in the analysis of what New Zealand fashion companies are currently doing and in the analysis of the best-practice initiatives of global companies.

Barkers was the only New Zealand fashion brand to pay a living wage out of the brands examined. In research question 2, Outland Denim was the only brand to pay all its workers the living wage, and Patagonia paid 11/31 of Patagonia's factories the living wage. Many brands mentioned paying their workers the minimum wage (Patagonia, 2022). The findings from research questions 1 and 2 support previous literature stating that a living wage is necessary because so many factories in the supply chain are overseas in countries where the minimum wage is extremely low (Luce, 2021). This leads to issues where many employees work so much overtime to try to make money to meet their basic needs. The living wage is essential for social sustainability as it helps lift workers in the supply chain and their families out of poverty. Livable income allows workers and families to move from mere survival to a situation where they can plan for the future, such as investing in their family's education (Luce, 2021; Mair et al., 2021).

Worker empowerment was an issue that was not addressed well by three out of five companies in research question 1. Worker empowerment helps give employees support and opportunities for upskilling, education, and good working conditions (Williams, 2020). Outland Denim, examined in research question 2, focused on worker empowerment by providing education and upskilling for their employees, educating them not only in school subjects but also in matters such as human trafficking awareness, financial management, and more (Gold et al., 2015). It is an integral part of social sustainability as it can provide job security and economic independence for workers, which will help them have stability in their lives (Herman, 2019). Brands that addressed the worker empowerment issue well had legitimate third-party certifications surrounding social sustainability, such as Fairtrade, and focused on workers' upskilling and better wages. The Fairtrade certification is good for brands to work towards as it helps support worker empowerment. It was created to help farmers, producers, and other workers in developing countries (Fairtrade, 2022). Fairtrade means you pay a sustainable price that is not below market value, so these workers in developing countries get fair wages. With the extra income the workers are getting, they can invest in more efficient techniques to make or grow their products (Adams & Raisborough, 2008; Gold et al., 2015). Patagonia has this Fairtrade certification to focus on worker empowerment.

Fairtrade programs help both environmental and social issues. However, focusing on worker empowerment can help improve community development as they have initiatives that help healthcare, education, and housing; it is also known to improve social conditions. This supports worker empowerment as it helps provide employees with basic needs and the ability to upskill. Fairtrade has limitations, though, as the program generally does not attract as many big buyers as many bigger companies want to reduce costs instead of investing in Fairtrade products (Chambers, 2009). However, bigger fashion brands do not have to be Fairtrade to improve worker empowerment. They can have programs that help provide opportunities for employees, such as training workshops to help them upskill or educational classes. This can give employees better work satisfaction, meaning they are more likely to stay at the company, feel better supported, and possibly further their careers to more senior roles (Allain et al., 2013). Modern-day slavery is also a considerable risk for workers in

poverty. The higher wages with Fairtrade help stop this kind of exploitation (Benstead, 2020; Chambers, 2009).

6.5. Transparency and Traceability

Transparency and traceability weren't necessarily the least addressed issues; Barkers, Ruby, and Max were all actively making progress. However, it is one of the most important issues in the supply chain because it links all processes along the supply chain together. It also identifies key issues, what processing are being done correctly and what sustainability issues need to be investigated further (Garcia-Torres et al., 2022). For a supply chain to become sustainable, there needs to be clear traceability for clothes from the extraction of raw materials to the finished product. There also needs to be transparency of where and how it was made, were the workers treated ethically and were they paid enough (Tregidga et al., 2019). Outland Denim started its own traceability score scheme where the raw materials in the brand's supply chains must meet a 75% minimum traceability score. This includes looking at the country of origin, suppliers, third party certifications and the business names and locations. Looking into these criteria can help brands with their traceability (Outland Denim, 2020). Third-party verification also eliminates bias, meaning the traceability or certifications around it are reliable. Outland denim also had a lot of detailed information on their factories, what the factory did, details on the employees' and specific locations, this information helps brands be more transparent (Outland Denim, 2020). When processes are visible within a supply chain, it holds companies more accountable for their practices and makes them more likely to change to sustainable ones. Consumers are now becoming more aware of sustainability issues and want to shop more responsibly. Therefore, brands that have unsustainable practices could steer customers away. Transparency and traceability are key for brands to identify issues in the first place and then change them (Garcia-Torres, 2022).

New Zealand brands could improve transparency and traceability by bringing some of their supply chains to countries closer to or in New Zealand. Stella McCartney is a brand that keeps its supply chain closer to its country of origin, having almost 80% of its factories in Europe. However, making this move may mean manufacturing would cost more, which

would not suit some fashion brands, particularly fast fashion brands where their model emphasises cutting costs (Garcia-Torres, 2022; Tregidga et al., 2019).

Auditing is a way for brands to improve transparency and traceability within supply chains. Because so much of the supply chain is overseas, it can make it hard to keep things visible and constantly stay in touch with issues/resolve issues (Maze et al., 2016). Audits are a process that need to be done regularly throughout the supply chain to make sure codes of conduct and social and environmental standards are upheld, and any issues are addressed. These are done best when it is either an independent auditor or a third party, so the audits remain unbiased and credible (Maze et al., 2016; McGrath, 2021). Many brands did audits or mentioned audits in research question 1; however, some had minimal detail. Detailed audits are important and are what provide transparency. Many brands did not discuss how often the audits were done per year, who by and whether the factories were notified in advance. These are all things the brands need to be transparent and have credible audits.

6.6. Circular economy

Previous literature agrees that for the fashion industry to become sustainable, it needs to shift from a linear model, a take, make, waste model, to a circular model (Patwa et al., 2021). This involves renting, reusing, repairing, sharing products and being more efficient with using materials, so there is little to no waste produced. This can also be known as closed-loop production (Ellen MacArthur Foundation, 2022). Previous literature also discusses 'slow fashion' where companies put out fewer collections per year, which generally means less waste. This thesis' findings support the notion that shifting to a circular economy is the best way to create sustainable supply chains for the fashion industry (Dragicevic, 2020). Out of all the companies examined, four specifically mentioned shifting or adopting practices that involved shifting to a circular economy. Two companies in research question 1 and two companies in research question 2 mentioned specific processes and practices moving towards a circular economy. The circular economy will mean a sustainable fashion industry. However, it is not the most desirable model for fast fashion brands as they thrive off a linear one where corners are often cut in the supply chain to produce clothes quickly and cheaply (Govindan & Hasanagic, 2018).

For example, Barkers discusses their supply chain practices and tries to align them with a circular economy to eliminate waste and pollution. They are doing this through organic materials (a lot of organic cotton) and recycling/repurposing other materials that may otherwise be considered waste. For example, denim creates a type of waste called sludge, usually discarded. However, Barkers has combined this sludge with concrete to make bricks to use for affordable housing. Another example is Country Road, using recycled cotton in their clothes so it does not get thrown out. This also means a smaller carbon footprint because fewer raw materials are used. Also, brands need to stop mixing materials in clothes, such as cotton/polyester tops. If this is recycled, it is extremely difficult to separate the materials and wastes a lot of time and energy, so it is often thrown out. Sticking to one material is the best option for sustainable clothing (Ellen MacArthur Foundation, 2022; Govindan & Hasanagic, 2018). Ruby also discusses shifting to a circular economy by using more natural materials and having a repair program where you can bring in your Ruby clothes, and they will be repaired for free. In research question 2, Patagonia is hugely focused on the shift to a circular economy. They use processes such as chemical recycling and upcycling scraps to reduce waste. Outland Denim is in support of this using water and chemical recycling too.

The phrase 'circular economy' can sometimes be thrown around. For example, some people may describe recycling efforts as circular. However, a circular economy focuses on being regenerative, a model that can continue indefinitely and minimise the negative impacts of product and consumption (Patwa et al., 2021). A New Zealand clothing brand by Eileen Fisher has a circular framework. They describe essential factors to making this circular framework work relating to the fashion industry. These include improving waste management, energy management, water management, reducing chemical impact, sustainable raw material sourcing, investing in supplier and employee well-being, and sustainable communications and marketing (Kaley, 2020). The brand has a take-back program where they resell old clothes in great condition, repair clothes that need fixing and recycle old clothes that cannot be repaired. The brand uses organic fibres and uses Bluesign technology when dyeing their clothes as it uses safe chemicals and is water and energy efficient. The brand is also certified by Fairtrade, helping worker empowerment (discussed in the social issues section). This is an example of a brand that follows the circular

framework well, minimising its impact (Eileen Fisher, 2022). This thesis aligns with and supports these important factors in this framework regarding sustainable supply chains.

Some New Zealand brands are starting to shift to a circular framework, and many of these brands can follow and adopt some of these practices and processes that international fashion brands such as Patagonia and Outland Denim are using. However, these brands can only do so much. Previous literature agrees that government policies and recollection or recycling clothing infrastructures need to be put in place to make it easier for the fashion industry to stop clothes from being thrown out (Govindan & Hasanagic, 2018). No brands are perfect, including the ones chosen for best practices in research question 2. However, it is positive to see both New Zealand and global brands adopting more practices and slowly shifting to a circular model.

Chapter 7- Conclusion

7.1. Main conclusions

The fashion industry creates many negative social and environmental issues, particularly through practices within its supply chains. The rise of fast fashion has then accelerated these problems and continues to worsen them. This is due to corners being cut to increase production and sell clothes quickly and cheaply. There is increasing awareness regarding these social and environmental issues from consumers and brands. There needs to be a change in the processes and practices within the fashion industry's supply chains to create a sustainable supply chain to lessen and eventually eliminate these issues. If the fashion industry and its supply chains continue to operate unsustainably, it will contribute to a series of events jeopardizing the natural environment and human life on this planet. Therefore, the fashion industry needs to become sustainable to help prevent these events from happening. This thesis firstly looked at the environmental and social issues within the New Zealand fashion industry's supply chains and what specifically New Zealand brands were doing to address these. Secondly, what were the best practices and frameworks from overseas brands addressing these issues?

This study identified some key issues facing the New Zealand fashion industry and what were some best practices and frameworks for working towards a more sustainable supply chain. This was done by examining data, including sustainability reports, websites, articles, and the Ethical Tearfund Fashion Reports. Research question 1 looked at how representative companies in the New Zealand fashion industry were addressing the sustainability issues that arise in the supply chain. Environmental issues the brands were examined against were carbon emissions from international supply chains. Water usage and water/chemical pollution from different wet processing of clothes and plastic pollution were the most common issue addressed by the representative companies. New Zealand fashion brands tended to focus on reducing or eliminating single-use plastics. However, in doing this, they tended not to mention other issues such as water pollution. What was of particular interest in research question 1 was the issue of Greenwashing. It was also unexpected how common it was among the examined brands.

Many companies use eco-certifications and marketing as greenwashing to divert attention from the sustainability issues they are not addressing, particularly social sustainability issues. The main social issues the brands were examined against included lack of worker empowerment and living wages. Many employees' wages in the supply chain are so low that they work excessive overtime to meet their basic needs; a living wage would ensure this. Workers were also at high risk of being in unsafe working environments where there was a lack of support and opportunities for upskilling. Auditing and supplier relationships were important as these can help uphold and improve factory standards and policies. However, even though many brands mentioned auditing and supplier relationships, many did not provide enough detail, for example, how often were factories audited? Where were they? The detail of these audits is essential and helps provide transparency while also holding the company more accountable. Lastly, transparency and traceability are essential for a green supply chain. The more transparent a brand is, the easier it is for them to find an issue in the supply chain, be held accountable, and address a problem.

Research question 2 findings align with previous literature that the best framework for brands wanting a green supply chain was a circular economy where little to no waste is created. The global brands with the best practices all included practices that can help fashion brands shift to closed-loop production. It is also necessary for the fashion industry to move away from fast fashion to 'slow fashion' where fewer collections are bought out, decreasing the massive number of clothes produced. However, this will be a challenge due to the nature of capitalism, where the fast fashion model was made to produce a lot of clothes and have a quick turnover to maximise profits. Regarding environmental issues, take-back programs, fewer collections, and organic and recycled materials were used, along with chemical and water recycling through technologies such as Ozone and E-flow.

Regarding social issues, more audits or production closer to the country where the product is sold is helpful, living wages and better worker empowerment practices to help lift workers out of poverty were discussed. Technologies were used, such as Bluesign, to help with transparency and traceability throughout the supply chain. In both research question 1 and even 2, no fashion brand was perfect which had best practices. However, brands can adopt practices and frameworks from each other to create a greener supply chain.

7.2. Limitations and future research

Most existing literature has focused on bigger global brands and their supply chains. This thesis contributes to the literature by explicitly looking at the New Zealand fashion industry's sustainability performance through representative New Zealand brands. It does so by examining what green initiatives they have taken and looking in-depth at one ubiquitous fashion item: the cotton t-shirt. It then examines best practices from global brands addressing the same issues to assess steps that New Zealand brands could adopt. While this approach of examining representative brands is useful, it does have the following limitations.

A range of representative New Zealand Fashion Brands were used; however, some of the brands examined were of different sizes, from small brands such as Ruby through to Glassons, a much larger brand. Different size brands may have an easier or harder time implementing sustainable practices within their supply chains. For example, because Glassons is a larger brand, they may have a harder time implementing a living wage than Ruby because there are more people to pay. They also may have more factories overseas, making it harder to gain transparency in the supply chain. The range of sizes in the sample was a deliberate research choice to ensure that the full range of issues was covered, but it makes it hard to make confident suggestions for change. Another limitation is that not all brands examined in research questions 1 and 2 had equal information; some had a lot more, making them easier to write about. Others, it was harder to find information on. This was unavoidable, and some companies published only a small amount of information is interesting. Further research might use other approaches such as interviews to uncover more information. The last limitation is replying company sources to discuss its sustainability practices honestly and transparently as they can be biased, a wider range of sources would be beneficial for future research.

Several areas of research could be looked at in the future regarding green supply chains in the New Zealand fashion industry. One future area of research regarding green supply chain management could be the collection of used clothing and ways to increase the efficiency of this process so it is easier to reuse and recycle, working towards a circular economy. The economic benefits of used clothing collection would also be another area

that would be useful for future research, as it may make brands more likely to start implementing these practices if they know of the economic benefits. Another area that could be investigated is consumers' knowledge of certifications and bringing more awareness to brands using these certifications as 'greenwashing'. Lastly, a final suggestion for future research areas is for more research, particularly on the New Zealand industry's supply chains, as more research was based on bigger countries overseas but not as much on New Zealand specifically.

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