Managing for sustainable fashion

– A comparative review of the Higg Index 2.0 Brand and Retail Module and the UN Sustainable Development Goals

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Master's thesis 2018
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Att arbeta mot ett hållbart modeföretagande - En jämförande analys av the Higg Index 2.0 Brand and Retail Module och FNs Globala mål

Sammandrag

Detta examensarbete undersöker hållbart företagande inom ett modeföretag och hur företag kan använda sig av det hållbarhetsmätande verktyget Higg Index 2.0 Brand and Retail Module för att arbeta mot sina prioriterade Globala mål, som är framtagna av FN. Detta har genomförts genom en jämförande textanalys av de två ramverken, Indexet och de Globala målen, från ett livscykelanalysperspektiv. Examensarbetet inkluderar även en fallstudie på det globala livsstilsvarumärket GANT. Examensarbetet visar att det i viss utsträckning är möjligt att arbeta mot ett företags prioriterade Globala mål med hjälp av Indexet men att det finns behov av kompletterande ledningssystem och verktyg för att arbeta mot alla mål. Skillnaden i fokus mellan de två ramverken är främst att de Globala målen i stor utsträckning fokuserar på livscykelanalyspåverkanskategorierna Markanvändning, Biodiversitet och Klimatförändringar och de sociala intressentgrupperna Samhälle och Lokalt samhälle. Indexet i sin tur fokuserar i större utsträckning på livscykelanalyspåverkanskategorier som rör kemikaliehantering och den sociala intressentgruppen Arbetare. Skillnaden i fokus kan förklaras med skillnader i syfte och målgrupp för de två ramverken. Begränsningar med Indexet har också tagits upp och diskuterats i uppsatsen. Fokusdistributionsmodellen som skapas i examensarbetet syftar till att ge en förståelse för hur de två olika ramverken fokuserar på hållbarhetsaspekter och hur ett företag kan använda sig av sina resurser för att arbeta mot specifika hållbarhetsaspekter. Modellen ger en förståelse för hur hållbarhetsaspekter interagerar med varandra och försöker reda ut den komplexa frågan hur man gör modebranschen mer hållbar. Mot bakgrund av att branschen förväntas växa enormt kommande år är det viktigt att adressera dessa frågor redan nu och frånkoppla social och miljömässig utarmning från ekonomisk tillväxt i modebranschen.

Nyckelord

FNs Globala mål, Higg Index, Sustainable Apparel Coalition, LCA, Påverkanskategorier, Hållbart modeföretagande, CSR, Miljöledningssystem

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Abstract

This master's thesis investigates sustainability management within a fashion company and how a company could use the sustainability management tool the Higg Index 2.0 Brand and Retail Module to work towards its prioritised UN Sustainable Development Goals (SDGs). It is a comparative review of the two frameworks, the Index and the SDGs, from a life cycle analysis perspective. It also includes a case study at the global lifestyle brand GANT. The thesis found that it is possible to work towards a company's prioritised SDGs to some extent with the help of the Index but that there is a need for complementary management systems or tools to target all prioritised SDGs. There are large focus differences between the SDGs and the Index. The SDGs put more focus on the life cycle analysis impact categories Land use, Biodiversity and Climate change and the social stakeholders Society and Local community. The Index however focuses to a larger extent on the life cycle analysis impact categories regarding chemical pollution and the social stakeholder Worker. The difference in focus between the two frameworks could be explained by the difference in scope and aim. Limitations to the Index are discussed further in the thesis. The resulting focus distribution model created in the thesis aims to provide an understanding of how the two frameworks focus on sustainability issues and how a company could use their resources to target a specific issue. The model also creates an understanding of how these issues interact and untangles the complexity of how to make the fashion sector more sustainable. Since the sector is expected to grow tremendously it is important to address these issues now and decouple social and environmental degradation from economic growth within the fashion sector.

Keywords

UN Sustainable Development Goals, Higg Index, Sustainable Apparel Coalition, LCA, Impact categories, sustainable fashion, CSR, environmental management system

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Summary

A growing economic activity over the 20^{th} century has lead to many countries being able to raise the living standards of their citizens leading to less poverty and improved education and health care. This in turn has lead to an increase in the earth's population, resulting in environmental and social sustainability challenges. With regards to this the UN launched Agenda 2030 and the Sustainable Development Goals (SDGs) in 2015, which is a global action plan to ensure a sustainable future for all. These goals span across all three dimensions of sustainability; economic, social and environmental.

The fashion industry has a major role in the sustainable development agenda, as it is a major contributor to non-sustainable practices. Fast fashion patterns have lead to a take-make-waste structure of how the industry works, putting enormous pressure on for example water, land and material resources as well as labour costs, leading to violations of human rights. The Sustainable Apparel Coalition (SAC) is a reaction to the need for change within the fashion industry. It is an industry initiative aiming to work for a sustainable fashion industry. Founded in 2009, today it constitutes of around 30% of the industry. Its major outcome is the Higg Index, a sustainability management tool aiming to provide an integrated approach to social and environmental issues over a product's entire life cycle. The Higg Index is made out of modules with questions concerning social and environmental performance of a product, brand or facility that results in a score that could be communicated to the public in the future. In this study the Higg Index 2.0 Brand and Retail Module, from now on referred to as the Index, was investigated.

The aim of the thesis was to analyse the difference in focus, from a life cycle perspective, between the Higg Index 2.0 Brand and Retail Module and the UN Sustainable Development Goals, this to investigate if a fashion company could use the Index to work strategically towards the SDGs. To fulfill this aim, the following three research questions were answered: Question 1 - *Which environmental and social life cycle analysis impact categories could be connected to the fashion industry?*, Question 2 - *What is the focus of the SDGs and the Index on the identified impact categories and how and why does the focus between the two differ?* and Question 3 - *Could the Index be used in order to work strategically towards a fashion company's, more specifically GANT's, prioritised SDGs?*

The thesis was conducted in three parts. Part one is a literature study aiming to get an overall understanding of the industry, the SDGs and the Index. The second part is an identification of how environmental and social life cycle analysis impact categories could be connected to the fashion industry, enabling a further investigation of the connections between the identified impact categories and the SDGs and the Index respectively. To further analyse the focus of the two frameworks, the connections for each impact category were compared between the two, creating a model of how each framework distributes its focus over each impact category and how this distribution of focus differs between the two frameworks. Part three is a case study investigating how GANT could use the Index to strategically work towards their prioritised SDGs.

There were eleven environmental life cycle impact categories and 30 social life cycle impact categories, divided into five stakeholders, that were found relevant for the fashion industry. The resulting focus distribution model shows that a fashion company could use the Index to work strategically towards the SDGs. However, there are some focus differences between the two frameworks, which means that to work towards some SDGs a company might need complementary management systems or tools. Especially SDGs referring to Climate change, Biodiversity and Land use, as well as the social stakeholders Local community and Society. The Index focuses to a large extent on chemical pollution impact categories. However, the case study at GANT showed that the Index gives incentives to improve the work with almost all identified impact categories. The case study also showed that by targeting one SDG there is a connection to many different impact categories, implying that sustainability challenges often are complex and interlinked.

The difference in focus between the two frameworks could be explained by the difference in scope and aim. The SDGs are universal and should be applicable to all nations, businesses and civil society while the Index targets fashion companies and workers in the supply chain. Furthermore, there are some limitations to the Index that have been discussed in this thesis. The small focus on transparency towards consumers could create barriers for sustainable consumption. The Life Cycle Analysis (LCA) perspective of the Index could be challenged due to its larger focus on segments close to the company. This could be explained by the lack of transparency within global supply chains. Another explanation could be that these parts of the supply chain are where the Index claims that a fashion company today not necessarily should take responsibility. This might rather fall on the nation to provide for example social benefits and security, which is an aspect that the SDGs take into account. Depending on where in the world and what kind of production a company has, the responsibility may fall either on the company or the nation. Hence, it is very important to work with a global developing agenda where companies and nations work together towards a sustainable future. Furthermore, the results show that the Index is partly aligned with current EU legislation. As it is supposed to create incentive for continuous improvement it could be questioned if the Index is such a forefront runner as it claims when it rewards companies for being compliant with existing law. This as the general score for companies in the Social/labour submodule is 60 out of 100, which is a quite high score if all companies are supposed to be encouraged into improving their sustainability work by increasing their score. The sector has asked for a more harmonized streamlined system that gives equal opportunities to all fashion companies and is fair to all business models and one could argue that the Index has delivered this. However, in some aspects, such as for driving for continuous improvement, the level of ambition of the Index and to what extent SAC members have influenced this ambition could be questioned.

Aligning a fashion company's work towards the SDGs can to some extent be done with the Index. The focus distribution model aims to get an understanding on how these two frameworks focus on sustainability issues and how a company can use their resources to target a specific issue. The model also tries to create an understanding of how these issues interact and to untangle the complexity of how to make the fashion sector more sustainable. Since the sector is expected to grow tremendously it is important to address these issues now and decouple sustainability issues from economic growth.

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Malin Hansson Reuter
Lia Zetterlund
21st of May, Lund

Contents

Abbreviations

CSR Corporate Social Responsibility

DMT Dimethyl terephthalate

E-LCA Environmental Life Cycle Analysis

EIC Environmental life cycle Impact Category

EU European Union

ILO International Labour Organisation

Index The Higg Index 2.0 Brand and Retail Module

IPU Inter-Parliamentary Union

LCA Life Cycle Analysis

MDGs Millennium Development Goals

OECD Organisation for Economic Cooperation and Development

REACH Registration, Evaluation, Authorisation and restriction of CHemicals

SAC Sustainable Apparel Coalition

SDGs UN Sustainable Development Goals

SETAC Society of Environmental Toxicology and Chemistry

SIC Social life cycle Impact Category

S-LCA Social Life Cycle Analysis

UN United Nations

UN DESA United Nations Department of Economic and Social Affairs

UNECE UN Economic Comission of Europe

UNEP United Nations Environmental Programme

1 Introduction

1.1 Background

With a growing economic activity over the 20th century, many countries have been able to raise the living standards of their citizens. The end of the 20th century left the world with less violence, poverty and with improved education and health care for a steadily increasing number of people (ILO 2018), raising the earth's population to 7.6 billion in 2017, with a prospect of 9.8 billion in 2050 (UN DESA 2017). The backside to this development has been the strain it has put on the environment, resulting in issues such as climate change, biodiversity loss and water scarcity. Furthermore, there is much to be done in terms of poverty, security, health and equality. In 2018, the world is facing huge challenges regarding both social and environmental concerns, with the prospect of more unrest as a deterioration of the environment takes place (UNEP 2017).

With regards to this the United Nation (UN) launched Agenda 2030 and the Sustainable Development Goals (SDGs) in 2015, which is a global action plan aiming to ensure a sustainable future for all. These goals span across all three dimensions of sustainability; economic, social and environmental (UN 2015). Contrary to previous development work, the private sector was this time acknowledged as an equal, and sometimes even leading, agent to achieve sustainable development together with nations and civil society (Sheyvens, Banks and Hughes 2016; Malan 2016).

The fashion industry has a major role in the sustainable development agenda, as it also is a major contributor to non sustainable practices (Deda 2018). The increasing economic standard of many people has lead to an excessive consumption, especially in developed countries. The concept of fast fashion, i.e. shorter turnover times and faster consumption patterns, has lead to a take-make-waste structure of how the industry works. This is putting enormous pressure on for example water, land and material resources as well as labour costs, leading to violations of human rights (Ellen MacArthur Foundation 2017). The industry has in recent years acknowledged these issues progressively and the need to change from business as usual to more sustainable practices has been identified by many companies, but also on national, regional and global governance levels (TEKO 2017, Retail forum of Sustainability 2013, United Nations Climate Change 2018, Naturvårdsverket 2016).

The Sustainable Apparel Coalition (SAC) is a reaction to this need. It is an industry initiative aiming to work for a sustainable fashion industry. Founded in 2009 (SAC 2018a), today around 30% of the industry are engaged in the organisation (SAC 2018b). Its major outcome is the Higg Index, a sustainability management tool aiming to provide an integrated approach to social and environmental issues over a product's entire life cycle (SAC 2018c). The Index is made out of modules with questions concerning social and environmental performance of a product, brand or facility which results in a benchmarking score that in the future is supposed to be communicated to the public (SAC 2018d).

Approaching the sustainability issues from a life cycle perspective, as SAC (2018c) claims that the Higg Index does, makes it possible to quantify and review the environmental and social impacts of a fashion company's activities, from raw material extraction to disposal. International standards of environmental and social life cycle analysis (LCA/S-LCA) includes numerous different impact categories that are of importance and should be assessed. Examples of life cycle impact categories are climate change and working hours (UNEP/SETAC 2009, UNEP/SETAC 2011).

The research gaps identified for this report are many. Previous research on the Higg Index includes both bachelor and master theses and peer reviewed research. One bachelor thesis investigates how the Index is perceived by its users and if the frequency of CSR communication to external stakeholders can be correlated to the company's Higg Index score (Wildt 2016). One master thesis analyses how to measure sustainability and how the non-financial Higg Index indicators could be translated into financial ones (Alhainen & Järvinen 2015).

The peer reviewed research includes the book *Roadmap to Sustainable Textiles and Clothing Regulatory Aspects and Sustainability Standards of Textiles and the Clothing Supply Chain*, where three chapters evaluate the Higg Index from different aspects. The first chapter *Sustainable Apparel Coalition and the Higg Index* (Radhakrishnan 2015) discusses the history and development of SAC and the Index while the second and third chapter *Making the Connection between UNGC Code of Conduct for the Textile and Fashion Sector and the Sustainable Apparel Coalition Higg Index (2.0)* (Gardetti 2015) covers the connection and differentiation between UNGC and the Higg Index. Other than that, not many studies have yet been done with regards to the Higg Index.

If a fashion company strives towards aligning their sustainability work with the SDGs, the Higg Index might be a way of doing so. GANT, a global lifestyle brand based in Stockholm, Sweden, has adopted five SDGs as their main focus, see *Table 7*, and in the spirit of their credo "Never stop learning" wanted to know how the Higg Index could be used to enhance their work towards these SDGs.

This thesis analyses the Higg Index and the SDGs with a life cycle perspective, something that follows on the currently existing research. Furthermore, the SDGs have yet to be thoroughly analysed with regards to the fashion industry. The importance of the alignment of the sustainability work of the fashion industry with the SDGs has been noted by many of the industry's stakeholders (Deda 2018, Newman & Smyth 2017). In 2018 such outreaches have been made by the UN and the industry but have yet to reach an outcome (UNECE 2018). As SAC is such an influential organisation, with members like Nike, H&M, Target and Marks&Spencer (SAC 2018e), it is desirable that the outcome of the Higg Index follows the SDGs. Hence, a research gap has been identified with regards to how the life cycle approach of the Higg Index is aligned with the SDGs, which motivates such an investigation as done in this thesis.

1.2 Aim and research questions

The aim is to analyse the difference in focus, from a life cycle perspective, between the Higg Index 2.0 Brand and Retail Module and the UN Sustainable Development Goals (SDGs), this in order to investigate if a fashion company could use the Index to work strategically towards the SDGs.

To fulfill the aim, the following research questions will be answered.

1. Which environmental and social life cycle analysis impact categories could be connected to the fashion industry?
2. What is the focus of the SDGs and the Index on the identified impact categories, and how and why does the focus between the two differ?
3. Could the Index be used in order to work strategically towards a fashion company's, more specifically GANT's, prioritised SDGs?

1.3 Scope

This section describes the scope of the thesis, i.e. what is included and excluded in the study.

Regarding the Agenda 2030, the thesis includes all 17 Sustainable Development Goals and their 169 targets.

The thesis investigates the Higg Index 2.0 Brand and Retail Module but not other tools developed by the Sustainable Apparel Coalition, such as the facility and product tools. The Brand and Retail Module includes both a social/labour and an environmental submodule, both of which are included in this thesis. The Index also separates the Brand and Retail Module into an apparel section and a footwear section. The thesis only investigates the apparel section.

The case study is limited to one company: GANT AB.

The thesis investigates primarily prerequisites for fashion brands within the European Union (EU).

The sources were limited to academic articles and reports not older than five years and that are peer reviewed. This due to the novelty of the two frameworks investigated and the rapidly changing topic of sustainable fashion. Exceptions were made for the acknowledge study from Greendex (2012) which was deemed relevant for the thesis and as well as the UNEP/SETAC S-LCA (2009) and LCA (2011) framework reports. The sources also include some industry reports that were deemed relevant. One source regarding supply chains is from 2001 and was deemed relevant because it is well cited.

2 Methodology and structure

The study was conducted in three parts. Part one is a literature study aiming to get an overall understanding of the fashion industry and the sustainability challenges that the industry is facing, see *Chapter 3*. Furthermore, the literature study includes a description of sustainability management systems and tools, see *Chapter 4*. The Agenda 2030 and the Sustainable Development Goals (SDGs) are covered in *Chapter 5* and the Sustainable Apparel Coalition (SAC) and the Index in *Chapter 6*. References were gathered in Lund University Libraries Search (LUBsearch) and through industry organisation reports.

The second part is an identification of how environmental and social life cycle analysis impact categories could be connected to the fashion industry, see *Chapter 7*, enabling a further investigation of the connection between the identified impact categories and the SDGs and the Higg Index respectively. This resulted in an analysis of the differences and similarities between the two frameworks. These results and the following analysis can be found in *Chapter 8*. Further detailed methodology for this part can be seen in *Section 2.1* to *2.6*.

Part three is a case study investigating how GANT could use the Higg Index 2.0 Brand and Retail Module to strategically work towards their prioritised SDGs, see *Chapter 9*. The Index was applied to GANT and the results were analysed in *Section 9.1*. For further detailed methodology for this part see *Section 2.5*.

2.1 Identifying relevant life cycle impact categories for the fashion industry

To identify standard environmental life cycle impact categories (EICs) and social life cycle impact categories (SICs) the UNEP/SETAC reports regarding life cycle analysis, *Towards a Life Cycle Sustainability Assessment: Making informed choices on products* (UNEP/SETAC 2011, p.8) and *S-LCA, Guidelines for Social Life Cycle Assessment for Products* (UNEP/SETAC 2009, p.49), were used as frameworks. The UNEP/SETAC report regarding S-LCA divides the social impact categories into five different stakeholders; Worker, Local community, Society, Value chain actor and Consumer.

To ensure that the impact categories were relevant for the fashion industry, several reports were used to confirm that the UNEP/SETAC impact categories were used in reports measuring and evaluating the fashion industry. The reports and articles used were deemed relevant if their scope included fashion products and/or brands. The impact categories that were found in these fashion relevant reports in relation to the impact categories that were found in UNEP/SETAC can be seen in the Appendix. When evaluating which impact categories to use in the thesis, the UNEP/SETAC impact categories had to be found in at least two of the chosen fashion relevant reports. When an impact category had a different vocabulary but the same meaning in the fashion relevant reports and in UNEP/SETAC, the UNEP/SETAC vocabulary was used.

2.2 Identifying connections between the SDGs and the impact categories

To investigate to which extent there is a connection between each impact category and the 17 SDGs each impact category was compared to each of the 169 targets that constitute the SDG framework. A connection was made if a target mentioned the impact category in a direct way, that is a connection was not made if the target dealt with causes or consequences of effects connected to the impact category. Each connection that was made between an impact category and a SDG target was given a numerical value.

Environmental impact categories (EICs) were explicitly connected to targets that dealt with the use, degradation and pollution of resources connected to that specific impact category. As an example, Climate change was connected to targets specifically mentioning climate change related risks and management of green house gas emissions, i.e. targets with a main focus on reducing climate change, infrastructural mitigation of and adaptation to climate change. Two examples of such targets are:

> "13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning"

"7.2 By 2030, increase substantially the share of renewable energy in the global energy mix"

(UN 2015)

Social impact categories (SICs) were connected to a target if they directly mentioned the aspect at hand, i.e. the cause or consequence to an issue was not deemed as a connection. SICs are diverse and range over several different stakeholders and varies from very defined to very broad issues. The social impact category Access to material resources is very broad and includes for example access to land, water and health care, which motivated a connection to targets specifically mentioning ensuring access to such specific resources. Another example of a social impact category is Respect for indigenous rights, which in turn is quite specific. This category was only connected to targets explicitly mentioning indigenous people or minority groups. Two examples of such targets connected to Access to material resources and Respect for indigenous rights were respectively:

> "9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all"

"4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations"

(UN 2015)

As described earlier, each connection was given a numerical value. As the SDGs are to be seen as indivisible and equal (UN 2015), each SDG would account for 1 point. However, all SDGs do not have an equal number of targets. For example, Goal 7, Ensure access to affordable, reliable, sustainable and modern energy for all, has three targets while Goal 17, Partnerships for the Goals, has 19 targets. To ensure that one SDG accounts for 1 point no matter how many targets it includes, each target was given a point of 1 over the number of targets of that specific SDG. As an example each of the three targets of Goal 7 were given a value of 0.33 points each.

For example, when grading target 7.3, see below, it was connected to both Energy use and Climate change, giving each impact category 0.33 points for a connection to this specific target.

> " 7.3 By 2030, double the global rate of improvement in energy efficiency"
> (UN 2015)

The maximum point possible, i.e. if an impact category has connections to all 169 targets, for any impact category would thus be 17.

2.3 Identifying connections between the Index and the impact categories

To investigate to which extent there is a connection between each impact category and each question in the Higg Index 2.0 Brand and Retail Module, the impact categories were compared to both the social/labour and environmental apparel submodules. Each impact category was analysed towards both the environmental and the social/labour submodule. Each connection was given a numerical value.

Many questions in the Index provide extra information in "more info" boxes, where for example it is defined what the Index means by the words "environmental" and "social/labour". These definitions were used when analysing the connections to the impact categories. For example, "environmental" in the Index refers to "energy and greenhouse gases, water use, waste water effluent, emissions to air, waste management, chemical management". Thus, these questions were connected to corresponding impact categories. "Social/labour" in the Index refers to ILO conventions and to some extent the UN Declaration of Human Rights, which allowed a connection to be made with for example Working hours, Forced labour and Freedom of association/Collective bargaining. Furthermore, a connection was made if a question mentioned the impact category in a direct way, that is a connection was not made if the question dealt with causes or consequences of effects connected to the impact category.

Each submodule, i.e. social/labour and environmental, has a maximum possible score of 100, meaning that the overall maximum possible score for the entire Brand and Retail module is 200. Thus, one individual impact category could receive a maximum possible score of 200. Both submodules are divided into different sections. The environmental submodule includes for example the sections "Materials", "Manufacturing" and "End of use". The social/labour submodule includes for example "Social/labour performance management system for value chain partners" and "Transparency and public disclosure".

When giving a numerical value to each connection that was made between the Index questions and the impact categories, the score weighting already in place in the Index was taken into account. For example, the section "Materials" in the environmental submodule is weighted to compose 25% of the total score, meaning that if a brand receives the maximum score in the "Materials" section they would receive 25 points. One question in this section could be worth 4 points, but in the final score this would only count as 1 point, as 25% of 4 equals 1. Thus, each connection made with this question earned 1 point. The results represent the connections with the impact categories if a company would receive the maximum score for both the environmental and social/labour submodules, i.e. a score of 200.

One example of a question from the "Material" section in the environmental submodule can be seen below.

> "Brand has written Restricted Substance List (RSL) or has adopted an industry-accepted standard RSL. The RSL reflects the strictest regulations of all countries/markets in which the brand operates and sells products (e.g., regulations in manufacturing, marketing, or sales location)."
> SAC (2015)

This question is worth 2 points, but as the "Materials" section is weighted to account for 25% of the total score, a connection with this question would give 0.5 points. This specific question was for example connected to the environmental impact categories Human toxicity and Ecotoxicity.

Another example of a question in the Index's social/labour submodule, section "Social/labour performance management system for value chain partners", is:

> "The Company's social/labour performance requirements for partners in the value chain incorporates all the ILO's eight core conventions of fundamental human rights and the UN Declaration of Human Rights."
> SAC (2015)

This question is worth 2 points, but as this section is weighted to account for 20% of the final score, a connection with this question would give 0.4 points. This specific question was for example connected to the social impact categories Child labour, Forced labour and Collective bargaining/freedom of association.

2.4 Comparison of focus distribution between the SDGs and the Index

To enable a comparison between the two frameworks there was a need to create a common scale. To do this, the sum of all numerical values given to the connections between each environmental/social impact category and the two frameworks respectively was divided with the total sum of all numerical values given to the connections between all environmental/social impact categories for each framework. Thus, showing how many percentage of the total connections between the impact categories and the SDG targets or the Higg Index 2.0 Brand and Retail Module questions that are made with one specific impact category, i.e. to what extent a framework focus on a specific impact category, creating a focus distribution model. An example calculation from the results for the envrionmental impact category (EIC) Climate change can be seen in *Equation 1.*

$$\frac{\sum \text{numerical values from connections between Climate Change and SDGs}}{\sum \text{numerical values from connections between all EICs and SDGs}} = \text{SDG focus on Climate Change} \tag{1}$$

Inserting data into *Equation 1* results in:

$$\frac{1.86}{11.1} = 0.17 \tag{2}$$

Thus, *Calculation 2* shows the focus on Climate change from the SDGs. The same calculation was then made for the Index which resulted in *Table 1.*

Table 1: *Example of calculation to create a common scale in order to determine to what extent the SDGs and the Index focuses on the EIC Climate change.*

	Sum of numerical values from connections made with the EICs	Sum of numerical values from connections made with Climate change	Focus on Climate change
The SDGs	11.1	1.86	0.17
Higg Index 2.0	760	67.7	0.089

The difference between the numerical values in the third column in *Table 1* therefore signifies a difference in focus on the EIC Climate change between the SDGs and the Index. This example shows that the SDGs have allocated 17% of their total focus on the environmental impact categories to the EIC Climate change. The Index has however allocated approximately 9% of its total focus on the environmental impact categories to the EIC Climate change.

2.5 Case study: GANT

The Higg Index 2.0 Brand and Retail Module was applied to GANT AB by answering all the questions in the Index using policy and governance documents provided by the company. Thereafter, questions that were still unanswered were connected to a specific department and said department was consulted to be able to answer each question. The consulted departments were CSR, Quality, Sourcing, Logistics, Design, Strategic development, HR and Retail. The result was then applied to the focus distribution model. This was used to see how GANT could work towards its targeted SDGs by using the Index. Three of GANT's prioritised SDGs, 4, 6 and 14, were exemplified and more closely analysed. The results and analysis for this can be seen in *Chapter 9*.

Referring back to the example question from the Index's social/labour submodule described in *Section 2.3* and to give an example of the evaluation method, it was evaluated as follows for GANT:

> "The Company's social/labour performance requirements for partners in the value chain incorporates all the ILO's eight core conventions of fundamental human rights and the UN Declaration of Human Rights."
>
> SAC (2015)

As GANT is working with the Business Social Compliance Initiative (BSCI), which incorporate the eight core conventions of fundamental human rights in their work, this question was answered with a "Yes". The social impact categories (SICs) Child labour, Forced labour, Freedom of association, Working hours, Fair salary, Equal opportunities/discrimination, Health and safety and Social benefits was therefore given 0.4 points each for a connection to this question.

2.6 Structure of methodology

In *Figure 1* a concluding graphic overview of the methodology can be seen.

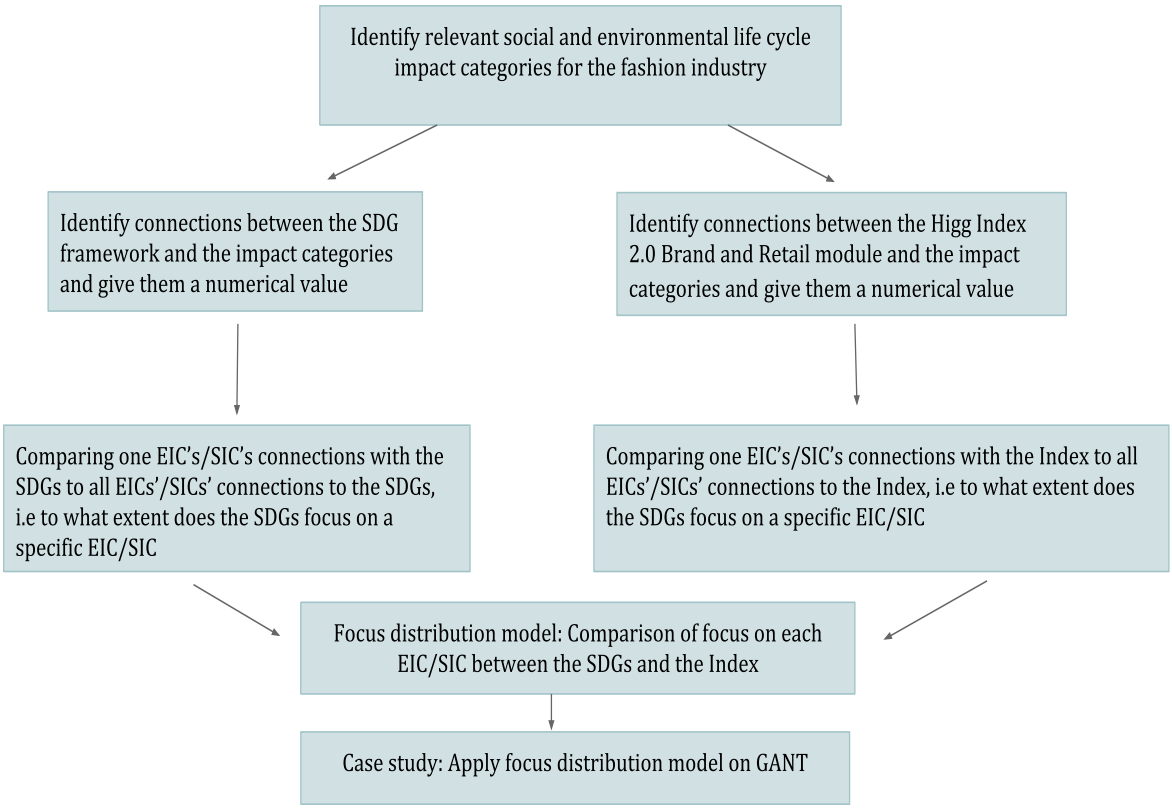

Figure 1: *A graphic overview of the methodology.*

3 The fashion industry

Over the past 15 years the fashion industry has grown tremendously, with a doubling in production volume (Ellen MacArthur Foundation 2017). In 2016 it was one of the world's largest economies (McKinsey 2017), employing more than 300 million people (Ellen MacArthur Foundation 2017). The industry growth has gone hand in hand with an increase in the turnover speed of products (McKinsey 2017), i.e. an increase in the fast fashion cycles, with more collections and cheaper prices (Ellen MacArthur Foundation 2017). This is putting pressure on the actors in the supply chain to do more in less time and with less money (McKinsey 2017). With a growing world population and with an increasing Gross Domestic Product (GDP), especially in developing countries, the demand for apparel will most likely rise by 63% between 2017 and 2030, creating a value increase of 30% and an increase in the need for input resources such as raw material, energy, water and labour (Global Fashion Agenda & The Boston Consulting Group 2017).

The fashion industry has become more and more globalized, with an intricate supply chain operating in many different countries (Strähle & Müller 2017), resulting in a fragmented and huge network of stakeholders difficult to overview and creating difficulties to reach transparency in the supply chain (Global Fashion Agenda & The Boston Consulting Group 2017). The global supply chain starts with the extraction of raw material and ends with the sale of the ready garment (Roos, Sandin, Zamani & Peters 2015). In 2016 the global fibre production was dominated by cotton, 24.3%, and synthetic oil based man-made fibres, 62.7%, such as acrylic and polyester (Lenzing 2017). China, India and the US are the leading cotton producing countries in the world, with China also being the world import leader of cotton (Cotton Australia 2016). Polyester fibres are usually made from DMT (dimethyl terephthalate) and EG (ethylene glycol), which is derived from fossil based petroleum (Roos et al. 2015). Globally, Northeast Asia is the largest consumer of DMT, followed by the Indian subcontinent (IHS Markit 2017). Over 97% of all raw material for fashion apparel have virgin origin (Ellen MacArthur Foundation 2017). With regards to manufacturing of garments, Asian countries such as China, Bangladesh, India and Vietnam have been labour intensive areas and have had a leading role in garment manufacturing activities such as cutting and sewing since the beginning of the 21^{st} century. Today, this is somewhat changing with a shift towards other areas, often African countries like Ethiopia (ILO 2016).

For a long time the environmental and social sustainability challenges that the industry faces have been overlooked for the sake of economic profitability. As resources are getting scarcer the traditional linear business model for fashion companies will not sustain (Global fashion Agenda & The Boston Consulting Group 2017). The use and pollution of resources in apparel production is affecting environment and people both locally and globally. For example water use and water pollution affect people close to the production whereas the energy use and green house gas emissions are a global concern. Today, the industry contributes to 2% of the CO_2 budget set up for the world if we are to reach a maximum global warming of 2°C target as established in the Paris Agreement. In 2050 this contribution will have increased to 26% if the industry continues with business as usual (Ellen MacArthur Foundation 2017). Another great concern for the industry is the use of chemicals, both from a pollution perspective

but also from a material re-circulation perspective. The presence of hazardous substances in apparel makes them unsuitable to re-circulate, as they pose a threat to human health and the environment. Therefore it is important to phase out these substances (Ellen MacArthur Foundation 2017; Naturvårdsverket 2016). The industry has also many times gained attention for issues such as poor labour, health and safety standards in the production stage (Global Fashion Agenda & The Boston Consulting Group 2017). This calls for a change and the industry has already to some extent begun taking steps in a more sustainable direction.

There are numerous different programs, certificates and management systems to promote a more sustainable production and consumption in the fashion industry, coming from the industry itself or organisations closely connected to the activities related to the fashion industry. The industry has expressed a need for a more streamlined and harmonized system to standardize their sustainability work. An argument for this is that if a majority of actors were backed up by a standardized system it could lead to a greater and faster change. With a common goal and a level playing field to start from, a sustainable global supply chain could be reached (Karlsson 2015, Ellen MacArthur Foundation 2017). To achieve this, collaboration between industry stakeholders and policy makers is crucial (Global Fashion Agenda & The Boston Consulting Group 2017).

Sustainability issues are often addressed in the company's CSR management. CSR stands for Corporate Social Responsibility. The work aims to align the company with human and labour rights along the supply chain and will be further explained in *Section 4.2*. Examples of how the CSR work might be implemented in practice is by committing to different international standards such as International Labour Organisation (ILO) standards or Guidelines for Multinational Enterprises (OECD Guidelines), but also to commit to for example The Modern Slavery Act form the UN (OECD 2017). Another CSR practice is to join different auditing organisations that work for more social and environmental sound practices in the supply chain (Amfori 2018; Better cotton initiative 2018). The CSR work can be manifested in different aid and/or research programs, for example H&M's collaboration with the NGO Water Aid and Gina Tricot's collaboration with UNICEF (Water Aid 2018; Gina Tricot 2018). CSR management is likewise present in high end fashion, such as in the Kering group, a luxury fashion brand group with brands such as Gucci, Bottega Veneta and Stella McCartney (Kering 2018).

Furthermore, many fashion companies make specific collections marketed to the public as more sustainable, for example H&M's Conscious Collection which includes energy and water saving washing processes (H&M Group 2018). Another example is the brand Lindex's collection Better Denim, which aims to reduce the water usage in denim production (Lindex 2018). The brand Filippa K for example provides services such as mending and second hand retail to increase the longevity of their products and in this way "close the loop" of fashion (Filippa K Circle 2018).

In 2009 the Sustainable Apparel Coalition (SAC) was founded (SAC 2018a). It is an industry organisation which today constitutes of approximately 30% of the industry (SAC 2018b). It aims to work with all three pillars of sustainability and especially with transparency within the supply chain. Its major element is the Higg Index, a sustainability measurement tool (SAC 2018d). SAC and the Higg Index will be more thoroughly explained in *Chapter 6*.

As previously stated, the consumption of fashion is rapidly increasing in volume and is anticipated to continue to do so (Global Fashion Agenda & The Boston Consulting Group 2017). This consumption behavior is partly triggered by the fast fashion concept which is built on bringing the latest trends as fast as possible to the consumer, with new collections every week (Ellen MacArthur Foundation 2017). From a consumer perspective, to be able to make more informed and sustainable choices it is crucial to have transparency on the environmental and social performance of a product (Global Fashion Agenda & The Boston Consulting Group 2017). Surveys show that consumers want to make informed and conscious choices, however there is a values-action gap on what consumers say in regards to how they act, i.e. they do not consume as sustainable as they state that they want to (Greendex 2012). This values-action gap has been discussed for several years but recent studies show that the trend might have turned. A survey conducted by the Sustainable Brand Index (SBI) (2018) shows that 34% of consumers actually act on their values and SBI (2018) acknowledges a positive trend where attitude sooner or later translates into behaviour.

The fast fashion concept is also coupled with the decreasing prices of products. The cost of the environmental degradation and the social negative impact due to apparel production and consumption is not shown in the product price. Furthermore, in order to avoid trade offs for more stressing needs, such as water and food provision, there is a need to decouple the need for these vital resources from the industry (Global fashion Agenda & The Boston Consulting Group 2017).

3.1 The supply chain of a fashion company

According to a well-cited article from Mentzer et al. (2001), a supply chain may be defined as "a set of three or more entities (organisations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer (Mentzer et al. 2001). Since the fashion industry includes thousands of actors and the industry is continually growing globally, the supply chains in the industry varies much and there is no standard supply chain (Global Fashion Agenda & The Boston Consulting Group 2017). One example of this can be found in the report *Environmental assessment of Swedish fashion consumption. Five garments - sustainable futures* where the varying supply chains of five different garments are described (Roos et al. 2015). However, when reviewing the report it can be seen that there are many similarities between the five supply chains, making it possible to identify a "general" fashion industry supply chain even though it might not be valid for all production methods available. Today's supply chain is typically linear and not circular, i.e. it starts at the raw material extraction phase and ends at the retail phase (Roos et al. 2015). *Figure 2* shows a general fashion company supply chain, adopted from the descriptions of a process flowchart in Roos et al. (2015) and a fashion supply chain

in Strähle & Müller (2017).

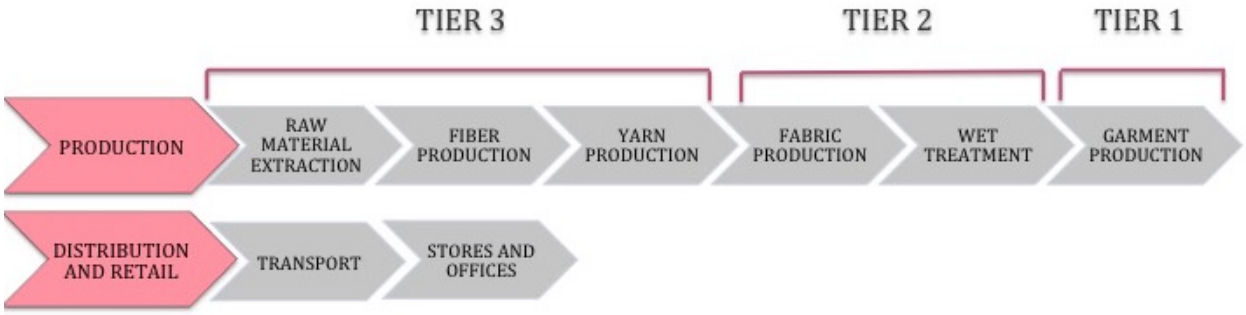

Figure 2: *General fashion industry supply chain, adopted from Roos et al. (2015) and Strähle & Müller (2017).*

As can be seen in *Figure 2*, the supply chain is divided into different segments based on the distance from the fashion company. The nearest segment is called tier 1 and includes garment production (Global Fashion Agenda & The Boston Consulting Group 2017). The garment production starts with cutting, sewing, printing if required, finishing of the garment, usually ironing and packaging. Garment production may take place at one or several factories (Roos et al. 2015).

Second closest to the fashion company is tier 2, which refers to the fabric production and wet treatment segment in the supply chain (Global Fashion Agenda & The Boston Consulting Group 2017). Fabric production includes weaving, knitting or any other technique that produces fabric. The production technique depends on the fibre and the requirements on the final garment (Roos et al. 2015). The wet treatment could in some cases be done after garment production, however it is more common that it takes place before the garment production. The wet treatment could include bleaching depending on the yarn and colour of the end product. This step could also be a dry treatment depending on the fibre. Normally this phase includes bleaching, opening and then drying and starts with a wash and ends with a finishing process. It is a very chemical intensive phase (Roos et al. 2015; Global Fashion Agenda & The Boston Consulting Group 2017).

The last segment is tier 3, which refers to the raw material extraction, fibre production and yarn production segments in the supply chain (Global Fashion Agenda & The Boston Consulting Group 2017). Depending on the raw material the processes for this phase may vary (Roos et al. 2015). For natural fibres, such as cotton, the process includes agricultural cultivation. For a synthetic fibre, such as polyester, the process normally consists of extraction of crude oil from the earth. The fibre production phase processes also may vary with material type. In case of a synthetic fibre (e.g. polyester, elastane, polyamid), the fossil petroleum is transformed into chips and then into filament staples or cut to staple fibres. How this is done depends on the type of synthetic fibre. Natural fibres are naturally staple fibres and are ginned and bailed before going to yarn production. Also yarn production processes may vary with material type. Synthetic fibres are twisted into yarn while staple fibres are spun

(Roos et al. 2015).

A fashion company normally works closest to the suppliers and producers in tier 1. However, to have transparency further down the supply chain, in other words in tier 2 and 3, is not as usual due to the complexity of most supply chains (Global Fashion Agenda & The Boston Consulting Group 2017).

The traditional supply chain does not include the consumer use and end-of-life phase. A supply chain that includes these phases is called an extended supply chain (Mentzer et al. 2001). It includes all stages in a product's life cycle and correlates with the product life cycle used in life cycle analysis, which will be further explained in *Section 4.3*. An extended supply chain can be seen in *Figure 3*. This figure only includes the option of incineration or landfill in the end-of-life phase is due to the fact that commercial recycling options for textiles are currently under development and no scaled up technique is available. Re-use of garments is furthermore only done to a small extent (Roos et al. 2015).

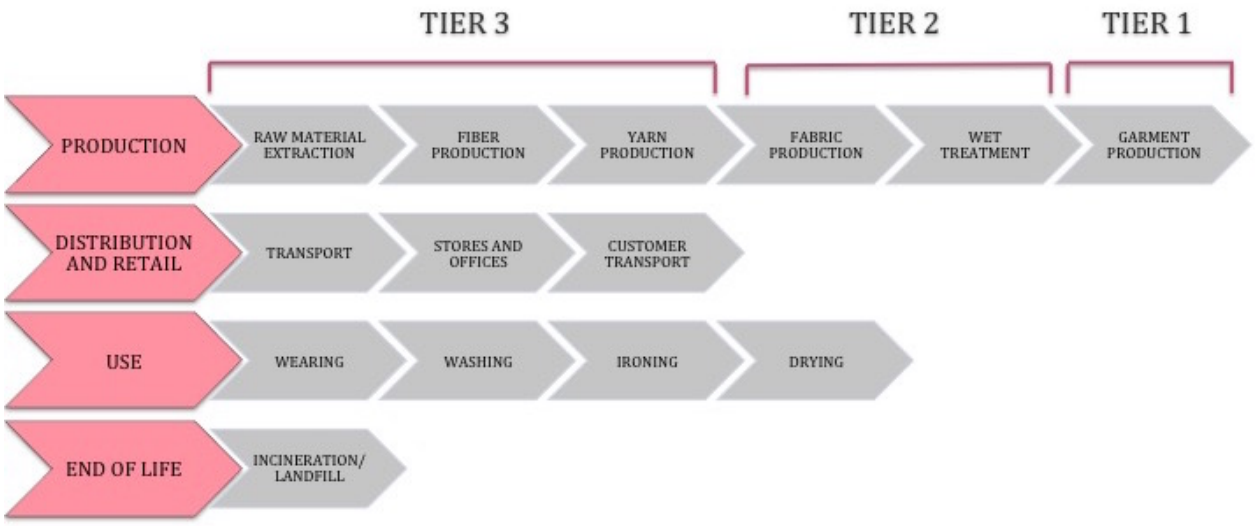

Figure 3: *Extended supply chain, as adopted from Roos et al. (2015) and Mentzer et al. (2001).*

3.2 Policy instruments for sustainability in the fashion industry

The need for policy instruments to promote a sustainable fashion industry has been identified on many governing levels, both national, international and global. The UN and EU, as well as many individual nations such as the UK (WRAP 2018), Sweden, France (Naturvårdsverket 2016) and China (Chen 2016) have established regulations, goals and action plans to decrease the negative environmental and social impacts from the fashion industry. The industry itself has also shown ambition to contribute with input, collaboration and partnerships (Naturvårdsverket 2016; Retail forum of sustainability 2013; TEKO 2017; United Nations Climate Change 2018).

Because of the global nature of the supply chain of many fashion companies the jurisdiction of the countries in which the company acts is limited to downstream stages of the product's life cycle, such as the use and end-of-life phase. These regulations can take form in the shape of producer responsibility schemes, waste management and research and development in recycling and re-use areas (Naturvårdsverket 2016). There are also regulations on limitations of chemical substance occurrence in imported goods, which both regulate the chemical substances circulating on the in house market, as well as what can be used and in what amount further upstream (Kemikalieinspektionen 2016). The upstream stages in the life cycle, as well as in the supply chain, are regulated by the nation in which cultivation and manufacturing takes place (Naturvårdsverket 2016). These are often countries with low interest in sustainable practices as a trade off for economic growth, coupled with low ambition and resources for re-enforcement of existing regulations (Arif 2015).

At a global level the resourcefulness to promote action and set up frameworks to guide countries, businesses and individuals towards a more sustainable future falls on the UN. This is realized in the concept of the Agenda 2030 and the Sustainable Development Goals (SDGs). These guidelines and goals are to be implemented in policy frameworks on a regional and national level by the UN member states. The SDGs include all three aspects of sustainability, tackling the challenges from both an environmental, social and economic standpoint (UN 2015). The SDGs will be further explained in *Chapter 5*.

On a regional level the EU has for example established the REACH (Registration, Evaluation, Authorization and restriction of CHemicals) regulation to restrict the use and occurrence of hazardous chemicals on the EU market. This is an administrative policy instrument in the form of a legal framework (EC 1907/2006 OJ L 396, 30.12.2006, p. 1–849). REACH does not directly refer to textiles or apparel but affects the fashion industry as garments are chemically treated to achieve certain qualities, thus being imported goods containing chemicals. REACH puts the responsibility on the fashion companies to make sure that actors in the supply chain comply to the chemical restrictions, enabling some control and resourcefulness further upstream. The restrictions are based on what the product contains when it is imported and is volume based. As apparel often contain very low volumes of each chemical the yearly import of clothes usually do not contain enough of a substance to evoke obligation to register. The incentive to gain knowledge of what the garment actually contains could therefore be low (Kemikalieinspektionen 2016).

The Biocidal Products Regulations (EU 528/2012 OJ L 167, 27.6.2012, p. 1–123) is another EU regulation which regulates the use of chemicals in products. Biocidal agents are chemicals that control animals, bacteria and pests. Garments are not the primary target but can for example be affected when biocidal agents are used to prevent bad odour or bacteria in sports clothing (Kemikalieinspektionen 2015).

The EU issued in 2008 a Waste Framework Directive which is based on the principles of the waste hierarchy (2008/98/EC OJ L 312, 22.11.2008, p. 3–30). This model ranks the end-of-life strategies for products based on the strategy's resource efficiency. Disposal in landfill is the least resource efficient, followed by recovery, recycling, re-use and at the top of the hierarchy is prevention of waste. The waste hierarchy can be seen graphically in *Figure 4*. In the EU member states the Waste Framework Directive has lead to a focus on shifting the end of life stage upwards in the hierarchy (Gharfalkar, Court, Campbell, Ali & Hillier 2015). For textiles and garments this has resulted in research and development regarding the infrastructure and techniques of textile recycling and re-use schemes and investigations on how to promote sustainable consumption (Mistra Future Fashion 2018; Hennlock, Tekie and Roth 2015).

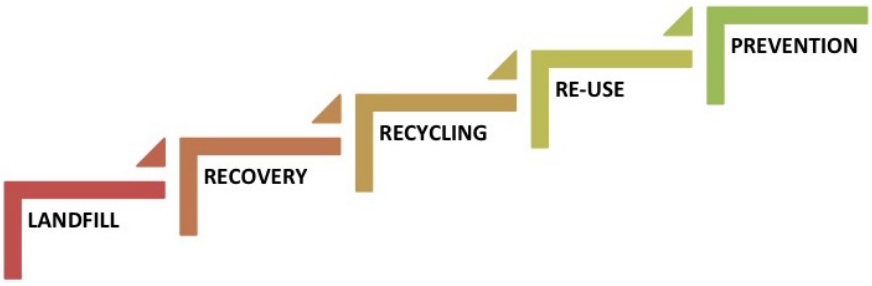

Figure 4: *The waste hierarchy model (Gharfalkar et al 2015).*

Extended Producer Responsibility (EPR) places the responsibility of the impacts from the products on fashion companies, extending their responsibility to beyond the general supply chain, see *Section 3.1*, to also include the use and disposal phase (OECD 2018), i.e. an extended supply chain (Mentzer et al. 2001). A mandatory EPR system has been found to have positive effects with regards to increasing the resource efficiency of textile products with recycling and re-use (Elander, Tojo, Tekie & Hennlock 2016). Such management systems are rare for textile products, but one country that has implemented an EPR for textiles is France. EPR is also regarded as enabling for more circular flows of materials and a way to reach a circular economy (French Ministry of Environment 2014). The French model of an EPR for textiles has also been noted to decrease environmental impact. Palm, Harris & Ekvall (2013) investigate an implementation of different EPR models in Sweden and conclude that the French model would decrease the climate change emissions by 20%, based on the consumption of textiles in Sweden in the year of 2010. They also conclude that the socioeconomic benefits for Sweden of introducing the French EPR model would be approximately 7 billion SEK because of avoided emissions of green house gases, acidification, eutrophication

and photochemical ozone (Palm, Ekvall & Harris 2013).

There is also legislation within the EU regarding sustainability reporting to enhance communication and transparency to external stakeholders, such as consumers (2014/95/EU OJ L 330, 15.11.2014, p. 1–9). Sustainability reporting will be further explained in *Section 4.4*. Another informative policy instrument is environmental performance labelling. Labels managed by states are in minority, the majority are private sector and non-profit organisation labels. However, there are three types of harmonized and standardized labelling concepts constructed by the International organisation for Standardisation (ISO). Type I (ISO 14025) is called eco label and has the strictest requirements. It must for example be revised by a third party. Type II (ISO 14021) is a self declaration label and does not need to be revised by a third party, but needs to be verifiable. Type III (ISO 14024) is an environmental declaration, meaning that the label should inform on environmental performance with for example life cycle analysis data. All labelling types are to be used for consumer facing communication (OECD 2016).

To ensure social sustainability there is national legislation on labour and human rights in the countries where most production and manufacturing takes place. How and if it is re-enforced is however more uncertain (Sapkal 2015; Coyne 2014). On a global level international organisations such as the Organisation for Economic Co-operation and Development (OECD), International Labour Organisation (ILO), EU and UN have developed standards and frameworks that are promoting social sustainability in global supply chains (OECD 2017). Some examples of social issues of concern are fair wages, working hours, occupational health and safety, social benefits and equality. These standards are not legally binding but have increased in importance and multinational companies are to some extent expected to follow and engage in a social responsibility program (OECD 2017).

4 Sustainability management systems and tools

In order for a company to measure, manage and push for improvement within their sustainability work it may use management systems, life cycle analysis and sustainability reporting. These tools and systems will be described in the following sections.

4.1 Environmental Management Systems

An Environmental Management System (EMS) is a management tool that enables organisations to systematically control their environmental impact. One of the aims of an EMS is to continuously increase the environmental performance of an organisation, i.e. to strive for continuous improvement (Brorson & Almgren 2016). To be able to have continuous improvement an EMS is built upon the Plan-Do-Check-Act-wheel that can be seen i *Figure 5* below (Brorson & Almgren 2016).

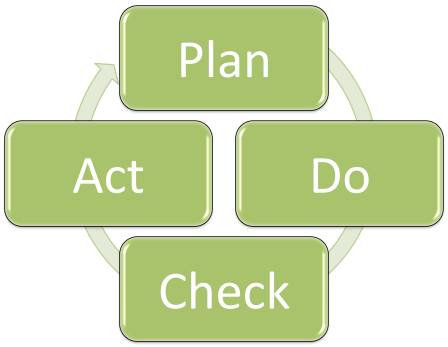

Figure 5: *Plan-Do-Check-Act-wheel. Inspired by Brorson & Almgren (2016).*

The incentives for a company to use an EMS could be both to ensure good relationships with stakeholders, an interest in making the company's environmental impact smaller, for commercial reasons, economic advantage and/or legal demands (Brorson & Almgren 2016). An EMS is a general management tool and thus not adapted to any specific sector, which means that the company using an EMS has to customize it to the company's business model and sector. Furthermore, an EMS does not have to include measurements of impact (Brorson & Almgren 2016), as a life cycle assessment does.

Environmental management systems are voluntary and companies could construct their own EMS. However, there are international standards that one may use (Zilahy 2017). In 1992, the international standard ISO 14001 was constructed by the International organisation for Standardisation (Salim, et al. 2017). Salim et al. (2017) has claimed that "The ISO 14001 standard has been championed as one initiative to help achieve the sustainable development goals." In 1993 the European Eco-Management Audit-Scheme (EMAS) was formed.

In 2015, more than 4400 organisations were certified by EMAS and over 300 000 by the ISO 1400 standard (Zilahy 2017). It is clear that the interest for EMS is increasing and in a recently made study the authors discovered that the scientific publications regarding EMS have increased from 10 to 58 articles between the year 2000 and 2016 (Salim et al. 2017).

4.2 Social responsibility management

Social responsibility management is often realised in the concept Corporate Social Responsibility, CSR. CSR started to develop in the middle of the 20th century and grew towards the end of the century, this due to an increasing debate regarding what kind of responsibility a company should take for its activities (Camilleri 2017). In the very beginning CSR was mainly associated with business ethics and philanthropy. Since then the word has been used within different contexts and until this day there is still no consensus on what actually defines CSR work in practice. CSR is a way for companies to manage their social responsibility not only by being compliant to the law but also by taking responsibility for the company's activities and its impacts on human rights and social sustainability challenges. CSR is often nowadays also connected to environmental responsibility. Today, the most commonly used term is Corporate Sustainability Responsibility, aiming to cover the social, economic and environmental aspects in an integrated manner (Camilleri 2017).

To take social responsibility often entails taking responsibility for the supply chain by for example having a responsible supply chain management and stakeholder engagement. This could be done in several different ways, one approach is to encourage partners in the supply chain to follow international standards such as ISO 9001 and 14001 and SA8000 (Camilleri 2017). There is also an ISO standardized guidelines framework, called ISO 26000. ISO 26000 defines what social responsibility is and how organisations may work with this to contribute to a more sustainable future. In addition to international standards, a company could also create own frameworks such as sustainability policies, have code of conducts and conduct social audits to ensure that suppliers are compliant with the company's sustainability standards (Camilleri 2017).

4.3 Life Cycle Analysis

Life cycle analysis (LCA) is an impact analysis and assessment tool. It covers a product's entire life cycle (ISO 14040:2006), i.e. from cradle-to-grave (Klöpffer 2014a). *Figure 6* shows such a life cycle for a fashion product, adopted from Roos et al. (2015). The life cycle starts in the production stage with raw material extraction, continues with distribution and retail, user phase and ends with the end-of-life phase. The most common end-of-life option today for textile products are incineration or landfill. To some extent clothes are re-used and almost nothing is recycled (Roos et al. 2015).

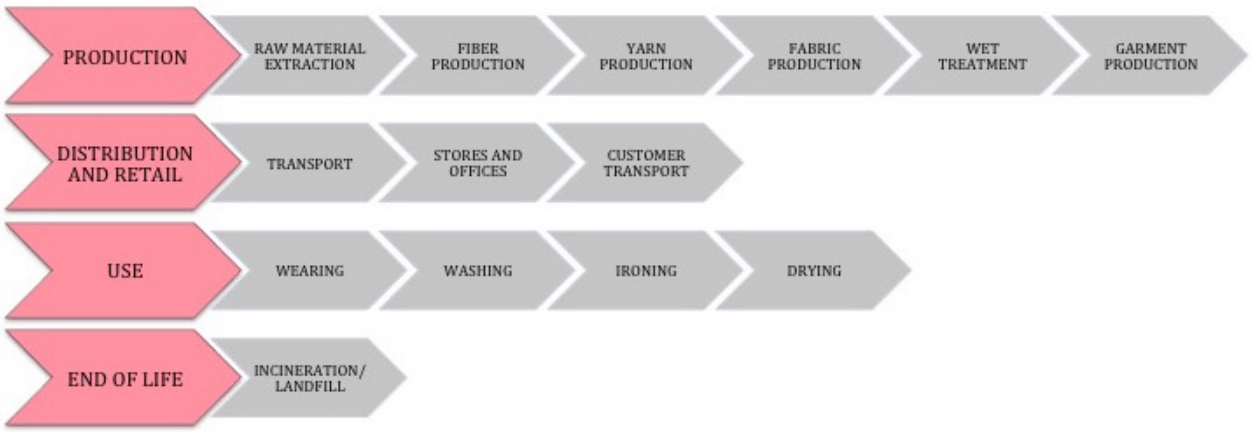

Figure 6: *Life cycle, cradle-to-grave, of a fashion apparel product, adopted from Roos et al. (2015).*

Traditionally, LCA has been used to quantify and analyse the environmental impacts. However, recently there has also been development of a social LCA (S-LCA) (Klöpffer 2014b). These two tools will be described separately in *Section 4.3.1* and *4.3.2* below.

4.3.1 Environmental Life Cycle Analysis

Environmental LCA (written here as E-LCA) was first adopted in the 1970's and was during the 1990's developed into an international standard, ISO 14040:1997(E) (Klöpffer 2014c). In 2006 an updated version, ISO 14040:2006 was launched. An E-LCA identifies, quantifies and assesses the environmental impact of a product throughout its life cycle. It provides data on factors such as water use, emissions to air, water and land and energy use, relating this factors to impact categories such as freshwater consumption, acidification, eutrophication, climate change and eco toxicity (UNEP/SETAC 2011). E-LCA allows the producer to identify hotspots and improve the producing processes accordingly, in order to enhance resource efficiency and reduce negative environmental impacts (Roos 2016). In 2002 the Life Cycle Initiative was launched by UN Environment Program (UNEP) and the Society of Environmental Toxicology and Chemistry (SETAC). It is a multi-stakeholder partnership between the public and private sector (Life cycle initiative 2018). The organisation aims to create a common ground for how to use life cycle assessment knowledge to enhance sustainable production and consumption (Sonnemann & Valdivia 2014).

4.3.2 Social Life Cycle Analysis

Social life cycle analysis (S-LCA) identifies, measures and assesses the social impacts a product has over its life cycle. It is not as mature and developed as E-LCA (Klöpffer 2014b; Radhakrishnan 2015), but UNEP/SETAC Life cycle initiative developed a framework in 2009. S-LCA aims to drive improvement of the social aspects in a product's life cycle with regards to human well-being, human dignity and human health. It assesses a company's behaviour towards its stakeholders workers, consumers, local communities, society and Value chain actors (UNEP/SETAC 2009; Radhakrishnan 2015). As the methodology for S-LCA is not as mature as for environmental LCA there are some limitations. The aspect of measurability of social impact categories, such as for example equal opportunities, is complicated and classification of data can be difficult (Radhakrishnan 2015).

4.4 Sustainability reporting

One way for companies to be more transparent and communicate with their stakeholders is to conduct and publish a sustainability report. In 2014, EU issued a directive urging nations to legislate on sustainability reporting (2014/95/EU OJ L 330, 15.11.2014, p. 1–9). The EU Directive on disclosure of non-financial and diversity information by certain large companies forces approximately 6000 companies in the EU to report by law on non-financial and diversity matters. According to the EU directive, the reporting does not have to be done according to any international standard but many companies report with the established Global Reporting Initiative (GRI) standard, which is the first global standard for sustainability reporting (Global Reporting Initiative 2018).

As a consequence of the Directive, a law on due diligence for companies working in global supply chains passed in France in 2017 (Kippenberg 2017). Its purpose is to ensure ethical sourcing of material and manufacturing both from a social and environmental standpoint (Lopez & McKevitt 2017). Sweden also passed a law in 2016 compelling companies to report on their sustainability risks and how they resolve them (Johansson 2016).

5 Agenda 2030 and the Sustainable Development Goals

Agenda 2030 is a global framework set up by the United Nations (UN) with the aim to ensure a sustainable future. It is built upon the 17 Sustainable Development Goals (SDGs) and within them 169 specific targets that span over the three dimensions of sustainability; economic, social and environmental, divided into the focus areas people, planet, prosperity, peace and partnerships. It is emphasized that the goals are to be seen as integrated, indivisible and equal to one another. They were first launched in September 2015 and have been adopted by the member states as the action plan for a sustainable future until 2030. The agenda calls for participation of nations, civil society and the private sector for the implementation of the SDGs (UN 2015).

In 2015 the previous developing agenda, Agenda 21 and the Millennium Development Goals (MDGs) would reach its end year. Negotiations and work for a new developing agenda started around 2009 and resulted in Agenda 2030 and the Sustainable Development Goals. The universality and holistic perspective in Agenda 2030 could in some ways be seen as a reaction to the inefficiencies of the MDGs. The launching of the MDGs was the first time there was a global agenda addressing poverty eradication with specific targets and goals. The MDGs were however criticised for not handling the root causes of poverty and for being too focused on developing countries rather than universally applicable. In preparation for the Rio+20 conference, to mark the 20 years that had passed since the Rio Earth Summit in 1992, the UN Secretary General appointed a High-Level Panel of Eminent People to investigate on in what direction the post 2015 development agenda should take. The outcome of the panel was broader and more extensive than expected and opened up for the possibility of a new and different post MDG agenda. The process in forming the SDGs continued with the Open Working Group, that consisted of official representatives from all around the world. The negotiations were focusing on the concept of universality and a holistic viewpoint (Dodds, Donoghue & Roesch 2017).

However, similar to the MDGs, the SDGs can be seen to have a stronger focus on developing countries, with the responsibility to lift and ensure sustainable activities in these countries. However, Goal 12, Sustainable Consumption and Production, puts a stronger focus on the responsibility of the developed world. Overall, the SDGs aim to eradicate poverty, protect the environment and to enable sustainable economic growth. The layout of the framework also aims to interlink and create connections between the goals. Thus, implementing one goal should in some way interact with implementing another, creating a synergistic effect (Dodds et al. 2017). Spangenberg (2016) argues that the SDGs are not lacking in ambition but in implementation measures. To accomplish the Agenda 2030 and reach the SDGs there is a need for harder targets and limitations regarding resource consumption, income disparities and wealth distribution than the current formulations in the SDG framework.

The 17 Sustainable Development Goals (SDGs) can be seen graphically in *Figure 7*.

Figure 7: *The 17 Sustainable Development Goals (The design of Goal 10, Reduced inequalities, is altered in the final version but not available for publication) (UN 2018).*

5.1 Business, fashion and the SDGs

The role of business actors in the developing agenda has increased in importance up until Agenda 2030, which states that the private sector, nations and civil society should contribute equally to achieve the goals (UN 2015). Business has been claimed to be able to contribute greatly with innovation, efficiency and specific skill and knowledge. Scheyvens, Banks & Hughes (2016) elaborate on how business has been put forward as a development agent rather than, as it has been historically, a development tool, and is therefore acknowledged as an important contributor to achieve a sustainable future.

However, there is criticism and concern regarding the length of which businesses are willing to go to ensure sustainability. If there are no win-win situations left and trade offs are inevitable, private actors might not be willing to endanger their profit for the sake of environmental or social concerns, leading to shortsighted rather than longsighted strategies and actions (Scheyvens et al. 2016). Scheyvens et al. (2016) argue that many times it is forgotten that business could be the root cause of the barriers for sustainability, and that they might have a difficult time to rearrange their agenda away from business as usual. Similarly, Malan (2016) states that it is through the core business activities, for example to increase

resource efficiency in production for fashion companies, that the UN searches for support by companies. He continues as Scheyvens et al. (2016), stating that to motivate business to invest in sustainable practices there needs to be a business case, i.e. the practice must create profit over time. However, sometimes social or environmental concerns can not be made into a business case (Malan 2016).

Much of the criticism towards the previous developing agenda, the MDGs, is mirrored in the criticism of how businesses have handled development issues, especially the lack of tackling the root causes of poverty and environmental degradation (Scheyvens et al. 2016). Malan (2016) states that including corporate responsibility into day-to-day activities is the most effective approach to tackle the sustainability issues that a company is causing. However, Scheyvens et al. (2016) further argue that the business sector cannot be held responsible for creating economic activity and profit, i.e. economic development, and at the same time regulate themselves with social and environmental sustainability policies. It is therefore important that the Agenda 2030 motivates a development in national legislation for social and environmental sustainability within the business sector, i.e. to create a level playing field for all companies. Spangenberg (2016) argues that the SDGs do not formulate limitations or obligations for businesses to adhere to, but softer terms such as partnerships, cooperation and encouragement are used. He also states that business corruption in the form of tax evasion was excluded in the final version of the Agenda. Regarding the influence that the business sector has had on the SDGs Spangenberg (2016) states that the sector has successfully gained more influence over the development agenda without receiving more sustainability responsibility.

As part of the private sector, the fashion industry is ushered by the UN to take part in achieving the SDGs. Karen Newman, UN Development Programme, and Cara Smyth (2017), Vice President of the Fair Fashion Centre, argue that fashion industry is very affected by the SDGs and vice verse. They argue that Goal 5, 8 and 12 are goals that the industry is already working towards and encourage the industry to engage in how to take on the rest of the goals. Paola Deda (2018), UN Economic Commission of Europe (UNECE), has also argued for alignment of the fashion industry and the SDGs.

In March 2018 the UNECE invited stakeholders from governance, civil society and the private sector to discuss and understand the connections between the fashion industry and the SDGs and how to work towards a more sustainable industry in line with the goals. The pm for this meeting exemplifies that Goal 1, 3, 5, 6, 8, 12, 13, 14 and 15 could have connections to the industry's activities (UNECE 2018).

6 Sustainable Apparel Coalition and the Higg Index

In 2009, the two American companies Walmart and Patagonia came up with the idea of creating a global environmental measurement index. They engaged CEOs of leading companies all over the world inviting them to collaborate and in 2010 the Sustainable Apparel Coalition (SAC) was launched, aiming to have a common vision of sustainability measurement for all apparel and footwear companies worldwide. Today the organisation has not only created a measurement tool for environmental impact of products but also tools for measuring the sustainability performance of brands and retailers as well as for facilities, gathered under the name Higg Index. The first version, Higg Index 1.0, was created in 2011 and an updated version, Higg Index 2.0, was launched in 2013 (Radhakrishnan 2015; SAC 2018a).

SAC is a multi-stakeholder organisation with members such as brands, retailers, manufacturers, organisations (both governmental and non-governmental) and academia (SAC 2018e), accounting for over 30% of the global clothing and footwear market share (SAC 2018b), making it an organisation with great power to influence the sustainable development agenda (Radhakrishnan 2015). The vision of SAC is to have:

> "... an apparel, footwear and textiles industry that produces no unnecessary environmental harm and has a positive impact on the people and communities associated with its activities."
>
> (SAC 2018f)

To achieve this vision, SAC has two main objectives. Firstly, to create an aligned plan for addressing the systemic sustainability challenges in the apparel industry through collaboration. Secondly, to create and continuously develop the sustainability measurement tool Higg Index (SAC 2018d).

The Index includes three different tools; one for products, one for facilities and one for brands and retailers. The tools are divided into different modules (SAC 2018d), see *Figure 8*.

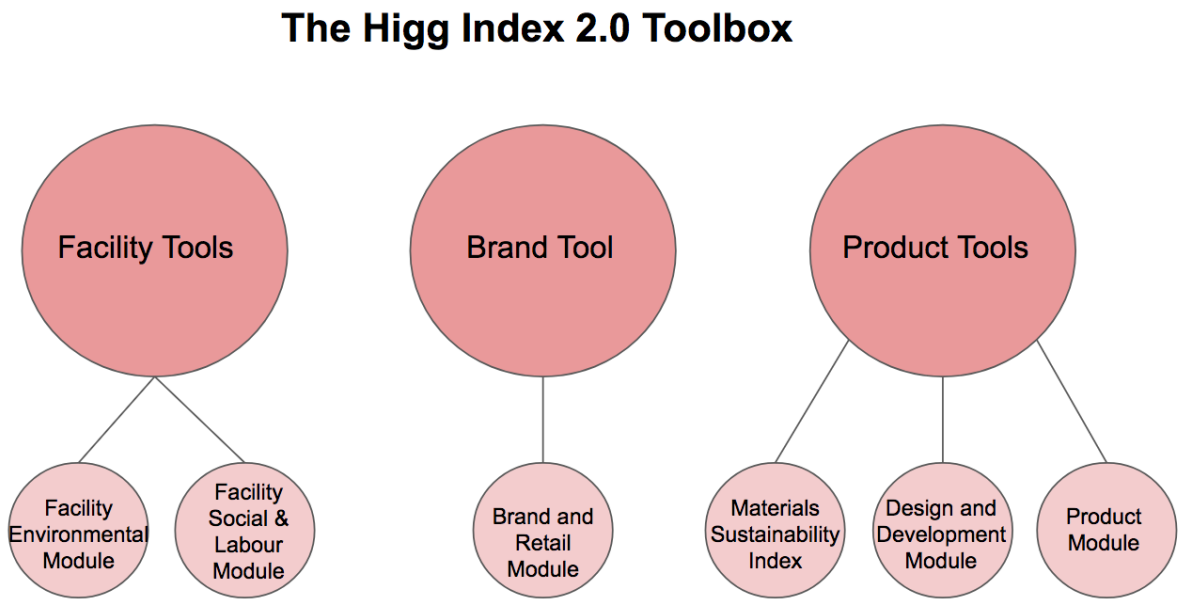

Figure 8: *The Higg Index 2.0 toolbox and the tools and modules which it includes.*

There are no requirements for members to use the entire toolbox, all including modules can be used independently (Radhakrishnan 2015). According to SAC (2018g), "Higg product tools offer brands and manufacturers information to make better choices at every stage of a product's development". The Facility Tool aims to create a system where facilities could compare themselves with other facilities as well as identify social and environmental hotspots, provide guidance on improvements and to create better relationships between business partners in different segments in the supply chain (SAC 2018h). The Brand Tool, aims to have a holistic view of the whole fashion company by measuring the social and environmental performance of all its activities with a life cycle perspective (SAC 2018c).

The Higg Index is built upon both quantitative and qualitative environmental and social/labour indicators each given a score, resulting in an overall score which could be used as benchmarking against other brands, facilities and products. This benchmarking score is a grading ranging from 0 to 100. It is not supposed to be possible to reach the maximum score, 100, and thus the scoring system aims to give incentives for continuous improvement (SAC 2015).

Currently, the use of the Index is based on self-assessment analysis, meaning that the company themselves assesses their performance with regards to the indicators measuring the social and environmental impact of the brand, facility and/or products. The resulting Index benchmarking score that they achieve cannot be published and used in marketing since it is not yet validated (Wildt 2016). SAC (2018d) however has a plan to become 100% transparent in 2020, which will mean that the score needs to be verified by a third party. SAC is currently working on a verification program that will make this possible and the first module that will be validated is the Facility Environmental Module. The score will then be shared

with stakeholders, both consumers and business partners, in order to create transparency (SAC 2018d).

6.1 The Higg Index 2.0 Brand and Retail Module

The Higg Index 2.0 Brand and Retail Module consists of three submodules: Environment (apparel), Environment (footwear) and Social/labour (apparel/footwear) — Beta version (SAC 2015). In this thesis the environmental and social apparel submodules are investigated.

The Brand and Retail Module was created with three main objectives (SAC 2018c);

- Evaluate environmental and social and labour performance of brands and retailers
- Benchmark against peers
- Identify opportunities to demonstrate leadership

The module can be used by both small and large apparel and footwear companies and by both beginners and leaders in sustainability (Radhakrishnan 2015) to achieve the above mentioned objectives and thus catalyse sustainability knowledge to teach companies their strengths and weaknesses as well as identify hot-spots in order to enhance efficiency (Alhainen & Järvinen 2015).

According to SAC (2018c), the environmental submodule should measure the impact of greenhouse gas emissions, energy use, water use, water pollution, deforestation, hazardous chemicals and animal welfare. The social submodule should measure the impact of child labor, discrimination, forced labor, sexual harassment and gender-based violence in the workplace, non-compliance with minimum wage laws, bribery and corruption, working time, occupational health and safety and responsible sourcing (SAC 2018c).

Each submodule gives a result in a numeric index on a scale from 0 to 100 (SAC 2015). In 2017 the average global score for the Higg Index Brand and Retail 2.0 environmental and social submodules were 28 and 60 respectively (Larsson 2017), which is consistent with the SAC intention that companies should be able to strive continuous improvement by striving for a higher benchmarking score (SAC 2018d).

Furthermore, each submodule is divided into different sections. These sections include a number of questions measuring different parts of a company's sustainability work, as for example how the company handles their chemical management. The different sections have a predetermined weight on the final score (Radhakrishnan 2015). As an example the section "Materials" has the weighting 25% in the Environmental module which means that 25% of the brands environmental score will depend on how they work with materials (SAC 2015).

The Higg Index 2.0 Brand and Retailer Module includes the following sections, subsections and weighting presented in *Tables 2* and *3* (SAC 2015).

Table 2: *Sections in the Higg Index 2.0 Brand and Retailer Module, social/labour submodule, their weightings and subsections (SAC 2015).*

Brand module - Social/labour: Apparel/Footwear Beta		
Section	**Weighting**	**Subsection**
Company's internal social/labour performance management	14%	Company's internal workplace standards
		Company's internal employee orientation and development
Company's social/labour performance management systems for partners in the value chain	63%	Company's social/labour performance management system for value chain partners
		Monitoring and continuous improvement in the value chain
		Company's integration of social/labour performance requirements to the business
External engagement, community impact, transparency and public disclosure	23%	Engagement and collaboration
		Community impact
		Transparency and public disclosure

Table 3: *Sections in the Higg Index 2.0 Brand and Retailer Module, environmental submodule, their weightings and subsections (SAC 2015).*

Brand module - Environmental: Apparel		
Section	**Weighting**	**Subsection**
General	15%	Internal sustainability performance and accountability
		Supplier tracking and risk assessment
		Product life cycle assessment (LCA)
		Chemicals management system
		Public reporting and verification
Materials	25%	Materials program
		Chemical responsibility > the resticted substance list (RSL) content and transparency
		Chemical responsibility: restricted subtance list (RSL) verification/certificaion
		Chemicals management system
		Public reporting and verification
Packaging	7.5%	Packaging program
		Packaging restricted substance list (PRSL)
Manufacturing	20%	Manufacturing program
		Environmental guidelines for manufacturing suppliers
		Water use/conservation
		Manufacturing efficiency: seconds/reject rate reporting
		Continuous improvement programs with manufacturing suppliers
Transportation	7.5%	Optimizing modal type, distance and weight/volume
		Maximizing utilization of transportation assets
		Carrier selection
Product care and repair service	15%	Product care and repair service program
		Repairability design standards
		Design for durability and longevity (quality assurance feedback mechanism)
		"Product care" communication to consumers
		"Repair service" communication to consumers
End of use (EOU)	10%	EOU program
		Design policies for EOU streams
		EOU collection/processing infrastructure
		EOU communication to consumers

6.2 Recognized improvement areas

Since the Higg Index is a fairly new tool with some modules still in beta version the research area is still quite unexplored and the studies that have been conducted are few. However, as mentioned before, some research identifying improvement areas in the Index is available. One example of such an improvement area is that the Higg Index 2.0 does not include all areas of the UN Global Compact and Manual for the Fashion and Textile Sector, for example anti-corruption is not explicitly included (Gardetti 2015).

Other criticism towards the Index includes a survey done by Alhainen & Järvinen (2015) showing that SAC members only partially thought that the requirements they had on the Index had been met. The members said that they had a positive view of SAC but also that it was a "slow and rigid organisation". Many members also thought that the costs of using the Index were too high both in time, resources and money. Members especially highlighted the data collection, that has to be made in order to fill out the modules, to be very time consuming. There were also complaints made on the additional fees for the benchmarking component. Another comment was that the Index is difficult to integrate with other IT systems. Positive notes were made on the enhanced communication, both internally and externally, towards partners in the supply chain that the Index brings (Alhainen & Järvinen 2015).

Other challenges are according to Radhakrishnan (2015) that the scoring and weighting system needs an update. He states that the weighting should be improved by receiving input from a large number stakeholders and that there should be a "multicriteria-based approach to allocate weights". The scoring criteria in the Index should be reviewed from a systemic perspective to keep consistency throughout the Index (Radhakrishnan 2015). Larsson[1] states that the companies involved in the development of the Index have had a large influence on which questions that are present in the different modules. Furthermore, Larsson[1] states that "you receive points from prerequisites and not from results", meaning that the questions do not always take the results from a company's sustainability work into account.

[1]Jonas Larsson, university lecturer Swedish School of Textiles, Borås. Interview 25^{th} of April 2018

7 Life cycle analysis impact categories

To investigate to which extent the Index and the SDGs focus on environmental and social sustainability challenges, social (SIC) and environmental (EIC) life cycle impact categories relevant for the fashion industry were identified. The use of fashion relevant life cycle impact categories furthermore enables an investigation of the life cycle perspective of the Higg Index 2.0 Brand and Retail Module.

As a reference framework for environmental and social life cycle impact categories the United Nations Environment Program (UNEP)/Society of Environmental Toxicology and Chemistry (SETAC) Life cycle initiative (2011; 2009; 2013) were used.

The reports used for the relevance analysis can be seen in *Table 4*. The requirements for the fashion relevant reports were that they had been published in 2013 or onward, that they covered social and/or environmental concerns in the fashion industry from a life cycle perspective and that there were three reports covering the environmental and social aspects respectively. The reports were also chosen to represent a broad spectrum. For the environmental aspects an industry report, a cradle to grave LCA, a cradle to gate LCA and a book covering LCA methodology for textiles and clothing were chosen. For the social aspects there was a more limited range of reports as the UNEP/SETAC social LCA framework is quite undeveloped. The social reports include an industry report, a S-LCA and a combined social and environmental LCA. For further information on how the fashion relevant reports were compared to UNEP/SETAC Life cycle initiative (2009; 2011; 2013), see Appendix.

The result from the relevance analysis concluded that almost all UNEP/SETAC social and environmental impact categories were relevant for the fashion industry, as well as the impact category Energy use. In UNEP/SETAC Life cycle initiative (2011), Energy use is included in the impact category Resource depletion. However, as several of the fashion relevant reports were using Energy use as an impact category in itself it is included in this thesis as well (Roos et al. 2015; Global Fashion Agenda & The Boston Consulting Group 2017; van der Velden, Patel & Vogtländer 2013). Furthermore, Resource depletion from UNEP/SETAC (2011) was included even though it is not mentioned as an individual impact category in the fashion relevant reports. However, it is included by for example alternative raw material sourcing and/or consumption patterns, such as using recycled fibres or collaborative consumption through for example clothing libraries (Roos et al. 2015). Ozone depletion from UNEP/SETAC Life cycle initiative (2011) was not included as no fashion relevant report mentioned this impact category. Animal welfare was not included in the study as UNEP/SETAC Life cycle initiative (2009; 2011) did not mention this impact category. It was however mentioned in one fashion relevant report (Global Fashion Agenda & The Boston Consulting Group 2017). Thus, there were 11 environmental impact categories (EICs) and 30 social impact categories (SICs) that were deemed relevant for the fashion industry.

Table 4: *Fashion relevant reports used for identification of relevant life cycle impact categories for the fashion industry*

Author	**Name of publication**	**Description**
Roos, S., Sandin, G., Zamani, B. Peters, G. (2015)	Environmental assessment of Swedish fashion consumption. Five garments - sustainable futures	This report is an environmental cradle to grave LCA of Swedish fashion consumption based on LCAs of the five most commonly used garments in Sweden. It was published in June 2015 by Mistra Future Fashion.
Global Fashion Agenda & The Boston Consulting Group (2017)	Pulse of the fashion industry 2017	Published by Global Fashion Agenda, a trade organisation striving towards making the fashion industry more sustainable. It covers both environmental and social aspects from a life cycle perspective and is a global report published in 2017.
van der Velden, N.M., Patel, M.K. and Vogtländer, J.G. (2013)	LCA benchmarking study on textiles made of cotton, polyester, nylon, acryl or elastane	An environmental cradle to gate LCA studying the life cycle impact of cotton, polyester, nylon, acryl and elastane. Published in 2013 in Int J Life Cycle Assess.
Muthu, S.S. (2014)	Assessing the Environmental Impact of Textiles and the Clothing Supply Chain	A book covering the environmental aspects of fashion in the supply chain and how to measure them. Published 13^{th} of March 2014 by Woodhead Publishing Series in Textiles.
Zamani, B. (2016)	The Challenges of Fast Fashion - Environmental and Social LCA of Swedish Clothing Consumption	An LCA with both SICs and EICs for the Swedish clothing consumption. Published in 2016 by the Department of Chemistry and Chemical Engineering, Chalmers University of Technology, Gothenburg, Sweden
Lenzo, P., Traverso, M., Salomone, M. & Ioppolo, G. (2017)	Social Life Cycle Assessment in the Textile Sector: An Italian Case Study	A S-LCA on the SICs of textiles for a textile product from Sicily, Italy. Published in MDPI Sustainability 2017.

The identified environmental and social impact categories will be further described in the following two sections, *Section 7.1* and *7.2*. These definitions are the ones used when making the connections between the impact categories and the two frameworks, i.e. the Index and the SDGs.

7.1 Environmental impact categories

There were 11 identified environmental impact categories (EICs), which can be seen in *Table 5*. Each EIC will be further explained below.

Table 5: *Identified environmental impact categories (EICs), relevant for the fashion industry.*

Environmental impact category (EIC)
Resource depletion
Energy use
Climate change
Acidification
Ecotoxic effects
Human toxic effects
Photochemical ozone creation
Eutrophication
Water use
Land use
Biodiversity

Resource depletion

"Resources" refers to all biotic and abiotic relevant input sources in production processes, i.e. minerals, water, fossil fuels, energy, land (Finkbeiner et al. 2014) and more specifically for the fashion industry for example cotton and polyester raw materials (Roos et al. 2015). As the use of water, land and energy are independent impact categories, Resource depletion refers in this thesis to the extraction of virgin cotton, polyester and other raw materials for fashion items. Depletion occurs if these resources are used in a way that outpaces the biotic resource's ability to renew themselves (Finkbeiner et al. 2014), or by the use of virgin non renewable materials. By not using virgin material or buying new products, i.e. by re-using and/or recycling, the impact of all environmental categories can be decreased (Roos et al. 2015).

Energy use

Energy use refers in this thesis to the use of non-renewable energy sources (Roos et al. 2015), the share of renewable energy consumption (Muthu 2014; Global Fashion Agenda & The Boston Consulting Group 2017) and cumulative energy need (van der Velden et al. 2013). It is thus a measurement of how resource efficient the use is in terms of both the amount of energy and the energy sourcing. The largest impact of non-renewable energy use, as well as energy demand, can be linked to the garment and fabric production phase in a fashion products life cycle, i.e. tier 1 and 2 respectively (Roos et al. 2015; van der Velden et al. 2013).

Climate change

Climate change refers to the occurrence of an abundance of green house gases in the atmosphere enhancing the green house effect and over time increasing the earth's average atmospheric and oceanic temperatures. Human activities, such as the use of fossil fuels as energy source and deforestation for for example agricultural purposes, are the main reason for climate change (IPCC 2013). According to Roos et al. (2015) the green house gas emissions for fashion items are largest in the fibre production stage, i.e. in tier 2, but there are emissions in all stages of the life cycle. The total climate change impact from Swedish fashion consumption is quite small compared to other sectors, such as food and transportation. It constitutes only 2.5% of the total Swedish climate impact. However, if Sweden would decrease their climate impact to acceptable levels while not decreasing the contribution from fashion consumption, that contribution would reach 25% (Roos & Sandin 2016).

Acidification

Acidification is the process where pollutants to air and water start processes which lower the pH value. This can lead to impacts on ecosystems, such as higher mortality rates in fish communities. Sources for acidification are mainly emissions from combustion (Roos et al. 2015). Garment and fibre production, i.e. tier 1 and 2, are stages that mainly contribute to acidification (van der Velden et al. 2013; Roos et al. 2015).

Ecotoxic effects

Ecotoxic effects are an impact category measuring the number of species that are daily exposed to toxic levels of certain chemicals (Roos et al. 2015). Tier 3 for cotton fibre production is a major contributor to ecotoxic effects, as well as the wet treatment in tier 2 for all types of materials (Roos et al. 2015; van der Velden et al. 2013).

Human toxic effects

Human toxicity assess the increase in morbidity on the whole population per increase of unit chemical emissions (Roos et al. 2015). The Human toxic effects are largest in the fibre production and the fabric and garment production (tier 2 and 1) according to Roos et al. (2015) and van der Velden et al. (2013), since this is where workers are exposed to chemicals (Roos et al. 2015).

Photochemical ozone creation

Photochemical ozone creation, also called summer smog (van der Velden et al. 2013), is a photochemical oxidation related to combustion of fuels which increases low levels of ozone. Low ozone affects both human health and the environment. The creation of photochemical ozone is largest in phases where transportation takes place (Roos et al. 2015).

Eutrophication

Eutrophication is in this thesis an impact category covering both terrestrial and marine eutrophication (Zamani 2016) and fresh water eutrophication (Roos et al. 2015). Eutrophication is when water becomes overly enriched with nutrients, i.e. phosphorus and nitrogen, leading to excessive growth of plants and algae and later to oxygen depletion in the water body. Eutrophication is often in a fashion supply chain a consequence of usage of fertilizers (Muthu 2014).

Water use

Water use is in this thesis defined only as the use of water and not the pollution of water. Pollution is taken into account in other EICs such as Eutrophication and Acidification. Even if the planet boundary for water use (freshwater consumption) has not been overstepped globally, water is a scarce resource in many places in the world. Also, as the water use is expected to increase with 50% until 2030 many of the countries with apparel production will be even more water stressed and are anticipated to having to do trade-offs between drinking water and e.g. irrigation for cotton cultivation (Global Fashion Agenda & The Boston Consulting Group 2017). According to Roos et al. (2015) the water usage is by far highest in the fibre production phase which includes cultivation of the raw material and processing of the fibres.

Land use

Land use is in this thesis an impact category covering land transformation, land occupation (Zamani 2016) and agricultural land occupation (Roos et al. 2015). As with water, there are going to be issues with trade-offs between cultivating food and cultivation of materials for clothes, which may lead to conflicts (Global Fashion Agenda & The Boston Consulting Group 2017). According to Roos et al. (2015), the land use is largest in the fibre production phase which is because of the cultivation occurring in that phase.

Biodiversity

Biodiversity is the variety of plant and animal life in the world or in a particular habitat (Finkbeiner et al. 2014). A high biodiversity is desirable. Biodiversity is not as common in the relevant fashion reports used in this thesis as other environmental impact categories. According to Global Fashion Agenda & The Boston Consulting Group (2017) this is because of the lack of data and they see it as more of an ethical problem than an impact category. Roos et al. (2015) have also excluded Biodiversity as an impact category because of the site-dependency of this data and states that land use is the impact category covering the biodiversity loss the best. However, Roos et al. (2015) highlights the importance of discussing biodiversity even if they have not quantified it. Zamani (2016) also notes the importance of biodiversity as an impact category and includes biodiversity in her study.

7.2 Social impact categories

There were 30 identified social impact categories (SICs), which were divided between five different stakeholders; Worker, Consumer, Local community, Society and Value chain actors (UNEP/SETAC 2011, UNEP/SETAC 2013). The social impact categories and the stakeholder division can be seen in *Table 6*. Each SIC will be further explained below.

Table 6: *Identified social impact categories (SICs) with a stakeholder perspective, relevant for the fashion industry.*

Stakeholder	Social impact category (SIC)
Worker	Freedom of association and collective bargaining
	Child labour
	Fair wages
	Working hours
	Forced labour
	Equal opportunities/discrimination
	Health and safety
	Social benefits
Consumer	Feedback mechanism
	Consumer privacy
	Transparency
	End of life responsibility
Local community	Access to material resources
	Access to immaterial resources
	Delocalisation and migration
	Cultural heritage
	Respect for indigenous rights
	Safe and healthy living conditions
	Community engagement
	Local employment
	Secure living conditions
Society	Public commitment to sustainability issues
	Contribution to economic development
	Prevention and mitigation of armed conflicts
	Technology development
	Corruption
Value chain actors	Fair competition
	Promoting social responsibility
	Supplier relationships
	Respect for intellectual property rights

Worker

Freedom of association and collective bargaining

Freedom of association and collective bargaining is an impact category that measures if workers are free to associate and if collective bargaining is in place. When workers are not allowed to form unions it hinders the workers to put pressure on the management and demand e.g. fair wages and working conditions (Global Fashion Agenda & The Boston Consulting Group 2017). Freedom of association and collective bargaining is a labour-related impact category (Zamani 2016) and an especially important matter in countries where it is restricted by law and many enterprises do not allow freedom of association and collective bargaining (UNEP/SETAC 2009).

Child labour

The impact category Child labour seeks to stop the amount of children in the supply chain. Child labour is an impact category with a high priority according to both consumers and industry experts (Zamani 2016). Still many countries with manufacturing factories have large gaps in laws regarding child labour even if child labour overall has decreased over the last decades (Global Fashion Agenda & The Boston Consulting Group 2017). Companies need to work on finding the root cause of why child labour occurs in the factories (e.g. as lack of education and a pressure for low prices) and not seek to find short-term solutions which only moves the issue upstream in the supply chain (Global Fashion Agenda & The Boston Consulting Group 2017).

Fair salary

According to Global Fashion Agenda & The Boston Consulting Group (2017) "one speaks of 'fair wages' when those are able to support the worker as well as two adult dependents or one adult and two children or four children, covering food, clothing, housing, travel costs, children's education, health costs and 10% towards discretionary income (e.g. savings, pension)." Currently there is a large gap between minimum wages and living wages which means that even if a company pays the legal minimum wage it does not necessarily mean that the salary is a living wage (UNEP/SETAC 2009). International Labour Organisation (ILO) states that a living wage could be 120% of a minimum wage, however that is not a general recommendation since it depends on the country (Global Fashion Agenda & The Boston Consulting Group 2017). Hence the gap between a fair wage and a minimum wage is even larger.

Working hours

The impact category Working hours is meant to regulate that employees work decent hours (UNEP/SETAC 2009). The manufacturers and producers are obliged to follow local labour laws (Global Fashion Agenda & The Boston Consulting Group 2017), but some countries, such as India and Myanmar, have no national laws regarding working hours but only regional laws (ILO 2014). Also, even if the country has national legislation it is not certain that the manufacturers are compliant. A report from Human Rights Watch (2015) showed that workers in Cambodia had more overtime than what is regulated by law as permitted overtime. Factories also dismissed workers refusing to work overtime or gave them other punishments such as paying them less (Human Rights Watch 2015).

Forced labour

The ILO Forced Labour Convention, 1930 (No. 29) states that forced labour is: "all work or service which is extracted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily." A report from Human Rights Watch (2016) shows that about 21 million people globally are forced to labour. Another report from Human Rights Watch (2017) shows examples of people in Uzbekistan forced to pick cotton, e.g. public sector employees that picked cotton under the threat that they would be dismissed if they refused. Other penalties could be to withhold child benefits or academic penalties (Human Rights Watch 2017).

Equal opportunity/Discrimination

Unequal opportunities and discrimination are obvious where there are large wage gaps between genders, e.g. in India and Pakistan where there is a wage gap of 39% and 48 % respectively where women gets payed less for equal work. Furthermore, there are cases of sexual harassment, discrimination because of pregnancy and women having less free time than men. Besides gender inequality discrimination because of e.g. religion, sexual orientation, political opinion, age and social background also occurs (Global Fashion Agenda & The Boston Consulting Group 2017).

Health and safety

The risk of health and safety issues in the supply chain are large with todays standards. Global Fashion Agenda & The Boston Consulting group (2017) states that with a business-as-usual-case the injuries in the industry will reach 1.6 million per year by 2030. Health and safety impact in the supply chain could be everything from lacking facility standards such as fire safety issues, dangerous working equipment and exposure to hazardous chemicals, to the treatment of the workers (Global Fashion Agenda & The Boston Consulting Group 2017). As may be seen in UNEP/SETAC (2009) the impact category "Health and Safety" also covers the consumers health and safety when wearing the products produced. According to Zamani (2016) consumers are concerned about how the chemicals in products could lead to health issues.

Social benefits/Social security

According to UNEP/SETAC (2013) the impact category Social benefits/Social security is the employment compensation that is non-monetary. The four most important benefit categories are; retirement, disability, dependents and survivors benefits (UNEP/SETAC 2013). Social benefits and security vary much depending on in which country the production is located. According to ILO (2016) pensions for elder are the most crucial social security. In many countries with apparel production laws regarding pensions are in place. However, there are gaps in implementation if for example a worker is not properly employed, have short-term employment or have gaps in employment because of maternity. One example is in the Asian and Pacific region where only 38.9% of the population have one or more social benefit (ILO 2016).

Consumer

Feedback mechanism

A feedback mechanism is a way of communication between an organisation and its consumers. It may be through surveys or consumer guarantees. This impact category covers how companies react to consumer demands and measures consumer satisfaction through stakeholder engagement. In the long term consumer satisfaction is a large success factor for companies, hence this impact category is important to measure (UNEP/SETAC 2013).

Consumer privacy

Consumer privacy is an impact category covering how an organisation handles personal data and includes the confidentiality of this data, how much data and information that is gathered by the organisation and agreements on use of data between the consumer and the organisation (UNEP/SETAC 2013). From the 25^{th} of May 2018 the new law General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679 OJ L 119, 4.5.2016, p. 1–88) is enforced in all EU countries in order to protect personal data and the way organisations handle it.

Transparency

This impact category assesses if the organisation enables for the consumer to make an informed choice when consuming a product or service. This by being transparent towards the consumer on both social and environmental performance. This is a presumption and a starting point for the consumer to have a more conscious approach to consumption. Examples of transparency could be sustainability reporting and certifying products (UNEP/SETAC 2013).

End of life responsibility

To take end of life responsibility is defined by UNEP/SETAC (2013) as to take responsibility for the products end-of-life by either communication to the consumer on how to handle products after use or buy back, recycle or make sure that the waste is safely disposed. This impact category assess how an organisation addresses the social impacts of end-of-life. The social impacts are often referred to as when developed countries are transporting their waste to less developed countries where it ends up in landfills. Here it has an impact on public health and safety, either if people search through the landfills for value but also due to chemical leakage. It does not assess the environmental consequences of taking end of life responsibility (UNEP/SETAC 2013).

Local community

Access to material resources

Material resources could be both resources such as materials and water and infrastructural resources such as transport systems and schools. If a company works in a community this impact category could be measured as how the company works with protecting and improving the material resources. Organisations and communities often share resources which may lead to positive effects if a company starts building up the infrastructure system but also negative consequences if an organisation depletes natural material resources such as water and land leading to conflicts with the local community (UNEP/SETAC 2013).

Access to immaterial resources

According to UNEP/SETAC (2013) immaterial resources could be "community services, intellectual property rights, freedom of expression and access to information." According to Lenzo, Traverso, Salomone & Ioppolo (2017), access to immaterial resources could be e.g. language lessons and literacy courses to integrate migrant workers into the community where they work and live. A company operating in a community could have positive impacts such as sharing immaterial resources such as knowledge to the community but also negative impacts such as hindering freedom of expression or increase corruption (UNEP/SETAC 2013).

Delocalisation and migration

The impact category Delocalisation and migration covers both involuntary delocalisation because of companies or organisations claiming land or resources legally or illegally and people migrating because of job opportunities or lack of job opportunities. The impact category assesses if an organisation has a positive or negative impact on these phenomena. An organisation may contribute to the community by for example provide migrant workers with the same opportunities and benefits as local workers (UNEP/SETAC 2013).

Cultural heritage

Cultural heritage can be an immaterial resource of for example oral history traditions, the knowledge of local agricultural activities and other types of craftsmanship passed on to younger generations, but also the physical sites of cultural heritage infrastructures. The knowledge of different types of craftsmanship is identified to be especially important for garment production and design (UNEP/SETAC 2013). As stated by Lenzo et al. (2017), a fashion company could for example secure cultural heritage by financially contributing to the preservation of different local churches and by using and developing the craftsmanship found in the region where production takes place.

Safe and healthy living conditions

The public health and safety issues are often disregarded in the face of economic development. Therefore companies should make efforts to measure, control and mitigate the pollution or other activity related effects that could lead to inferior health. Decrease in water quality could for example lead to the increase of disease spreading. The company should also communicate such risks to the local community. Additionally, a company could enhance the health and safety of the local community by for example offering access to employee health services (UNEP/SETAC 2013). The pollution to air, water and ground along the fashion supply chain is hazardous to human health and safety. Especially in the manufacturing stage, i.e. tier 2, where the fabric is chemically treated to gain a certain design or quality. Many chemical substances are bio accumulative and could in the long term cause cancer or other severe health conditions (Global Fashion Agenda & The Boston Consulting Group 2017).

Respect for indigenous rights

The UN Declaration on the Rights of Indigenous Peoples states that indigenous peoples rights specifically include the right to self-determination of political status and to freely determine their economic, social and cultural development as well as other types of collective rights to lands, territories, resources and culture (IPU 2014). Companies should be aware of that states sometimes violate these rights in favour of economic development (UNEP/SETAC 2013). An example of such violations is the illegal acquisition and clearing of indigenous owned land for agricultural production by the government in Ethiopia (Human Rights Watch 2016).

Community engagement

When a company develops products, policies or acts in a way that affects the local community, the voice of community stakeholders should be taken into account to ensure that the interest of the local community is not overlooked. The community engagement could also be more direct with investments and involvement in community led activities (UNEP/SETAC 2013). It could be investments in education, local craftsmanship, inclusive employment or other types of community activity participation (Lenzo et al. 2017). The fashion industry is estimated to spend only 0.2% of their annual sales income on community related engagement. This can be compared to the national level goal of 0.7% of GDP stated in the Millennium Development Goals and the mining and pharmaceutical industries which spend 0.4% and

1.2% respectively on community related engagement (Global Fashion Agenda & The Boston Consulting Group 2017).

Local employment

This impact category examines a companies willingness to recruit local people and work with local suppliers (Lenzo et al. 2017). If a company engages in local employment it can have a large influence on the sustainable development in the local community with knowledge, skills and income development (UNEP/SETAC 2013). In outsourcing countries, such as India, the garment industry areas attracts people who seek work, and many of them are migrant workers working with flexible contracts but with very low job security (Carswell & De Neve 2012). A local commitment is beneficial for local community both in social security and from an economic perspective if it transfers economic activities to workers and other businesses in the community (UNEP/SETAC 2013; Mashithoh & Ginting 2016).

Secure living conditions

Companies ought to ensure that they are conscious of the state of community security in the areas in which they work. This to ensure that they do not contribute to inflate conflicts and crises in the community. Furthermore, the company should be aware of the risk of human rights violations by the governing state and the risk of being a silent compliant of these violations if they do not promote human rights in their own policies and practices (UNEP/SETAC 2013).

Society

Public commitment to sustainability issues

By publicly committing to sustainability issues a company displays an understanding of its role in the community and society. Public commitments are more exposed to investigation and public scrutiny and therefore the incentive to succeed is high. The commitment needs to be transparent and can be communicated in reports, on websites or campaigns (UNEP/SETAC 2013). Social sustainability commitments are usually categorised as CSR programs. However, UNEP/SETAC (2009) states that many social impact assessment tools often only reaches to tier 1 in the fashion supply chain. An example that is brought up is the GRI reporting method which even though it has expanded its framework to include parts of the supply chain, it is still a very limited coverage (UNEP/SETAC 2009).

Contribution to economic development

A company should contribute to economic development not only by generating revenue, but also in job creation, education and training, investments and research. For economic development it is necessary to invest in knowledge, capacity and skills development for both suppliers and workers (UNEP/SETAC 2013). The fashion industry has a huge impact on the economic growth of individual countries, such as Bangladesh where the textile and garment industry accounts for 80% of the GDP (Human Rights Watch 2015). It is estimated that

because of environmental and social unsustainable practices in the fashion industry, each year there is a value loss of €110 billion and €50 billion respectively (Global Fashion Agenda & The Boston Consulting Group 2017).

Prevention and mitigation of armed conflicts

Peace and security are crucial aspects for a sustainable development. This impact category aims to gain an understanding of a company's role in ongoing or emerging conflicts (UNEP/SETAC 2013). According to a study on the social hotspots from Swedish fashion consumption (Zamani, Sandin, Svanström & Peters 2016), armed conflicts do not stand out as a potential risk.

Technology development

Technology development refers to the investment and research in new environmentally sound technologies, and also the transfer of these technologies, skills, knowledge and abilities for functioning processes and systems to developing countries (UNEP/SETAC 2013). According to the Global Fashion Agenda & The Boston Consulting Group (2017) technology breakthroughs and investment support can to a high extent alleviate the pressure on environmental and social resources that come from the fashion industry. Examples are fibre-to-fibre recycling technologies and artificial intelligence technologies to monitor worker satisfaction. Roos et al. (2015) also show that for example changing from water based dyeing technology to dry dyeing technology can have a large impact on water use and chemical pollution.

Corruption

The UN Global Compact defines corruption as "the misuse of entrusted power for private gain" (UN Global Compact 2016). Examples of corruption in the supply chain are fraudulent billing, suppliers who evade legitimate law enforcement and who pay bribes to government officials to avoid taxation (UN Global Compact 2016). The Global Fashion Agenda & The Boston Consulting Group (2017) have identified, but not quantified, the presence of corruption to especially the processing and the manufacturing stages of the fashion supply chain, i.e. tier 1 and 2.

Value chain actors

Fair competition

Fair competition enhances efficiency, innovation, economic growth and, in the long term, increases living standards. Fair competition can be undermined by market competition restrictions and/or market entry barriers. Such activities could for example be monopolies and abuse of market power, price fixing and predatory prices (UNEP/SETAC 2013). An issue that could hinder fair competition on a global market is national government support in the form of subsidies which distort the global market (Vestager 2017). One example of this in the fashion industry is the distorted market of cotton raw material. The price of cotton is very volatile and has over the 20^{th} century decreased substantially. To protect the domestic export

of cotton many countries provide subsidies to cotton farmers. Farmers in rich countries gain a price advantage leaving smaller farmers or farmers from poorer countries behind. China and the USA are countries that provide such subsidies to their cotton farmers (Fairtrade 2015).

Promoting social responsibility

A company can promote social responsibility by monitoring, auditing and providing training to suppliers, in accordance with human rights conventions and requirements, as well as in their own activities and practices. For example, ILO conventions could be taken into consideration when evaluating supplier and sourcing options and for current suppliers a Code of Conduct might be in place (UNEP/SETAC 2013). For fashion companies, promoting social sustainability is mainly done within the CSR departments (Camilleri 2017).

Supplier relationships

The impact category Supplier relationships is defined as the communication and connection to other organisations or companies providing services and/or products from a fashion brand (UNEP/SETAC 2013). The global fashion supply chain is an intricate network with large geographical distances between manufacturer and customer (Zamani 2016). Ensuring a deeper relationship beyond purchasing transactions can achieve more in terms of social sustainability in the supply chain, with a deeper understanding of the need of both parties on order and purchasing planning and commitment to social issues (UNEP/SETAC 2013).

Respect for intellectual property rights

The aim of intellectual property rights (IPRs) is to protect original designs and to encourage creativity. It is a tool to promote fair competition and can be trademarks, copy rights and patents. It is important to safeguard the right to design and production methods of minority groups (UNEP/SETAC 2013). In fashion, being such a competitive industry, with fast cycles of collections, the creativity of a designer is highly valued. To protect a design, proper IPR is therefore important. In 2016 approximately 10% of all sold fashion items were counterfeits, i.e. fake products and copied designs (Hyde & Kalkorni 2017).

7.3 Concluding analysis of the identified impact categories

The resulting identified impact categories were almost identical to the ones found in the UNEP/SETAC E-LCA and S-LCA framework, with a few exceptions. The adding of the environmental impact category (EIC) Energy use is explained by that all fashion relevant reports covering environmental aspects were measuring energy use. Resource depletion is included in the UNEP/SETAC framework but not as a measured category in the fashion relevant reports. However, it is mentioned with regards to waste generation, recycling and re-use when looking at different consumption and/or sourcing scenarios (Roos et al. 2015, Global fashion agenda & The Boston Consulting Group 2017). Thus, it was included in the thesis as an individual impact category. The UNEP/SETAC framework includes the EIC Ozone depletion. However, as none of the sources mentioned this category, it was not deemed relevant for the fashion industry and thus not included in this thesis.

All UNEP/SETAC social impact categories (SICs) were concluded to be relevant to the study since they were used in a significant number of S-LCA fashion relevant reports. However, as mentioned by both Klöpffer (2014) and Radhakrishnan (2015), as the S-LCA is such an immature framework it may be concluded that the SICs used in this thesis have not been tested and used as thoroughly as the identified EICs. More research has to be done in order to determine if all these SICs are relevant to take into account in future fashion S-LCAs. Nevertheless, this UNEP/SETAC framework is the only acknowledged framework available and is therefore used in this study.

However, there was one impact category that was present in one sector relevant report, the Global fashion agenda & The Boston Consulting group (2017), but not in the UNEP/SETAC framework and that is Animal welfare. This is an ethical aspect that could be included as a social impact category. However, the UNEP/SETAC S-LCA framework only covers human aspects of social sustainability which could explain why Animal welfare is not included. Animal welfare is neither included in the E-LCA framework. The closest connected impact category could be Biodiversity, but this impacy category does not cover the ethical aspects of animal husbandry.

There are some differentiation between the SICs and the EICs. Firstly, there are 30 SICs and only eleven EICs. This may be explained by the difference in measurability where SICs are not as easy to measure as EICs hence the SICs are more specific and diverse. The SICs are divided into different stakeholders where some SICs have a more narrow perspective, as for example the SIC Transparency is only applicable for Consumers while as for example the EIC Water use is applicable for all steps in a product's life cycle. Another explanation of this difference in quantity may be explained by the difference in maturity level of E-LCA and S-LCA, as described by Klöpffer (2014) and Radhakrishnan (2015). If the S-LCA framework had been used more frequently for fashion products/brands it is likely that the number of SICs had decreased due to lack of relevance.

Many of the impact categories correlate and/or overlap each other. For example the EICs Climate change and Photochemical ozone creation are interlinked since Photochemical ozone

creation happens during combustion which is one of the sources to Climate change as explained by IPCC (2013) and Roos et al. (2015). Also, there are many impact categories that are linked to the usage of chemicals, both SICs and EICs. For example the EICs Acidification, Ecotoxic effects, Eutrophication and Human toxic effects can be linked to the SICs Health and safety and Safe and healthy living conditions since they all in some way measure the consequences of hazardous chemical pollution.

The EICs have connections to the different tiers in a fashion supply chain. The different chemical pollution impact categories can be connected to tier 2 and 3, while as Biodiversity and Land use are EICs which strongly connects to tier 3. Energy use, Climate change and Photochemical ozone depletion have connections with all tiers as energy production through combustion occurs throughout the whole production phase but is the largest in tier 1 and 2, as mentioned by van der Velden et al. (2013) and Roos et al. (2015). The SICs can somewhat also be connected to tiers, for example the stakeholder Worker relates to all workers in all three tiers in the UNEP/SETAC S-LCA framework. The stakeholder Consumer does not have a connection to a specific tier but can be connected to the concept of the extended supply chain which includes the use and end-of-life phase, as mentioned by Mentzer et al. (2001).

The stakeholder perspective of the SICs leads to that some aspects may be measured several times but on different "levels" from a systemic perspective. An example is the SIC Technology development, a Society impact category, which may be linked to Access to immaterial resources, a Local community IC, which in turn may be linked to Equal opportunities/discrimination for the Worker stakeholder. Technology development entails that the access to knowledge and skill of a new process or system should be ensured within the local community, in turn working against discrimination of certain groups and individuals. This shows the links between a broader perspective, the society, and a more narrow perspective, the worker.

8 Results and analysis

In this section the results and accompanying analysis of the identified connections between the impact categories and the Sustainable Development Goals (SDGs), the impact categories and the Higg Index 2.0 Brand and Retail Module and a comparison of the focus distribution between the SDGs and the Index will be presented. See *Section 8.1*, *Section 8.2* and *Section 8.3* respectively.

8.1 The connections between the SDGs and the impact categories

The following sections analyses the connections between the SDGs and the environmental impact categories (EICs), see *Section 8.1.1* and the social impact categories (SICs), see *Section 8.1.2*.

8.1.1 The connections between the SDGs and the environmental impact categories

The method of how the connections between the SDGs and the EICs were identified can be seen in *Section 2.2* . The result can be seen in *Figure 9*. The x-axis in *Figure 9* shows the different EICs and the y-axis shows the points received based on the connections made between the SDGs and the EICs. Since there are 17 SDGs the maximum possible point that one impact category could receive is 17, i.e. if one impact category had a connection with every one of the 169 targets it would have 17 points in the figure below. The different colours represent the 17 SDGs and show which impact categories that received connections with which SDG.

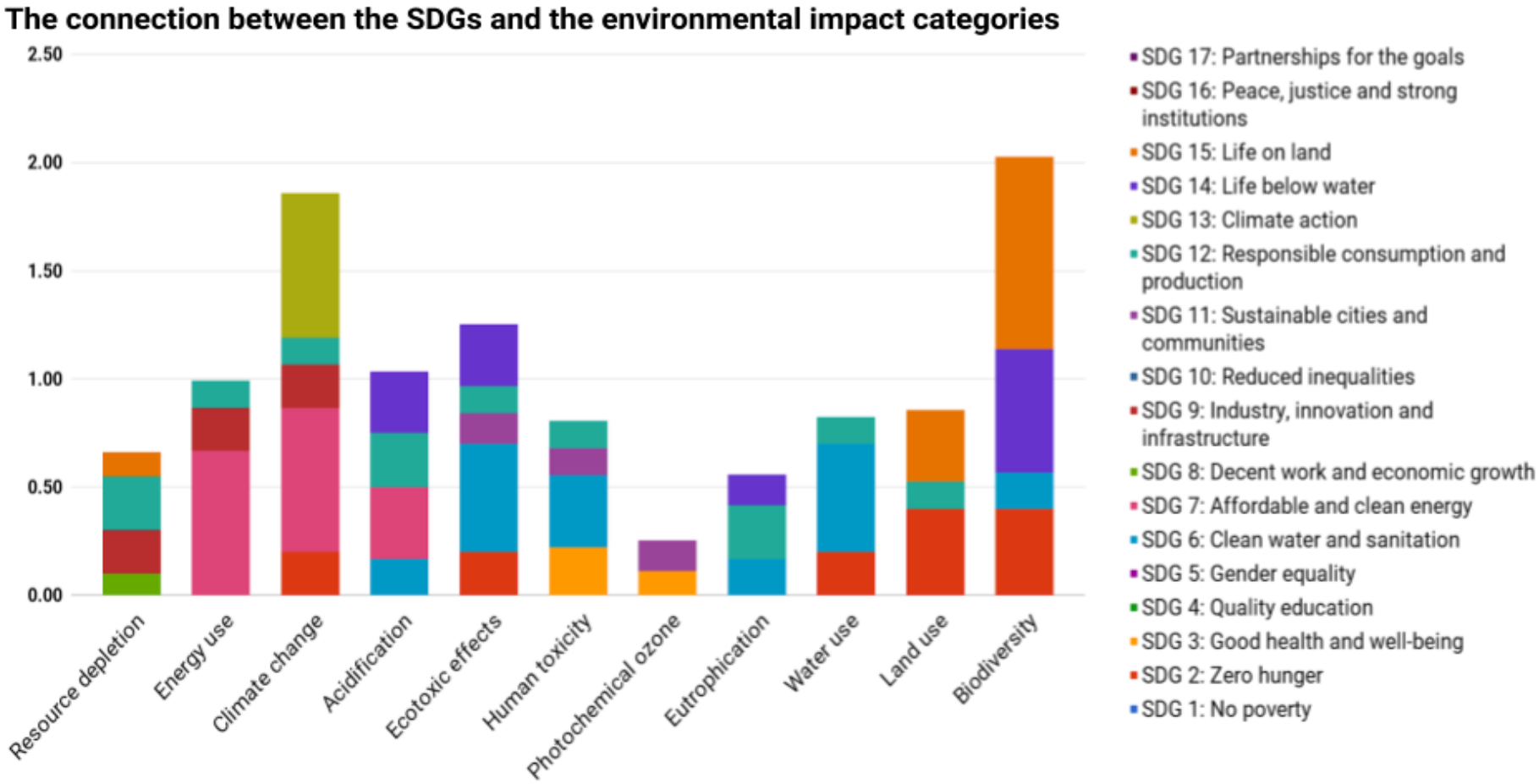

Figure 9: *The connections between the SDGs and the environmental impact categories (EICs). The x-axis shows the different EICs and the y-axis shows the points received based on the connections made between the SDGs and the EICs. As there are 17 SDGs the maximum possible point that one impact category could receive is 17, i.e. if one impact category had a connection with every one of the 169 targets it would have 17 points. The different colours represent the 17 SDGs and shows which impact categories that received connections with which SDG.*

As can be seen in *Figure 9* the points of the EICs are not equally distributed. Biodiversity and Climate change have received a large connection with the SDGs, 2.03 and 1.86 points respectively, where as Photochemical ozone creation has received a smaller connection, 0.25 points. The rest of the EICs have received a relatively equal connection with the SDGs.

The EIC with the highest point, Biodiversity, received 2 points out of 17 possible where as the one with the lowest point, Photochemical ozone creation, received less than 0.5 points. The EIC Biodiversity received connections from four different SDGs, Goal 2, Zero hunger (bright red), Goal 6, Clean water and sanitation (light blue), Goal 14, Life below water (blue/purple) and Goal 15, Life on land (orange), while as the EIC Photochemical ozone creation had connections with Goal 3, Good health and well-being (light orange), and Goal 11, Sustainable cities and communities (purple).

Regarding the SDGs it can be seen that Goal 12, Responsible consumption and production (turquoise), is represented in all EICs but Photochemical ozone creation and Biodiversity. This SDG is, as was discussed in *Chapter 5*, directly linked to the responsibility of the developed countries and the private sector to work towards a more sustainable future. As mentioned, one of the aims of the SDGs is to include developed countries and the private sector and this result shows that they succeeded in including this for the EICs at least. Another SDG that is well represented in the EICs is Goal 6, Clean water and sanitation (light blue), which is represented in 6 out of 11 EICs. This shows that if a company wants to work with water they do not only want to focus on the EIC Water use but also the impact categories Acidification, Ecotoxic effects, Human toxicity, Eutrophication and Biodiversity in order to work towards this SDG. This is confirmed by the descriptions of these impact categories in *Section 7.1*.

The reason for the large connection with the EIC Climate change is that two of the SDGs, Goal 13, Climate action (dusty green), and Goal 7, Affordable and clean energy (pink), are directly linked to this EIC and almost all targets in these SDGs have a connection to this EIC. Regarding Biodiversity it can be seen that Goal 15, Life on land (orange), Goal 14, Life below water (blue/purple) and Goal 2, Zero hunger (bright red), are strongly represented. The EIC has received connections with almost all targets for Goal 14 and 15, this not being strange since these goals have the aim to preserve ecosystems on and off land. The EIC Photochemical ozone creation has received quite few connections with the SDGs. This impact category is strongly linked to combustion, as described in *Section 7.1*, and hence linked to the EICs Climate change and Energy use, two impact categories with a significantly larger connection to the SDGs. As the method did not take indirect effects into account, this IC could be said to be "forgotten" in this thesis due to the fact that the SDGs seldom talk about this matter explicitly. However, focusing on Climate change and Energy use would give trickle down effects to this EIC.

8.1.2 The connections between the SDGs and the social impact categories

The method of how the connections between the SDGs and the social impact categories (SICs) were identified can be seen in *Section 2.2*. The result can be seen in *Figure 10*. The x-axis in *Figure 10* shows the different SICs and the y-axis shows the points received based on the connections made between the SDGs and the SICs. As there are 17 SDGs the maximum possible point that one impact category could receive is 17, i.e. if one impact category had a connection with every one of the 169 targets it would have 17 points in the figure below. The different colours represent the 17 SDGs and show which impact categories that received connections with which SDG.

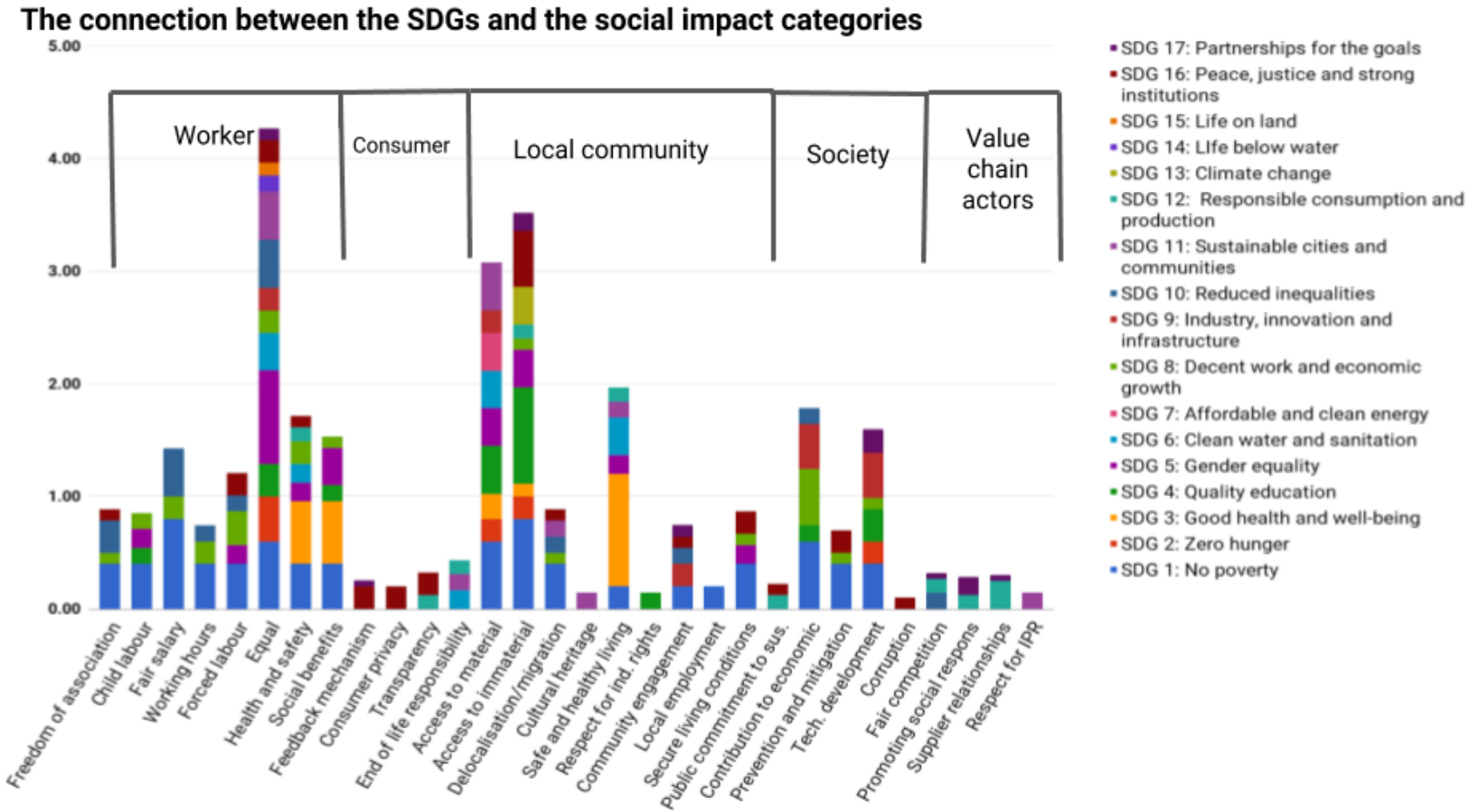

Figure 10: *The connections between the SDGs and the social impact categories (SICs). The x-axis shows the different SICs and the y-axis show the points received based on the connections made between the SDGs and the SICs. As there are 17 SDGs the maximum possible point that one impact category could receive is 17, i.e. if one impact category had a connection with every one of the 169 targets it would have 17 points. The different colours represent the 17 SDGs and show which impact categories that received connections with which SDGs.*

Figure 10 shows that the distribution of the connections made is quite uneven between the different stakeholders. It can be seen that the maximum point that a social impact category received was 4.27, this was the SIC Equal opportunities/discrimination. The SIC Corruption received the lowest point of 0.10.

The stakeholders Consumer and Value chain actors received an overall low point in comparison to the stakeholder Worker, which received a large amount of points, as well as the stakeholder Local community and some of the Society SICs. There are three SICs that stand out because of their large connection; Equal opportunities/discrimination and Access to immaterial/material resources. These impact categories are part of the stakeholders Worker and Local community. Several SICs have a very small number of points. Some examples are; Corruption, Respect for indigenous rights, Cultural heritage, Respect for IPR and Consumer privacy. These are all part of the stakeholders Consumer, Society and Value chain actor and Local community.

The large connection of the SIC Equal opportunities/discrimination can be explained by the large number of different SDGs that have targets with connections to Equality opportunities/discrimination, 13 SDGs are represented in this SIC. Two of the SDGs with many connections are Goal 1, No Poverty (bright blue) and Goal 5, Gender equality (purple). The two SICs Access to material/immaterial resources have also received a large connection, 9 SDGs are represented in both of these SICs. Goal 1, No poverty (bright blue), Goal 4, Quality education (bright green) and Goal 11, Sustainable cities and communities (dark purple) are well represented in Access to material resources. Goal 1, No poverty (bright blue), Goal 4, Quality education (bright green) and Goal 16, Peace, justice and strong institutions (dark red), are well represented in Access to immaterial resources. Why these SICs are highly prioritised by the SDGs could be explained by the aim to give all people equal rights as a solution to sustainability challenges. Furthermore, other aims of the Agenda 2030 are to combat poverty, work towards equality between countries and citizens and break structural barriers for sustainable development which is described in *Chapter 5* and well reflected in the results since the three prioritised SICs are connected to SDGs regarding no poverty and equality.

Additionally, the differentiation in focus on stakeholders may be explained by the holistic viewpoint of the SDGs (Dodds et al. 2017) as well as the aim of creating a world where all people are equal and have equal rights by working on structural problems and root causes rather than the consequences. Even if the SDGs have a strong focus on partnerships including the private sector, the focus is not on the consumer or the Value chain actor but on the individual and the society as discussed in *Chapter 5*, hence the results where the Worker, Local Community and Society gets the largest focus.

As can be seen in *Figure 10*, Goal 1, No poverty (bright blue), is represented in 18 out of 30 SICs. As stated above, this is not surprising as one of the goals of the SDGs according to UN (2015) is to combat poverty. Another well represented SDG is Goal 8, Decent work and economic growth (light green), which is represented in 14 out of 30 SICs as well as Goal 5, Gender equality (purple), which is represented in 9 out of 30 SICs. These two SDGs are

interesting as Newman & Smyth (2017) suggests that Goal 5, 8 and 12 are SDGs that the fashion industry is already working towards. According to *Figure 10* and *Figure 9* Goal 5 is represented in 9 out of 41 impact categories in total, Goal 8 in 15 out of 41 impact categories and Goal 12 in 18 out of 41 impact categories. Looking at the fashion industry from a life cycle analysis perspective, it may therefore be concluded that there is a consensus between the focus of the SDGs and the suggestion of Newman & Smyth (2017) regarding the importance of these SDGs.

8.1.3 Comparison between the environmental and social impact categories and their connections to the SDGs

The results show that there are some differences between the environmental impact categories in *Figure 9* and the social impact categories in *Figure 10*. The highest point that an EIC has received is 2.03 in comparison to the highest point a SIC received which was 4.27. As UN (2015) states the SDGs are not divided into social and environmental SDGs which means that there is no differentiation made by the UN between social and environmental targets. The SDGs are meant to correlate, meaning that targets achieved in one SDG may cause improvements on other targets in other SDGs as described by Dodds et al. (2017). The average value for the EICs and the SICs is respectively 1.01 and 1.03, showing that they are quite similar prioritised with the exception of some social impact categories with outstanding high points as described before.

Another difference that can be seen in the result is that one SIC usually has received connections with a large amount of SDGs while as the EICs are connected to fewer SDGs but to a larger extent with each SDG. All EICs have received connections with five or less different SDGs while as the SICs usually have received connections with more than five different SDGs. For example, the EIC with the highest point is Biodiversity, which is represented in four SDGs. The SIC with the highest point is Equal opportunity/discrimination which is represented in 13 SDGs. In general this means that even if a SIC and EIC has the exactly same point the probability that a SIC has connections with a larger amount of SDGs than an EIC is high. Social issues can therefore be said to be represented and interlinked in the whole SDG framework to a greater extent than environmental issues are.

Overall, the EICs and the SICs are equally connected to the SDGs. The agenda have prioritised the impact categories Biodiversity and Climate change for the EICs and Equal opportunities/discrimination and Access to material/immaterial resources for the SICs. From a stakeholder perspective the SDGs prioritise the stakeholders Local community and Worker. The lowest priority was given to Corruption for the SICs and Photochemical ozone creation for the EICs.

8.2 The connections between the Index and the impact categories

The following sections, *Section 8.2.1* and *Section 8.2.2* analyses the connections between the Higg Index 2.0 Brand and Retail Module and the environmental and social impact categories respectively.

8.2.1 The connections between the Index and the environmental impact categories

The method of how the connections between the Higg Index 2.0 Brand and Retail Module and the environmental impact categories (EICs) were identified can be seen in *Section 2.3*. The result can be seen in *Figure 11*. The x-axis shows the different EICs and the y-axis shows the points received based on the connections made between the Index and the EICs. The maximum possible score that each IC could receive was 200, as each submodule, i.e. environmental and social, had a maximum score of 100 each. The labels and the different colours represent a specific section within either the environmental or the social/labour submodule.

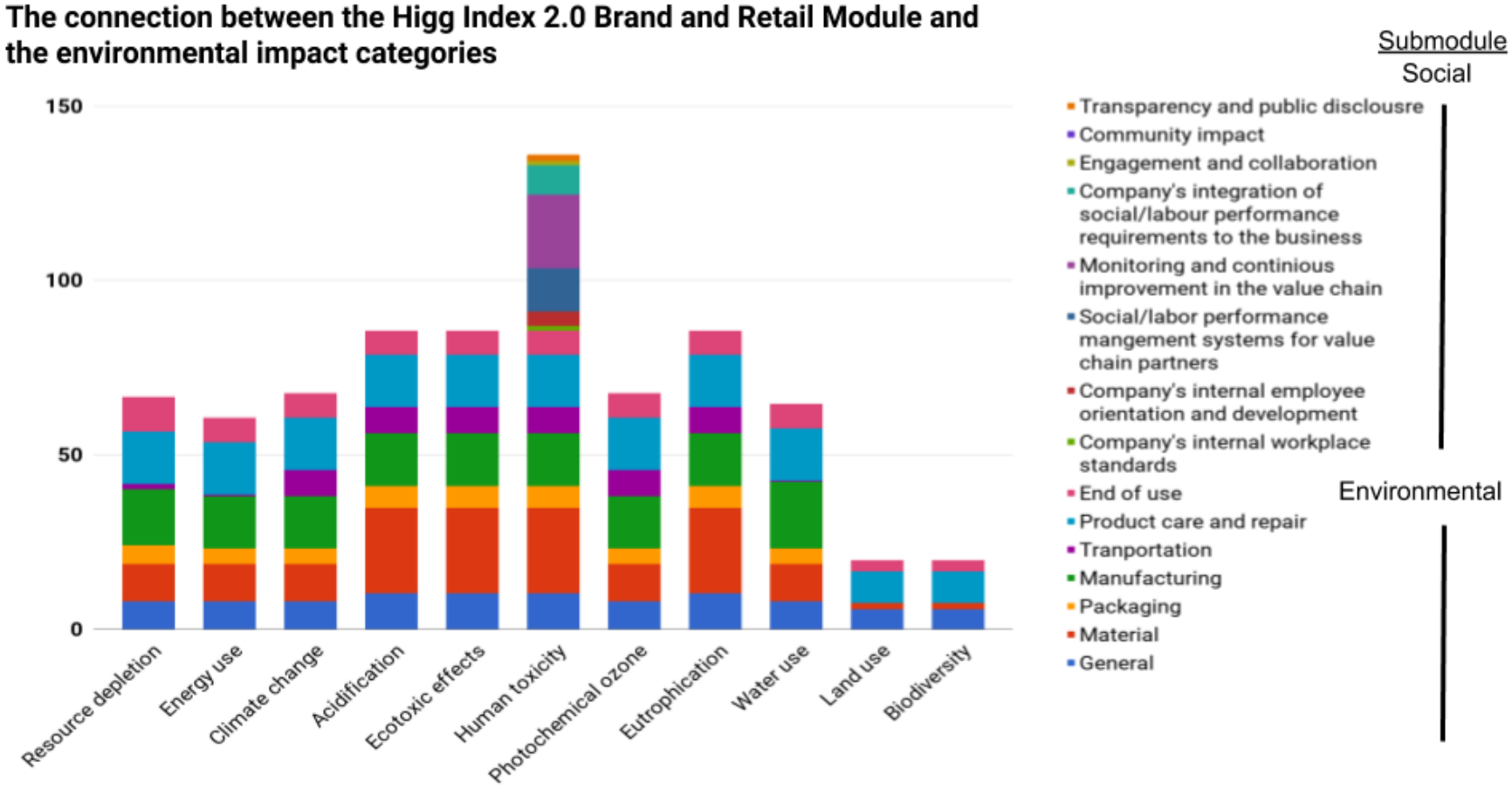

Figure 11: *The connections between the Higg Index 2.0 Brand and Retail Module and the environmental impact categories (EICs). The x-axis shows the different EICs and the y-axis shows the points received based on the connections made between the SDG targets and the EICs. The maximum possible score that each EIC could receive was 200, as each submodule, i.e. environmental and social, had a maximum score of 100 each. The labels and the different colours represent a specific section within either the environmental or the social/labour submodule.*

The Index connection with the EICs is quite even. Human toxicity stands out as an EIC with the highest point, 136, and Land use and Biodiversity, with 20 points each, as EICs with the lowest points. The environmental submodule is represented in all EICs, see for example "Materials" in red and "Product care and repair" in light blue. The social/labour submodule is only represented in Human toxicity, see for example "Monitoring and continuous improvement in the value chain" in purple and "Social/labour performance management systems for value chain partners" in dark blue.

Human toxicity's high points can be related to the fact that the Index in many questions asks about chemical management systems and the health and safety of workers in the value chain. This mirrors the concern mentioned by Ellen MacArthur Foundation (2017), Naturvårdsverket (2016) and Roos et al. (2015), stating that the industry uses large amount of chemicals, many of them hazardous substances and a threat to human health and the environment. Human toxicity is, as noted above, represented in all different sections in both the environmental and the social submodule, with the largest representation in the "Materials" section (red) and the "Monitoring an continuous improvement in the value chain" section (purple). As analysed in *Section 7.3*, the EIC Human toxicity overlaps with two SICs, Health and safety and Safe and healthy living conditions, because of their connection to chemical pollution. Thus the resulting correlation with the social/labour submodule is not unexpected when reviewing the Index.

Overall, chemical pollution categories, i.e. Eutrophication, Acidification, Human toxicity and Ecotoxic effects, are given slightly higher points than for example Climate change. The major contributor to the large connection to chemical pollution categories is the "Materials" section (red), implying that the Index relates the choice of materials and material characteristics as important in order to reduce chemical pollution. As described in *Section 6.1*, the "Materials" section in the Index has the largest relative weighting, constituting to 25% of the total score. Hence, the large contribution from the "Materials" section is not remarkable. The "Materials" section is connected to the manufacturing segment of the fashion supply chain which is very chemical intensive as stated by Roos et al. (2015) and the Global Fashion Agenda & The Boston Consulting Group (2017). Furthermore, the use of chemicals in textile products is covered by legislation within the REACH regulation and the Biocidal Products Regulation, setting a threshold for how to manage chemicals within the fashion industry. The large focus on chemical EICs in the Index is thus reflected in both legislation, Ellen MacArthur Foundation (2017), Roos et al. (2015) and Naturvårdsverket (2016).

Water use, Resource depletion, Climate change and Photochemical ozone creation have received roughly equal points. However, there are some differences regarding from which section within the Index that these connections originate from. For example Resource depletion has a slightly larger focus in the "End of use" section (pink) and the "Product care and repair" section (light blue). As described by Roos et al. (2015) end of use management systems, including recycling and re-use of garments, could decrease the pressure on raw material extraction and the overall production of fashion garments. Product care and repair also enables re-use. As stated by Ellen MacArthur Foundation (2017), almost all raw material input have virgin origin. The Global Fashion Agenda & The Boston Consulting Group (2017) state that

the linearity of the fashion industry will not sustain, hence the industry needs to put effort into creating circular flows for textile materials. The smaller point that Resource depletion received in comparison to the chemical EICs is therefore somewhat contradicting to the above statements. One reason for this could be that the legislation regarding textile waste is not as advanced as legislation regarding chemical EICs, as described in *Section 3.2*, and that this thus has influenced SAC and the Index. An example of lack of legislation is what Elander et al. (2016) state: that EPRs for textiles, and thus also the Extended supply chain (Mentzer et al. 2001), are very rare. Although, it is also stated that the Waste Framework Directive issued much research within these areas, but this knowledge has yet to be implemented on a larger scale. The lack of large scale recycling and re-use systems could therefore reflect the smaller focus on Resource depletion from the Index.

The difference in connections between the Index and the chemical pollution EICs and the EICs Land use and Biodiversity respectively can be related to what is described in *Section 3.1* and the division of the fashion supply chain into different tiers. The chemical pollution EICs can be connected to tier 1 and 2, i.e. the manufacturing stage where for example sewing and dyeing as well as other material treatment processes occur. Land use can be connected to tier 3, i.e. extraction of raw material such as cultivation of cotton fibre. As described in *Section 3.1* tracing the supply chain back to tier 3 is difficult and the smaller focus on these categories could be a reflection of this issue. Biodiversity can also be connected to tier 3 but as mentioned in *Section 7.1* it is an impact category which is hard to quantify and could therefore be given fewer connections with the Index. Furthermore, the chemical management has been given attention from policy makers with legislation such as REACH and the Biocidal Products Directive. Hence, as a fashion company has greater power to influence suppliers in tier 1 and 2 and as chemical pollution categories can be quantified it is easier to control, measure and strive for improvements in these chemical pollution categories. This explains the difference between these categories and the EICs Biodiversity and Land use.

SAC (2018a) claims that the Index should have a life cycle perspective, but following the above reasoning a larger focus is put on tier 1 and 2, and tier 3 has a minor focus. The life cycle perspective of the Index could therefore be questioned. Furthermore, to drive improvement within management systems Brorson & Almgren (2016) state that it is important to set targets, evaluate and measure goal fulfillment to drive for continuous improvement. The results in this thesis do not show if the questions in the Index are including a strive for continuous improvement as the life cycle impact categories do not take this aspect into account. In the social/labour submodule this is included in its own section, "Monitoring and continuous improvement in the value chain", but this section is only represented in the EIC Human toxicity because of the thesis methodology. However, Larsson[2] states that the Index measures the company's prerequisites rather than results. Nevertheless, SAC states that the Index is supposed to be aspirational and that a maximum score is not achievable for now, thus implying that the continuous improvement comes with a continuous strive for a higher bench marking score in the Index.

[2]Jonas Larsson, university lecturer Swedish School of Textiles, Borås. Interview 25^{th} of April 2018

However, the average company today has a score of 60 out of 100 in the social submodule showing a contradiction to SAC's ambition. Also, for the company to have incentives to receive a higher score there is a need for the benchmarking score to be made public, which is not possible today. The Index is today used as a self declaration type of eco label, mirroring what is described in *Section 3.2* regarding ISO 14021. For it to be public, the benchmarking score needs to be validated, and thus becoming a third party validated eco label, correlating to ISO 14025. With regards to this, the Index's role as a combination of LCA, EMS/social management system and sustainability label might need further evaluation and development.

8.2.2 The connections between the Index and the social impact categories

The method of how the connections between the Higg Index 2.0 Brand and Retail Module and the social impact categories (SICs) were identified can be seen in *Section 2.3*. The result can be seen in *Figure 12*. The x-axis shows the different SICs. The y-axis shows the points received based on the connections made between the Index and the SICs. The maximum possible score that each IC could receive was 200, as each submodule, i.e. the environmental and social/labour, had a maximum score of 100 each. The labels and the different colours represent a specific section within either the environmental or the social/labour submodule.

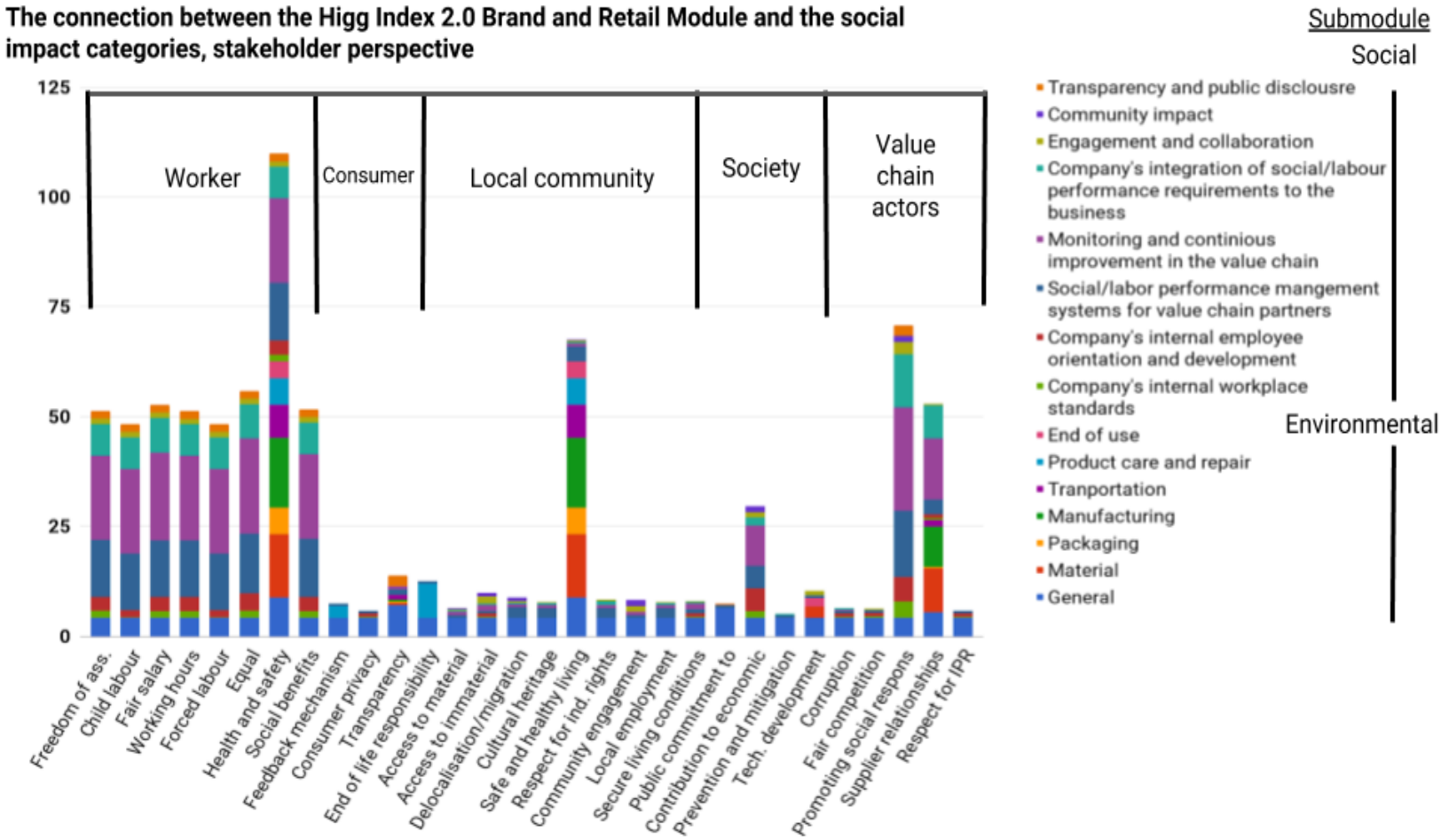

Figure 12: *The connections between the Higg Index 2.0 Brand and Retail Module and the socil impact categories (SICs). The x-axis shows the different SICs and the y-axis shows the points received based on the connections made between the SDG targets and the SICs. The maximum possible score that each SIC could receive was 200, as each submodule, i.e. environmental and social, had a maximum score of 100 each. The labels and the different colours represent a specific section within either the environmental or the social/labour submodule.*

The Index connections with the SICs are very unevenly distributed. The SIC that has received the highest point is Health and safety within the stakeholder Worker, with 110 points. The SIC that received the lowest point was Prevention and mitigation of armed conflicts which is within the stakeholder Society and received 5.16 points. Overall, the stakeholder Worker has the largest connection with the Index while the stakeholder Consumer has the smallest connection. The section "General" (bright blue), from the environmental submodule is represented in all SICs. The environmental submodule is otherwise mainly represented in the SICs Health and safety, with 14 out of 15 sections represented, Safe and healthy living conditions, with 12 out of 15 sections represented, and Supplier relationships with 11 out of 15 sections represented. The social/labour submodule is represented in all SICs but to a very small extent for some, see for example Prevention and mitigation of armed conflicts and Consumer privacy.

There is a distinct difference between the five different stakeholders' connection to the Index. The stakeholder Worker has received a significantly higher priority from the Index than the other stakeholders have, with a few exceptions. The Worker's priority is not surprising as the Index's main target groups are the internal employees and value chain partner employees, evaluating the social/labour performance of the activities associated with this part of the business, as mentioned in *Section 6.1*.

Safe and healthy living conditions within the stakeholder Local community stands out. As mentioned in the concluding analysis of the impact categories, *Section 7.3*, this impact category can be connected to the SIC Health and Safety within Worker. The large priority on these areas can be explained in the same way as when analysing the EICs: by the many questions in the Index targeting chemical management systems and the health and safety issues related to chemical use in the supply chain. However, there is a distinction between the two SICs related to their different stakeholders. The connections made to the SIC Safe and healthy living conditions within Local community mainly originate from the environmental submodule, which targets the overall chemical management system. The connections made to the SIC Safe and Healthy within Workers originate from both the environmental and social/labour submodule, reflecting again the Index's target group of value chain employees in the social/labour submodule.

Furthermore, for the stakeholder Value chain actor, i.e. the fashion company itself, the SICs Promoting social responsibility and Supplier relationships are impact categories that have received high points. Promoting social responsibility is covered mainly by the social/labour submodule, which is not surprising as this module in its entirety is a way to promote social responsibility trough monitoring, auditing and training. All these aspects can be related to this SIC, as explained in *Section 7.2*. Supplier relationships also has a higher point than other Value chain actors' SICs. This can be related to how the industry is intricate, with numerous different stakeholders and the need for transparency and cooperation between them in order to achieve more sustainable practices, thus mirroring what is described by Strähle & Müller (2017), Ellen MacArthur Foundation (2017) and Global Fashion Agenda & The Boston Consulting Group (2017). Additionally, SAC has stated that in order to be able to achieve the goal of improved environmental and social sustainability it is important to have

collaboration between stakeholders. This correlates to what is stated in *Section 6.2*, which is that SAC members have acknowledged the contribution that the Index has had on improved supplier communication. Thus, both the SAC vision and the member experience of the Index correlate with the results regarding the SIC Supplier relationships in this thesis. Furthermore the connections made with the impact category Supplier relationships originate from both the environmental and the social/labour submodule, reflecting the holistic and integrated approach that SAC has envisioned for the Index.

The stakeholders Society and Consumer are stakeholders that have a lower priority in the Index. It is not surprising that a few SICs for Society, for example Mitigation and prevention of armed conflicts, receive lower points as it follows the analysis in *Section 7.3*, that some SICs might not be as relevant for the fashion industry as others due to the underdeveloped S-LCA framework. However, a SIC that is noticeable within the Society stakeholder because of its high point is Contribution to economic development. It is represented in both the social/labour and the environmental submodule, mainly because of questions regarding investment in cooperation between companies and partners in the supply chain in order to achieve capacity building and fair wages for workers. The SIC Corruption has received few connections with the Index according to the results. This mirrors the criticism from Gardetti (2015) who states that anti-corruption has been forgotten by the Index.

Two correlating SICs within the stakeholders Society and Consumer, Public commitment to sustainability issues and Transparency, also received lower points. This contradicts what is mentioned in *Chapter 3* and by UNEP/SETAC (2013), which is that transparency is a severe challenge for the fashion industry and crucial for consumers in order to make informed and more sustainable choices. It is difficult to map and be transparent when it comes to activities far upstream in the supply chain, which might explain the lower priority given to this SIC although it is an important challenge for the industry. Public commitment is something that increases the incentives for companies to succeed with their sustainability targets, as mentioned by UNEP/SETAC (2013). However, the legislation for such commitment and communication is quite new, as is described in *Section 3.2* regarding sustainability reporting, which could explain the lower priority on this aspect in the Index.

Overall, the EICs and the SICs are unevenly connected to the Index. The main priority of Higg Index 2.0 Brand and Retail Module is concluded to be the IC Human toxicity followed by the other chemical pollution EICs for the EICs and the SIC Health and safety for the SICs. From a stakeholder perspective the Index prioritise the Worker. The lowest priority was given to the EICs Land use and Biodiversity for the EICs and the SIC Prevention and mitigation of armed conflicts for the SICs.

8.3 Comparison of focus distribution between the SDGs and the Index

As described in *Section 2.4*, a focus distribution model of the SDGs and the Higg Index 2.0 Brand and Retail Module was created. In the following sections the result and analysis regarding this will be presented. The focus distribution on the environmental impact categories can be seen in *Section 8.3.1* and the focus distribution on the social impact categories can be seen in *Section 8.3.2*.

8.3.1 Comparison: Focus distribution on the environmental impact categories

The comparison in focus distribution between the SDGs and the Index on the environmental impact categories (EICs) can be seen in *Figure 13* below. Thus, the figure is showing how many percentages of the total connections between the EICs and the SDG targets or the Index questions that are made with one specific EIC, i.e. to what extent a framework focuses on a specific impact category, creating a focus distribution model. The different axes in the radar chart represent the different EICs. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an EIC-axis the focus on that specific EIC is equal within both frameworks. An EIC-axis where the two lines do not meet indicates a difference in focus on that specific EIC.

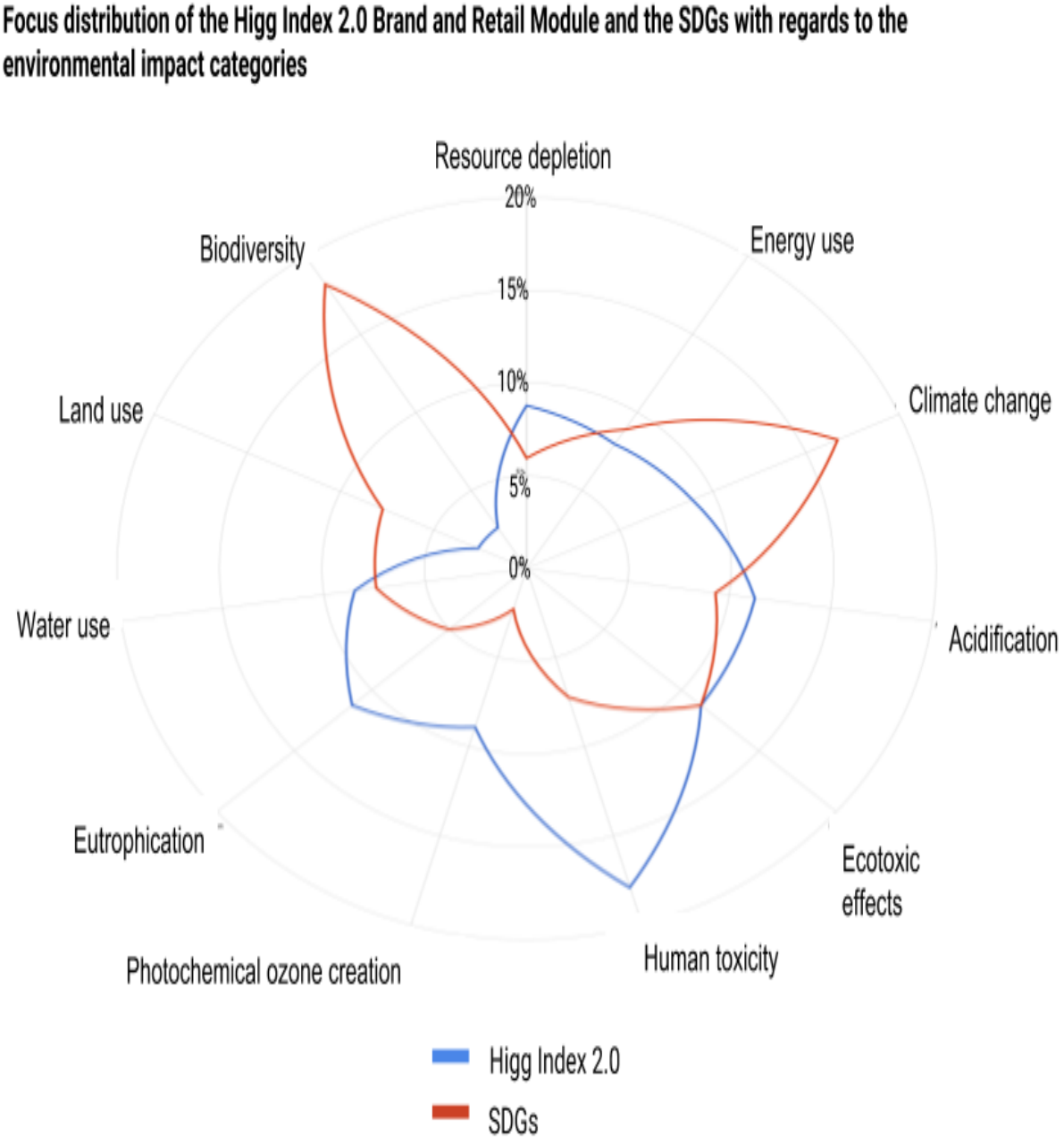

Figure 13: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 Brand and Retail Module on the environmental impact categories. The different axes in the radar chart represent the different EICs. The scale shows how many percentages of the total connections between the EICs and the SDG targets or the Index questions that are made with one specific EIC, i.e. to what extent a framework focuses on a specific impact category. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an EIC-axis the focus on that specific EIC is the same within both frameworks. An EIC-axis where the two lines do not meet indicates a difference in focus on that specific EIC.*

As seen in *Figure 13*, large differences in focus between the frameworks can be found. The SDGs have a larger focus on the EICs Climate change, Biodiversity and Land use than the Index has, since the SDGs focuses to 17% on Climate change, 18% on Biodiversity and 8% on Land use, compared to the Index's focus of 9% on Climate change, 3% on Biodiversity and 3% on Land use. In contrast, the Index puts a larger focus on the EICs Human toxicity , Photochemical ozone creation and Eutrophication than the SDGs do, since the Index focuses to 18% on Human toxicity, 9% on Photochemical ozone creation and 11% on Eutrophication, compared to the SDGs which put 7% focus on Human toxicity, 2% on Photochemical ozone creation and 5% on Eutrophication. There are less differences between the frameworks' focus on the EICs Resource depletion, Acidification and Water use, but also in this case the Index has a larger focus than the SDGs. The SDGs have a slightly larger focus on Energy use than the Index does. Very similar focus is put on the impact category Ecotoxic effects from the two frameworks.

The differences in focus that can be identified between the two frameworks could be used to guide a company on where in the Index that they should use their resources in order to work towards the SDG framework. The results for the EICs show that if a company is aiming to achieve the maximum score in the Higg Index 2.0 Brand and Retail Module they would put the same focus on Ecotoxic effects as the SDGs, i.e. the company would work towards the SDGs referring to Ecotoxic effects with the same focus as the SDGs require. Following this, the company would to some extent work towards SDGs referring to Energy use since the Index puts almost the same focus on this EIC as the SDGs. They would to a minor extent work towards SDGs referring to Climate change, Biodiversity and Land use since all these EICs have received a greater focus from the SDGs. The company would however work to a greater extent than what is stated by the Agenda 2030 with the SDGs referring to Water use, Eutrophication, Human toxicity, Photochemical ozone creation, Acidification and Resource depletion.

The larger focus on the EICs Biodiversity and Land use from the SDG framework can be related to the targets mentioning "protection" and "conservation" of ecosystems and sustainable agricultural management. The smaller focus from the Index could be related to the fact that it is difficult and complicated to establish transparency, and therefore also resourcefulness, all the way upstream in the supply chain to tier 3, which is connected to these EICs. This correlates with what is described by Roos et al. (2015), the Global Fashion Agenda & The Boston Consulting Group (2017) and in the concluding analysis of the impact categories, see *Section 7.3*. As further mentioned by Roos et al. (2015), Biodiversity is a difficult EIC to measure, which could explain the lower focus on this EIC in the Index, as the Index is a measuring tool in contrast to the SDG targets which are goal statements, reflecting a vision rather than a specific way to get there.

Regarding the EIC Climate change the difference in focus between the two frameworks is large. The SDGs have a large focus on this impact category, originating mainly from Goal 13, Climate action, and Goal 7, Clean and affordable energy. This differs from the Index, where Climate change has not been given extra notice compared to for example Photochemical ozone creation or Energy use. However, as stated by Ellen MacArthur Foundation (2017)

and by Roos & Sandin (2017), the fashion industry will have to decrease their green house gas emissions for the world to reach the 2°C target. The smaller focus on Climate change from the Index compared to from the SDGs does therefore contradict the importance and responsibility that the fashion industry has with regards to the climate change issue.

The Index puts a larger focus on chemical EICs, especially Human toxicity, than the SDGs do. This reflects the previous argumentation in *Section 8.1.1* that the Index has a large focus on human health and chemical management. Furthermore, the Index targets the fashion industry while as the SDGs have an overall systemic perspective as described by UN (2015) and should be universally applicable to nations, businesses and civil society. The Index could contrary to the SDGs be described to be more "hands on", targeting more measurable EICs. Furthermore, according to the concluding analysis in *Section 7.3*, the chemical EICs are connected to tier 1 and 2, where fashion companies have more control and insight, especially with the help of legislation such as REACH and the Biocidal Products Directive. Thus the larger focus on chemical EICs from the Index than from the SDGs could originate from the fact that the Index is more industry specific, but also that the regulation, knowledge and control over chemical pollution EICs are greater and more extensive than over other EICs.

Another EIC that has received a larger focus from the Index than from the SDGs is Resource depletion. Within the SDG framework this focus mainly originates from Goal 12, Responsible consumption and production, and Goal 9, Industry innovation and infrastructure, thus reflecting the areas where business and the developed world might have more responsibility. As mentioned by UN (2015), Agenda 2030 and the SDGs have a larger focus on the developing world. Therefore this smaller focus on Resource depletion, in comparison to the Index, is perhaps not surprising. Furthermore, as mentioned before, the Index puts no distinct focus on Resource depletion compared to other EICs. The slightly larger focus on this EIC in comparison to the SDGs' focus might be related to the fact that raw material resource efficiency is an important sustainability challenge for the fashion industry and the Index is an industry specific tool while the SDGs are global and should include all types of sectors.

8.3.2 Comparison: Focus distribution on the social impact categories, stakeholder perspective

The comparison in focus distribution between the SDGs and the Index on the social impact categories (SICs) with a stakeholder perspective can be seen in *Figure 14* below. Thus, the figure is showing how many percentages of the total connections between the stakeholders and the SDG targets or the Index questions that are made with one specific stakeholder, i.e. to what extent a framework focuses on a specific stakeholder, creating a focus distribution model. The scale shows the focus in percentage. The different axes in the radar chart represent the different SIC stakeholders; Worker, Consumer, Local community, Society and Value chain actors. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on a SIC stakeholder axis the focus on that specific SIC stakeholder is equal within both frameworks. An SIC stakeholder axis where the two lines do not meet indicates a difference in focus on that specific SIC stakeholder. The results for the focus distribution on the SICs within each stakeholder are shown in *Figure 15 - 19* and analysed separately.

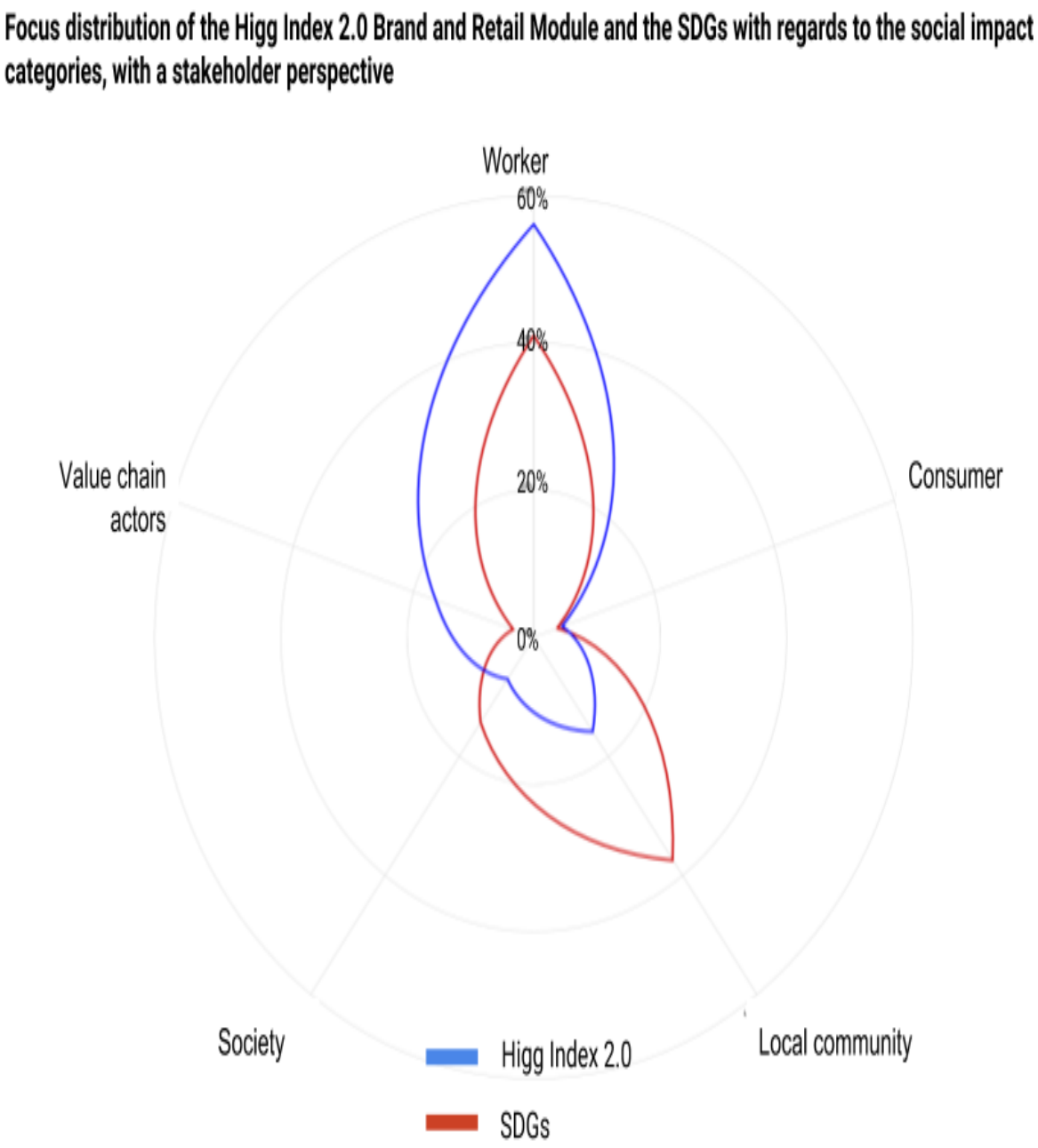

Figure 14: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 on the stakeholders for the social impact categories. The different axes in the radar chart represent the different stakeholders. The scale shows how many percentages of the total connections between the stakeholders and the SDG targets or the Index questions that are made with one specific stakeholder, i.e. to what extent a framework focuses on a specific stakeholder. The red line refers to the SDGs and the blue line to the Higg Index 2.0. Where the lines meet on a stakeholder-axis the focus on that specific stakeholder is the same within both frameworks. A stakeholder-axis where the two lines do not meet indicates a difference in focus on that specific stakeholder.*

As seen in *Figure 14*, there are large differences in focus between the frameworks. The SDGs put a significantly larger focus on the stakeholder Local community than the Index does, since the SDGs puts 37% of their focus on this stakeholder in comparison to the Index's focus of 16%. The Index is however somewhat more focusing on the stakeholder Worker than the SDGs, since the Index puts 56% of its focus on this stakeholder compared to the SDGs' focus of 41%. Overall, the two stakeholders previously mentioned are the ones which both the SDGs and the Index have as their main focus. Consumer has a small, and almost equal, focus from both frameworks, 4% from the SDGs and 5% from the Index. The SDGs focus partially on the stakeholder Society, with 14% and the Index in turn focuses partially on Value chain actors, with 16% of their total focus.

The differences in focus that can be identified between the two frameworks could be used to guide a company on where in the Index that they should use their resources in order to work towards the SDG framework. The results for the SIC stakeholders show that if a company is aiming to achieve the maximum score in the Higg Index 2.0 Brand and Retail Module they would put the same focus on the stakeholder Consumer as the SDGs, i.e. the company would work towards the SDGs referring to the SICs within the stakeholder Consumer with the same focus as the SDGs require. Following this, the company would to a minor extent work towards SDGs referring to the SICs within the stakeholders Local community and Society. The company would however work to a greater extent than what is stated by the Agenda 2030 with the SDGs referring to the SICs within the stakeholders Worker and Value chain actors. There are differences present between the SICs within each stakeholder, these are presented in sections below.

The difference in focus on the different stakeholders could be explained by the aim and the recipient of the different frameworks. Following up on the analysis made in *Section 8.1* and *Section 8.2*, the SDGs have a systemic approach that targets nations, civil society and the private sector which could explain the large focus that is put on the stakeholder Local community and on the stakeholder Society. These two stakeholders are both acting on a higher systemic and holistic "level" than for example the stakeholder Worker. This while as the Index targets the fashion industry and aims to measure a company's sustainability work and efforts, meaning a fashion company's direct impact through its activities in the supply chain, and has therefore put their largest focus on the stakeholder Worker. As stated by Malan (2016) it is through the day-to-day activities that companies should work to create efficient sustainability impacts, thus the large focus that the Index put on the stakeholder Worker could be related to how businesses should take on their sustainability responsibility. That the Index priorities the Worker therefore reflects Malan's (2016) notion. Although, as may be seen in *Figure 14*, the SDGs are also targeting the stakeholder Worker as a stakeholder with large focus. This could be explained, as mentioned before in *Section 8.1*, by the large focus on every individual's equal rights and opportunities. The fact that this SIC stands out with its large focus has been analysed before in previously mentioned section and may be seen in *Figure 15*.

Worker

Figure 15 shows the focus distribution of the SDGs and the Index on the SICs within the stakeholder Worker.

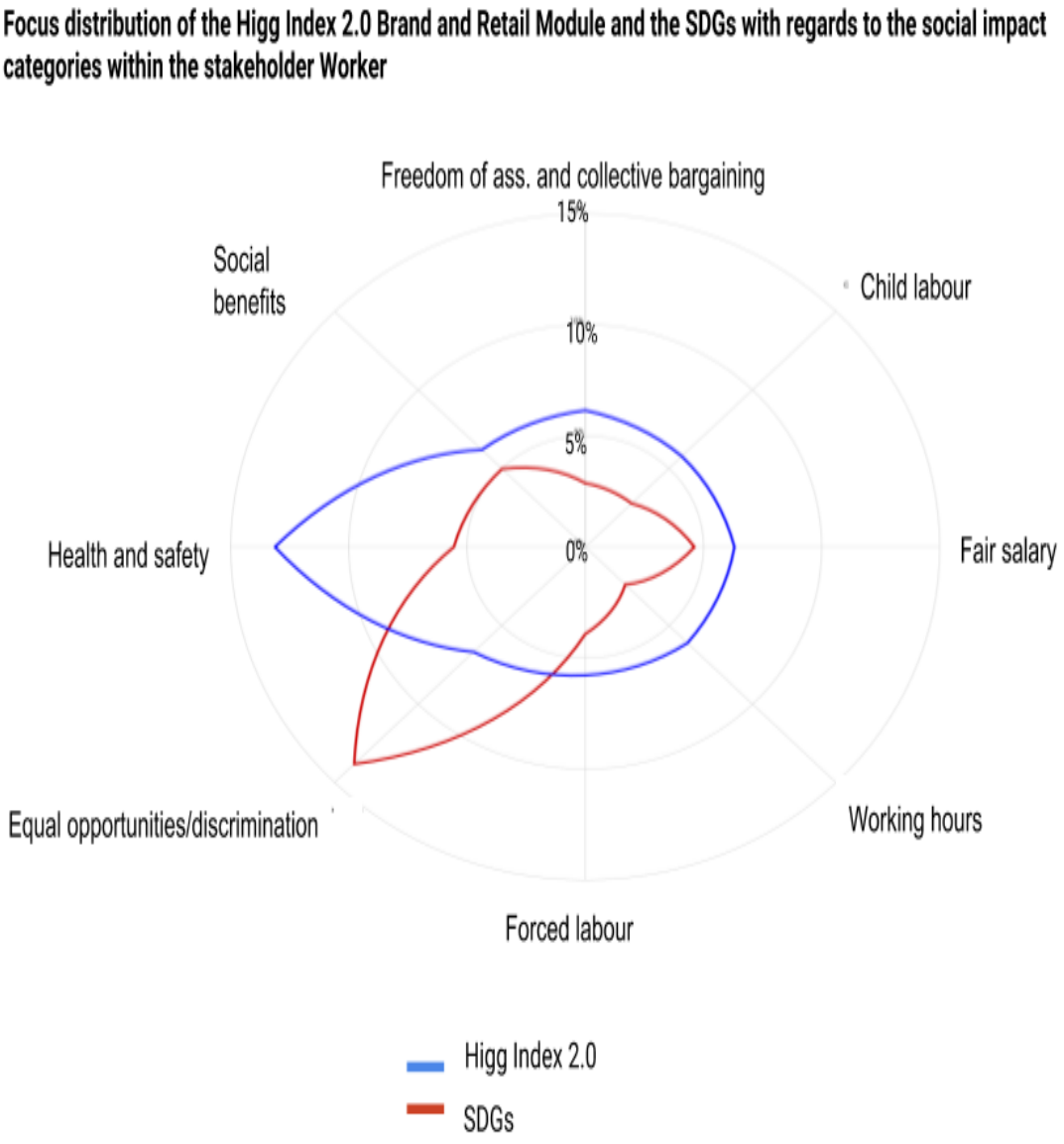

Figure 15: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 on the social impact categories for the stakeholder Worker. The different axes in the radar chart represent the different SICs. The scale shows how many percentages of the total connections between the SICs and the SDG targets or the Index questions that are made with one specific SIC, i.e. to what extent a framework focuses on a specific impact category. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an SIC-axis the focus on that specific SIC is the same within both frameworks. An SIC-axis where the two lines do not meet indicates a difference in focus on that specific SIC.*

As can be seen in *Figure 15*, overall, the Index has a larger focus on all categories except Equal opportunities/discrimination, as the SDGs put 14% of their total SIC focus on this category in comparison to the Index which puts 7% of their total SIC focus on this SIC. The Index however has an especially large focus on Health and safety, 13% of the total SIC focus is put on this SIC. The SDGs only put 6% of their total SIC focus on Health and safety. As analysed in *Section 8.1.2* the SDGs have a larger focus on Equal opportunities which can be explained by the scope of the category itself: 13 of 17 SDGs are represented in this impact category since one of the aims of the SDGs is to work for a more inclusive and egalitarian world. This can be seen more specifically in the phrasing of the targets which often uses words such as "access of... to all..", "equal rights to.." and "equal access to..". In the Index, Equal opportunities has as large focus as other impact categories such as Forced labour, Working hours, Child labour, Freedom of association and Social benefits. Thus, it is not to say that the Index "forgets" this impact category although it does not receive as large focus from the Index as from the SDGs.

The Index puts a lot of focus on the SIC Health and safety. This SIC covers a severe issue in the industry which fashion companies are continuously questioned about by for example media, as mentioned in *Chapter 3*. It includes for example chemical management, pollution prevention and access to safe and healthy workplaces, which results in many connections to this EIC with both the environmental and social/labour module of the Index. As the Index is a more industry specific framework than the SDGs this large focus on Health and safety from the Index is not a surprising notion. Furthermore, as analysed in *Section 8.2.1* the Index is often targeting tier 1 and 2, where most of the health issues for workers are present. This might also explain why the Index has an overall larger focus on the stakeholder Worker than the SDGs have.

Local community

Figure 16 shows the focus distribution of the SDGs and the Index on the SICs within the stakeholder Local community.

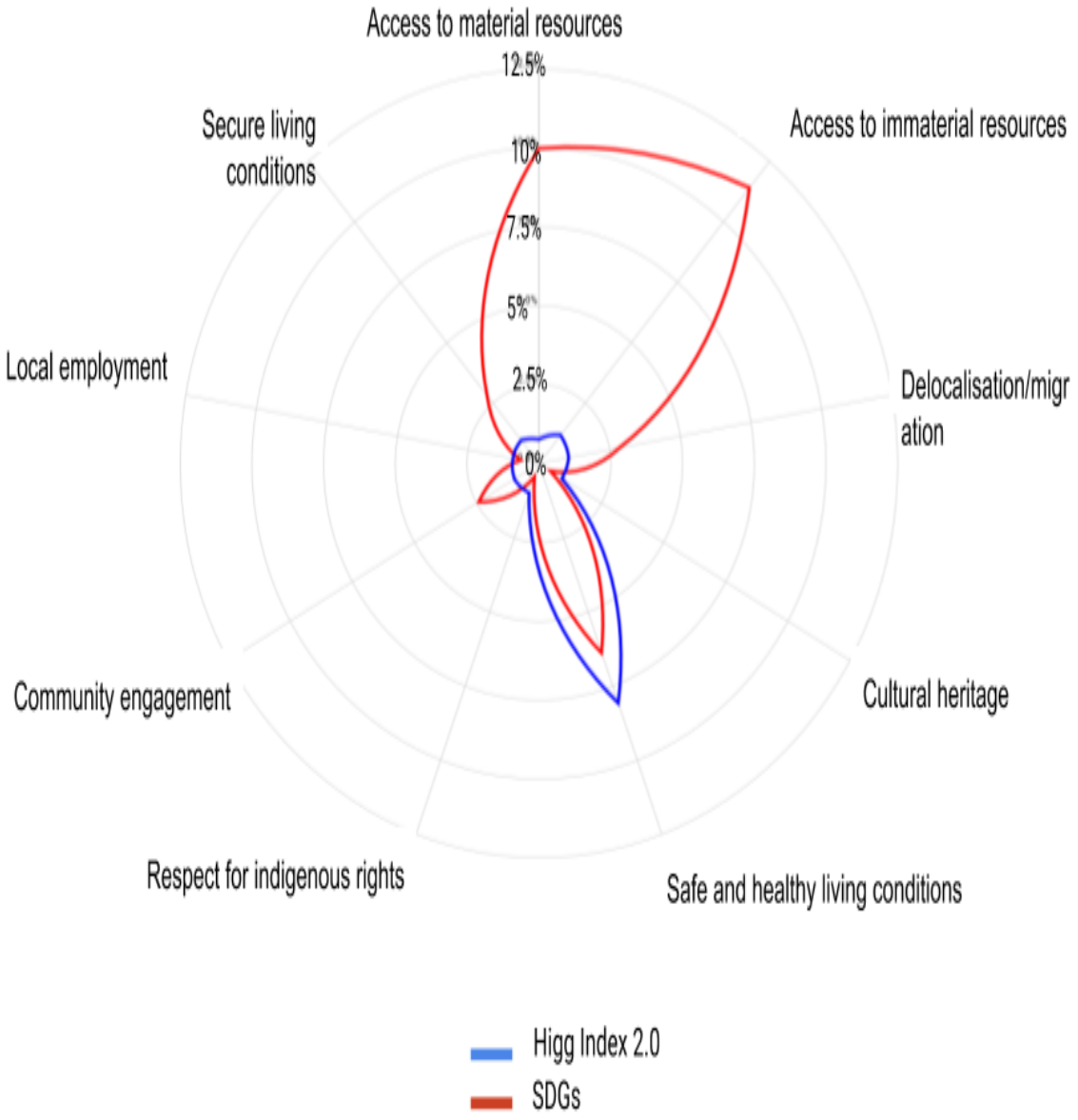

Figure 16: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 Brand and Retail Module on the social impact categories for the stakeholder Local community. The different axes in the radar chart represent the different SICs. The scale shows how many percentages of the total connections between the SICs and the SDG targets or the Index questions that are made with one specific SIC, i.e. to what extent a framework focuses on a specific impact category. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an SIC-axis the focus on that specific SIC is the same within both frameworks. An SIC-axis where the two lines do not meet indicates a difference in focus on that specific SIC.*

As can be seen in *Figure 16* the largest difference between the Index and the SDGs are for the two SICs Access to immaterial resources and Access to material resources where the SDGs have a much larger focus than the Index. The SDGs put 10% of its total SIC focus on Access to material resources and 11% on Access to immaterial resources in comparison to the Index which puts 1% of its total SIC focus on each category. As mentioned in the Worker analysis many of the targets in the SDGs have phrasings which give direct connections between the targets and these two SICs. The result is therefore not surprising as the aim, as discussed in *Section 8.1.2*, is to give all people in both developed and undeveloped countries equal access to resources of different kinds.

The remaining SICs have received approximately the same focus from the two frameworks but with some small differences. The SIC Safe and healthy living conditions has received a larger focus from the Index than from the SDGs but the difference is not significant. As analysed in *Section 8.2.2* this difference could be explained by the large amount of questions in the Index regarding chemical management. The same small difference between the frameworks applies to the SIC Community engagement where the SDGs have a larger focus than the Index. As analysed in *Section 8.1.2*, this could be a result of the holistic approach from the SDGs where the community is an important part in building a more sustainable society and world. The smaller focus on Community engagement from the Index could be related to what Camilleri (2017) states, that the CSR work within fashion companies has shifted from philanthropy to a company's direct activities.

Value chain actors

Figure 17 shows the focus distribution of the SDGs and the Index on the SICs within the stakeholder Value chain actor.

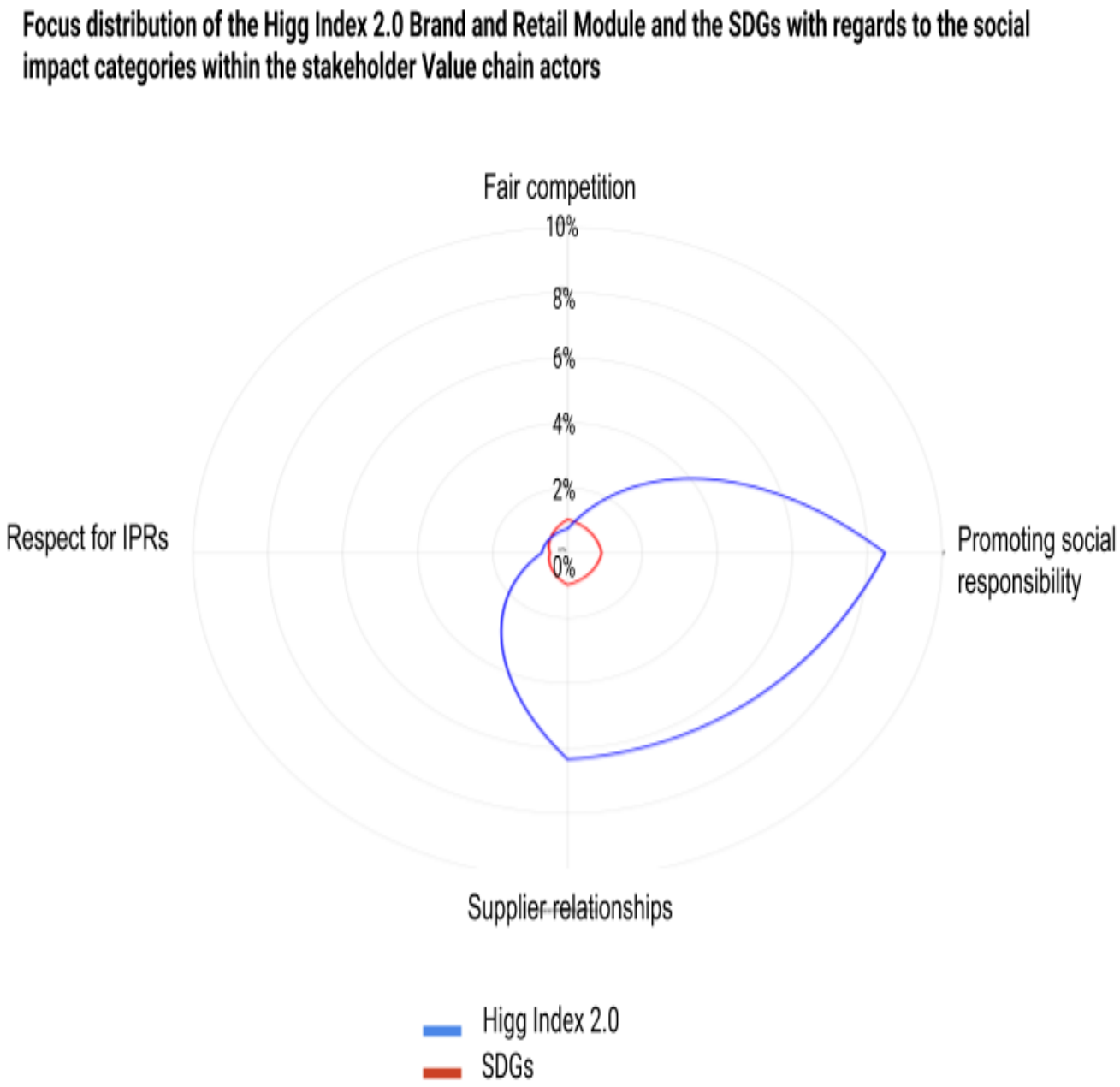

Figure 17: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 Brand and Retail Module on the social impact categories for the stakeholder Value chain actors. The different axes in the radar chart represent the different SICs. The scale shows how many percentage of the total connections between the SICs and the SDG targets or the Index questions that are made with one specific SIC, i.e. to what extent a framework focuses on a specific impact category. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an SIC-axis the focus on that specific SIC is the same within both frameworks. An SIC-axis where the two lines do not meet indicates a difference in focus on that specific SIC.*

In relation to the other stakeholders, see *Figure 14*, the stakeholder Value chain actors has not received a large focus from neither the SDGs nor the Index. However, the Index puts a larger focus on this stakeholder than the SDGs: the Index focuses to 8% on Promoting social responsibility and 6% on Supplier relationships. The SDGs however, put a focus of around 1% on all SICs within the stakeholder Value chain actor.

The large difference between the focus from the two frameworks regarding the two SICs Supplier relationships and Promoting social responsibility could be explained by the fact that the Index has companies, i.e. Value chain actors, as their recipient while as the SDGs have companies, nations and organisations of different kinds. However, the small focus from the SDGs on these SICs contradicts what UNEP/SETAC (2013) says about the importance of promoting social responsibility and creating good supplier relationships as a way to communicate and increase the knowledge and motivation to work together in the entire supply chain for enhanced sustainability. Agenda 2030 and the SDG targets developed countries and the private sector as one of the main solutions to achieving the SDGs, as mentioned in *Chapter 5*. Also mentioned in this section is that Goal 12, Sustainable consumption and production, is one of the main goals covering developed countries and the private sector. *Figure 10* shows that Goal 12 is represented in 3 out of 4 of the Value chain actors SICs. However, only to a small extent as only a few targets in Goal 12 have received a connection with the SICs Supplier relationships and Promoting social responsibility. Furthermore, UN (2015) uses words such as "collaboration" and "partnerships", which could be expected to reflect in these SICs. The SDGs' small focus on the SICs Supplier relationships and Promoting social responsibility could thus seem contradicting to the objectives of the SDGs.

Consumer

Figure 18 shows the focus distribution of the SDGs and the Index on the SICs within the stakeholder Consumer.

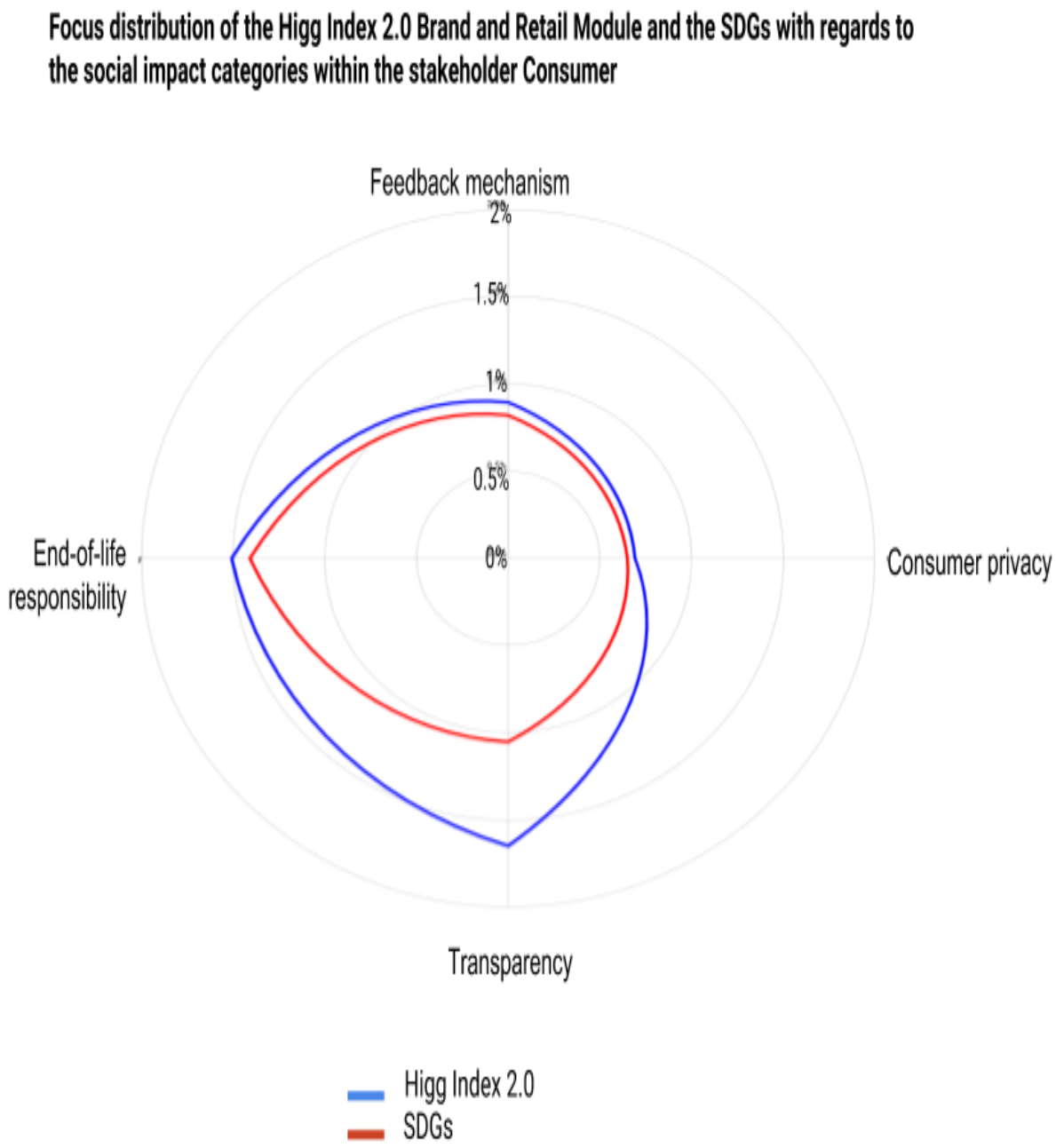

Figure 18: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 Brand and Retail Module on the social impact categories for the stakeholder Consumer. The different axes in the radar chart represent the different SICs. The scale shows how many percentages of the total connections between the SICs and the SDG targets or the Index questions that are made with one specific SIC, i.e. to what extent a framework focuses on a specific impact category. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an SIC-axis the focus on that specific SIC is the same within both frameworks. An SIC-axis where the two lines do not meet indicates a difference in focus on that specific SIC.*

As can be seen in *Figure 14* the focus from the two frameworks is approximately the same for the SICs within the stakeholder Consumer. In relation to the other stakeholders, a very small focus is put on the stakeholder Consumer. Looking at *Figure 18* it can be seen that there are some smaller differences between the different SICs. The Index puts a bit more focus on Transparency towards consumers than the SDGs does, since the Index focus on Transparency is 2% and the corresponding focus of the SDGs is 1%. Transparency is highlighted as an important aspect of sustainability by the Global Fashion Agenda & The Boston Consulting Group (2017). UNEP/SETAC (2013) agrees with this statement and notes that transparency towards consumers is a necessity in order for the consumers to make informed and conscious choices. This is mirrored in the positive trend where consumers have started to consume more sustainable according to their values (SBI 2018). The low focus on transparency from both frameworks is therefore not reflected in the statements of the high importance of transparency.

The focus on the remaining SICs are almost exactly the same from the two frameworks. This aligned picture of how much focus that should be put on these SICs could be explained by the low focus overall on consumers in both frameworks. Within the Index there is no special section for consumers as there is for internal employees and partners in the value chain. Although, there is some focus in the last section on the social/labour submodule that covers transparency and public disclosure, see *Table 2* and some questions in the environmental submodule that also have received a connection with these SICs. Regarding the SDGs, the explanation to why consumers have received a small focus could be that the focus from the SDGs is not on individuals or developed countries but rather on systemic structural issues such as poverty and equality, although they have targeted developed countries as an important success factor to achieve the SDGs.

Society

Figure 19 shows the focus distribution of the SDGs and the Index on the SICs within the stakeholder Society.

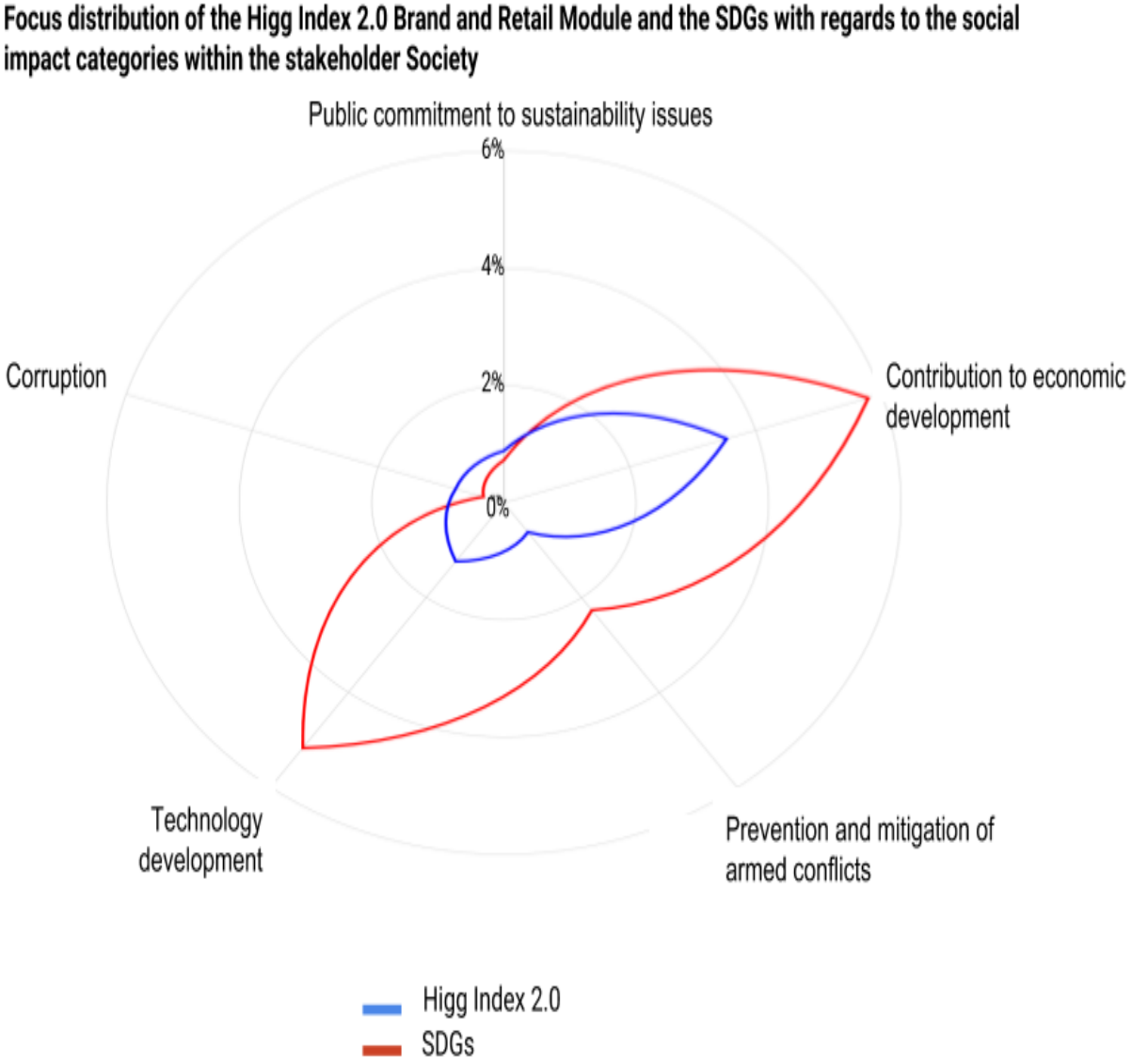

Figure 19: *The comparison in focus distribution between the SDGs and the Higg Index 2.0 Brand and Retail Module on the social impact categories for the stakeholder Society. The different axes in the radar chart represent the different SICs. The scale shows how many percentages of the total connections between the SICs and the SDG targets or the Index questions that are made with one specific SIC, i.e. to what extent a framework focuses on a specific impact category. The red line refers to the SDGs and the blue line to the Index. Where the lines meet on an SIC-axis the focus on that specific SIC is the same within both frameworks. An SIC-axis where the two lines do not meet indicates a difference in focus on that specific SIC.*

The stakeholder Society has as mentioned before received a larger focus from the SDGs than from the Index, which can be seen in *Figure 14*. The SICs with the largest focus within this stakeholder is Technology development and Contribution to economic development. The

focus from the SDGs on Technology development is 5% and on Contribution to economic development 6%. The Index's focus on Technology development is 1% and on Contribution to economic growth it is 4%. That these two SICs have received the largest focus can be related to the fact that the fashion industry is growing very fast and will continue to do so, as stated by both McKinsey (2017) and Ellen MacArthur Foundation (2017). However, the question is if the industry will contribute to sustainable growth, i.e. decoupling increasing monetary profit with environmental and social degradation. Both Scheyvens et al. (2016) and Malan (2016) state that it is important for companies to have a profitable business case to motivate investment in sustainable practices and hence contribute to technology development. Both Contribution to economic development and Technology development are seen as very important tools for the development agenda, both for social challenges such as poverty alleviation and environmental innovation such as renewable energy systems for decreasing carbon emissions. The larger focus from the SDGs is therefore reflected in the importance of these two SICs in order to develop a more sustainable sector. However, the SDGs' focus on the stakeholder Society in comparison stakeholders is relatively small and thus does not reflect the above mentioned importance of the two SICs Contribution to economic development and Technology development.

However, as Scheyvens et al. (2016) argues, it may be hard for a company to have economic development and be innovative, i.e. create technological development, and at the same time regulate themselves with policies. To be able to achieve sustainable practices it is according to Karlsson (2015) and Ellen MacArthur Foundation (2017) important to have a streamlined and harmonized system for the whole sector. The SDGs have been criticised for their take on how to regulate, or rather not regulate, business and the smaller focus on the SICs Public commitment to sustainability issues and Corruption from the SDGs could be related to this non regulatory approach. Corruption has also been given a rather small focus from the Index, although it is larger than the SDGs' focus on this SIC. This result corresponds well with the fact that both frameworks have been criticised for not including anti-corruption, as is mentioned by Spangenberg (2016) and by Gardetti (2015), who compared the UN Global compact with the Higg Index in 2015. As described by Global Fashion Agenda & The Boston Consulting Group (2017), corruption has been identified in tier 1 and 2 in the fashion supply chain and is identified as a very important SIC by the UN Global Compact (2016). This smaller focus on "limiting" and "regulating" SICs, such as Corruption and Public commitment to sustainability issues, compared to the larger focus on the SICs Contribution to economic development and Technology development could be related to what Scheyvens et al. (2016) states regarding the private sector as a development agent through innovation and creativity, rather than through self regulation. The responsibility of business regulation for enhanced sustainability is instead argued to belong to nations.

9 Case study: GANT

The case study is an application of the developed focus distribution model on GANT, a global fashion company based in Stockholm, Sweden. The aim of the case study is to see how a company could use the focus distribution model to strategically work and use their resources for different environmental and social sustainability challenges in order to align their sustainability work with the SDGs.

GANT is an American lifestyle brand mainly working with cotton fabrics. They started in 1949 in the US. Since the beginning, quality shirts have been their flagship fashion product. Today, the product range has increased to all types of apparel, as well as shoes, accessories and home interior (GANT 2018).

GANT has set up five SDGs that they prioritise in their sustainability work (GANT 2018). To them it is valuable to see if the Index could be a useful management system to achieve these prioritised goals. The prioritised SDGs are listed in *Table 7* below. The case study will thus aim to get an understanding of how the model seen in *Section 8.3* can be used to show how a fashion company can use the Higg Index 2.0 Brand and Retail Module strategically in their work towards the Sustainable Development Goals (SDGs).

Table 7: *The SDGs targeted as focus areas by GANT.*

SDG	
4	Quality education
6	Clean water and sanitation
12	Responsible consumption and production
14	Life below water
17	Partnerships for the goals

From these prioritised SDGs, the thesis will exemplify how the Higg Index 2.0 Brand and Retail Module could be used to work towards Goal 4, Quality Education, Goal 6, Clean water and sanitation and Goal 14, Life below water since these SDGs are very closely connected to the GANT values. For example, GANT seeks to integrate education into all its activities and this is clearly showed in their credo "Never stop learning". Furthermore, Goal 6 and 14 are prioritised by GANT since they both target the challenge of sustainable water management. Water is an important aspect for GANT because of its heritage within wellness and sports. This is shown in for example their membership in Better Cotton Initiative (BCI), Swerea and their collaboration with the organisation Water Keeper Alliance (GANT 2018). BCI aims to ensure that cotton cultivation is done in a sustainable way, both for people and the environment (Better Cotton Initiative 2016). Swerea is a leading Swedish research group in industrial innovation and sustainable development (Swerea 2018). They provide GANT with insight on how to manage their chemicals in a way that minimise the impact on water bodies (GANT 2018). Waterkeeper Alliance aims to ensure clean water sources for fishing, drinking and swimming. They are the largest nonprofit organisation working with the issue of water pollution (Waterkeeper Alliance 2018).

9.1 Results and analysis

The result of the case study can be seen in *Table 8* for the environmental impact categories (EICs) and in *Table 9* for the social impact categories (SICs), with a stakeholder perspective.

The result and analysis of the case study aim to show how the focus distribution model can be used when working strategically towards GANT's prioritised SDGs. This by answering the following four questions with regards to GANT's application of the focus distribution model:

- According to GANT's application of the focus distribution model, does GANT by using the Index today put the same or larger focus than the SDGs on a specific impact category?
- According to GANT's application of the focus distribution model, does GANT have potential to increase their focus within the Index on a specific impact category?
- According to the focus distribution model, is it possible for a fashion company to achieve the same focus as the SDGs on a specific impact category by using the Index?
- According to the focus distribution model, is it possible and are there incentives for GANT to use the Index as a tool to work towards the SDGs for a specific impact category?

The case study is a test of the thesis theoretical framework, i.e. the focus distribution model, in practice, i.e. on GANT. It is important to note that the results show a status analysis of GANT's application of the focus distribution model and is thus an interpretation of GANT's answers to the Index questions by the authors. This interpretation is not verifiable as of now, as GANT's answers to the Index questions, and GANT's benchmarking score, are not allowed to be made public as they first need to be validated by SAC. As of now, no company is officially validated since this process is yet to be established and implemented by SAC (SAC 2018d)

9.1.1 GANT's application of the focus distribution model on the environmental impact categories

The results of GANT's application of the focus distribution model on the environmental impact categories (EICs) can be seen in *Table 8*.

Table 8: *Result from the case study at GANT with regards to the environmental impact categories, describing how GANT can use the focus distribution model to see where the Index gives possibilities and incentives to work towards the SDGs.*

Environmental impact category	According to GANT's application of the focus distribution model, does GANT by using the Index today put the same or larger focus than the SDGs on a specific impact category?	According to GANT's application of the focus distribution model, does GANT have potential to increase their focus within the Index on a specific impact category?	According to the focus distribution model, is it possible for a fashion company to achieve the same focus as the SDGs on a specific impact category by using the Index?	According to the focus distribution model, is it possible and are there incentives for GANT to use the Index as a tool to work towards the SDGs for a specific impact category?
Resource depletion	No	Yes	Yes	Yes
Energy use	No	Yes	No	Not possible
Climate change	No	Yes	No	Not possible
Acidification	No	Yes	Yes	Yes
Ecotoxic effects	No	Yes	Yes	Yes
Human toxicity	Very close to the SDGs' focus	Yes	Yes	Yes, but very low incentives
Photochemical ozone creation	Yes	Yes	Yes	No incentives
Eutrophication	No	Yes	Yes	Yes
Water use	No	Yes	Yes	Yes
Land use	No	Yes	No	Not possible
Biodiversity	No	Yes	No	Not possible

As can be seen in *Table 8* there are differences between GANT's application of the focus distribution model and the SDGs' focus on many EICs. For example, the SDG focus on Resource depletion, Climate change, almost all chemical pollution EICs, Water use, Biodiversity and Land use is greater than that of GANT's focus distribution model application. By using the Index today, GANT would however put the same focus on the EIC Photochemical ozone creation and a somewhat similar focus on Human toxicity as the SDGs do. The Index give GANT the potential to increase their focus on all EICs. However, the model showed that the Index lack the same higher focus on the EICs Climate change, Biodiversity and Energy use as the SDGs have. Thus, GANT's focus distribution model application show that from

a SDG perspective, the Index give GANT the possibility and the incentives to work towards Resource depletion, Acidification, Ecotoxic effects, Human toxicity, Eutrophication and Water use in order to enhance their work towards the SDGs.

The EICs connections to the SDGs can be seen in *Figure 20* below. This result is not GANT specific but could be used by GANT to analyse which impact categories that should be targeted in order to work towards their prioritised SDGs. The x-axis represent the 17 different SDGs and the y-axis the points received from the connections. The labels and different colours represent the 11 different EICs.

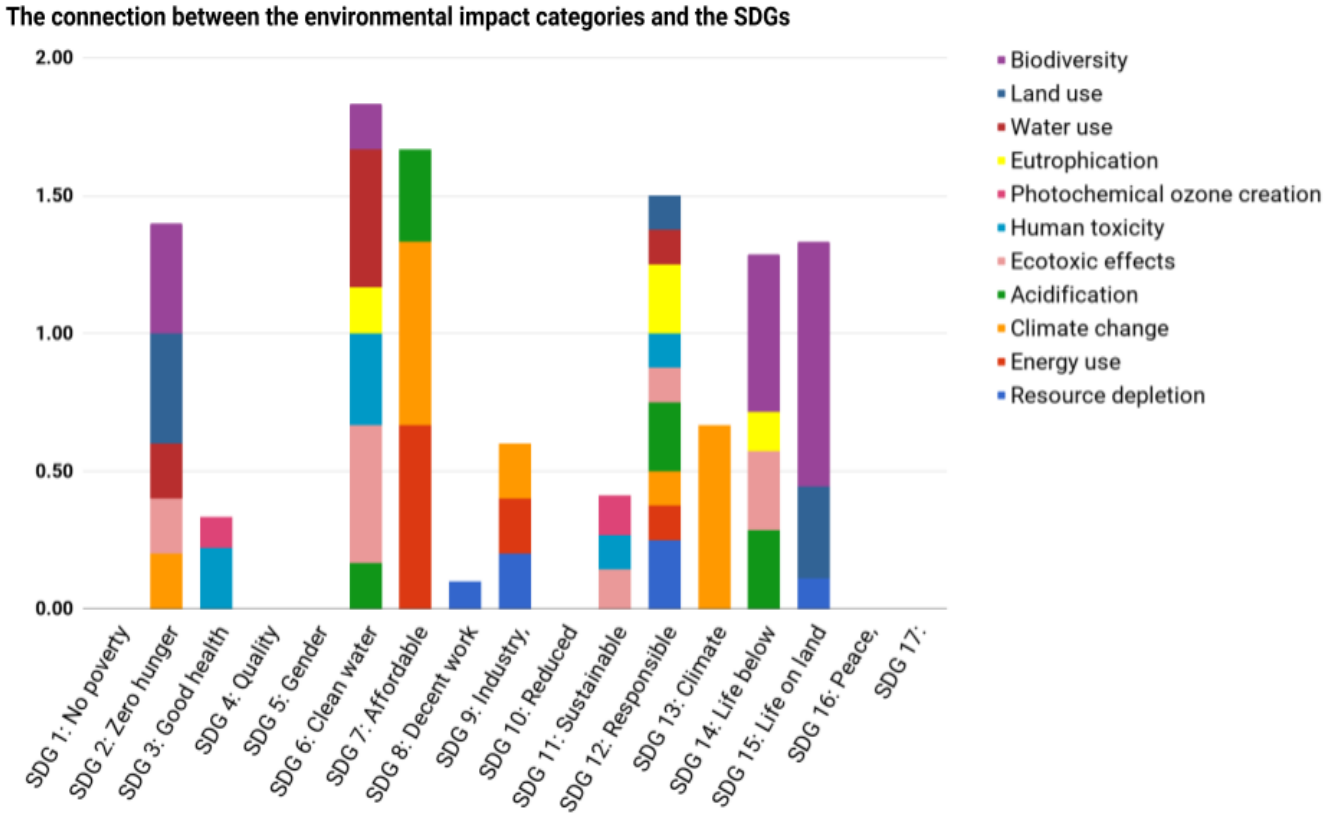

Figure 20: *The identified connections between the environmental impact categories and the SDG targets. The 17 SDGs are shown on the x-axis and the y-axis shows the points received based on the connections made between the SDG targets and the EICs. The different colours represent the 11 EICs and show which impact categories that received connections with which SDGs.*

As can be seen in *Figure 20* the exemplified GANT targeted SDGs can be related to many different EICs. The exception is Goal 4, Quality education, which received zero connections with the EICs. Goal 6, Clean water and sanitation, can be related to six EICs: Acidification (dark green), Ecotoxic effects (light purple), Human toxicity (light blue), Eutrophication (light green), Water use (dark red) and Biodiversity (dark purple). Thus, by working towards all these EICs, GANT would also be working towards Goal 6. Goal 14, Life below water, is

represented in four EICs: Acidification (dark green), Ecotoxic effects (light purple), Eutrophication (light green) and Biodiversity (purple). As stated earlier in *Table 8*, the Index give GANT the incentive and the possibility to work towards all these EICs except Biodiversity. Hence, the Index can be used to work strategically towards Goal 6 and Goal 14 by targeting questions that are connected to Acidification, Ecotoxic effects, Human toxicity, Eutrophication and Water use. However, for the EIC Biodiversity there is a need for complementary systems or tools to target this issue. It is especially important to be aware of this with regards to Goal 14, Life below water, as Biodiversity is highly represented in this SDG, see *Figure 20*.

The results in *Table 8* showed that in GANT's application of the focus distribution model GANT puts the same focus on the EIC Photochemical ozone creation and partly also on the EIC Human toxicity as the SDGs do. From *Figure 20* it can be seen that Photochemical ozone creation is to some extent present in Goal 3, Good health and well-being, as well as in Goal 11, Sustainable cities and communities. Human toxicity is to some extent present in Goal 3, Good health and well being, Goal 6 Clean water and sanitation, Goal 11, Sustainable cities and communities and Goal 12, Responsible production and consumption. It can also be seen that Goal 3 has only received connections with these two EICs, Photochemical ozone creation and Human toxicity. This shows that, from an environmental point of view, the focus distribution model hence shows that by using the Index GANT would today focus on Goal 3 to the extent that the Agenda 2030 requires. Thus, this means that according to the focus distribution model GANT does not have to put any more focus on Goal 3 from an environmental point of view.

9.1.2 GANT's application of the focus distribution model on the social impact categories

The results of GANT's application of the focus distribution model on the social impact categories, with a stakeholder perspective, can be seen in *Table 9*.

Table 9: *Result from the case study at GANT with regards to the social impact categories and the stakeholder perspective, describing how GANT can use the focus distribution model to see where the Index gives possibilities and incentives to work towards the SDGs.*

Social impact category, stakeholder perspective	According to GANT's application of the focus distribution model, does GANT by using the Index today put the same or larger focus than the SDGs on a specific stakeholder?	According to the focus distribution model, does GANT have potential to increase their focus within the Index on a specific stakeholder?	According to the focus distribution model, is it possible to achieve the same focus as the SDGs on a specific stakeholder by using the Index?	According to the focus distribution model, is it possible and are there incentives for GANT to use the Index as a tool to work towards the SDGs for a specific stakeholder?
Worker	No	Yes	Yes	Yes
Consumer	No	Yes	Yes	Yes
Local community	No	Yes	No	Not possible
Society	No	Yes	No	Not possible
Value chain actors	Yes	Yes	Yes	No incentives

As can be seen in *Table 9*, GANT's application of the focus distribution model and the SDGs' focus differ on several stakeholders. GANT's focus distribution model application has a smaller focus than the SDGs on the stakeholders Worker, Consumer, Local community and Society, but a larger focus on Value chain actors. This means that by using the Index today GANT would put a larger focus on the stakeholder Value chain actor than the SDGs require. GANT will have the incentive to work towards Value chain actors, as the Index's focus is larger than the focus of GANT's focus distribution model application. This would however not enhance their work towards the SDGs referring to this stakeholder, as GANT's focus on Value chain actors according to the Index is larger than that of the SDGs. Nevertheless, GANT will have the possibility and will be given the incentives by the Index to enhance their work towards the SDGs referring to the stakeholders Worker, Consumer, Local community and Society. However, as mentioned before, a company will always have to use additional tools or systems to be able to put the same focus on the stakeholders Local community and Society as the SDGs do. This as the Index's focus is lower than the SDGs' for these stakeholders. Thus in conclusion, by using the Index today GANT's focus distribution model application show that from a SDG perspective the Index give GANT the incentives

and the possibility to work with the stakeholders Worker and Consumer to enhance their work towards the SDGs.

The SICs connections to the SDGs can be seen in *Figure 21* below. This result is not GANT specific but could be used by GANT to analyse which impact categories that should be targeted in order to work towards their prioritised SDGs. The x-axis represent the 17 different SDGs and the y-axis the points received from from the connections. The labels and different colours represent the 30 different SICs.

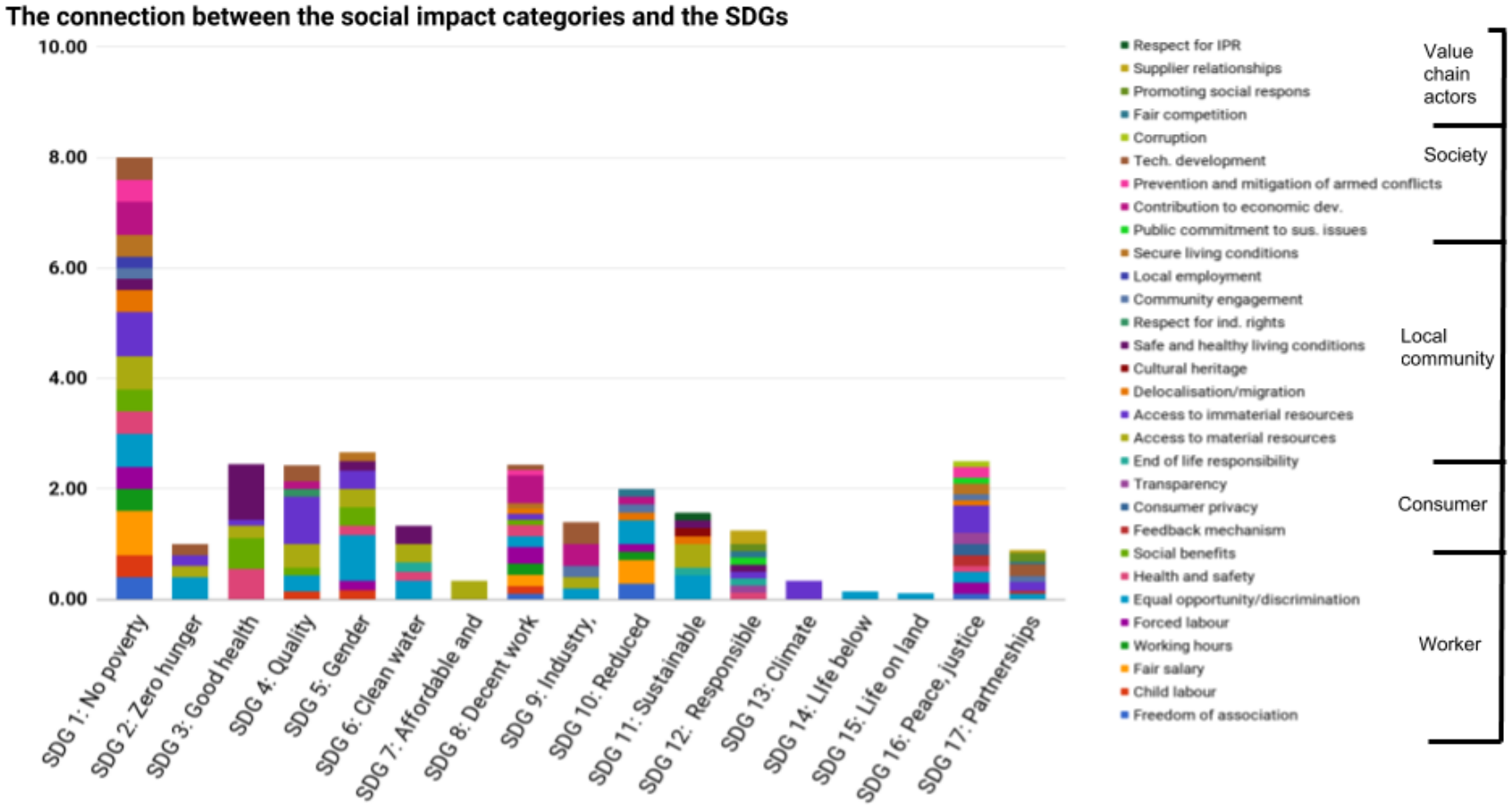

Figure 21: *The identified connections between the social impact categories and the SDG targets. The 17 SDGs are shown on the x-axis and the the y-axis shows the points received based on the connections made between the SDG targets and the SICs. The different colours represent the 30 SICs and show which impact categories that received connections with which SDGs.*

As can be seen in *Figure 21* some of the GANT targeted SDGs are represented in many varying SICs. For example Goal 4, Quality education, is represented in eight SICs: Child labour (bright red), Equal opportunities/discrimination (light blue), Social benefits (medium green), Access to material resources (yellow/green), Access to immaterial resources (dark blue/purple), Respect for indigenous rights (green), Contribution to economic development (dark pink) and Supplier relationships (brown). Goal 6 is represented in five SICs: Equal opportunities/discrimination (light blue), Health and safety (pink), End of life responsibility (turquoise), Access to material resources (yellow/green) and Safe and healthy living conditions (dark purple). Goal 14 is represented in only one SIC, Equal opportunities/discrimination (light blue).

For Goal 4, Quality education, and Goal 6, Clean water and sanitation, the majority of the SICs represented belong either to the stakeholders Society, Local community or Worker. Thus, for GANT to work towards Goal 4 and Goal 6 it is desirable to work towards the stakeholder Local community, Society and Worker. As has been stated in *Table 9*, GANT have the incentives to work towards the stakeholders Local community, Worker and Society. However, the Index does not put as much focus as the SDGs on the stakeholders Local community and Society, stakeholders that are important to focus on to be able to work towards Goal 4 and Goal 6. Therefore the Index might not imply an alignment with these goals. Although, as has been analysed in *Section 7.3* the focus put on the stakeholder Worker might be linked to SICs belonging to Society and/or Local community, creating an outward effect from the individual stakeholder Worker to the community based stakeholder Local community out to the overall stakeholder Society. However, this correlation is not included in the focus distribution model and therefore it can not be concluded that by focusing only on the stakeholder Worker an alignment with Goal 4 or Goal 6 will be reached. Thus, it might be necessary with other complimentary management systems to address these SDGs.

Regarding Goal 14, Life below water, it is not well represented in the social framework. This can be related to what is stated in *Section 7.3*, that Goals that are well represented in the environmental framework have a lower possibility to occur in other EICs or SICs. To reach an alignment with Goal 14 it is therefore important to target a few specific EICs, for example Biodiversity.

10 Discussion

10.1 The fashion industry's relation to life cycle impact categories

It was concluded that almost all the UNEP/SETAC (2009, 2011) life cycle impact categories could be linked to the fashion industry. However, there were some impact categories that did not correlate between UNEP/SETAC and the sector relevant reports. One of them was Animal welfare, which was included in one sector relevant report but not in the UNEP/SETAC framework, although this impact category is an important ethical factor for the fashion industry. The Sustainable Apparel Coalition (SAC) also states that the Higg Index should include this factor in its scope, which does not correspond to what is included in the Higg Index 2.0 Brand and Retail Module. That said, Animal welfare could be included in the other tools or modules. However, that it is not included in the Brand and Retail Module is surprising as it is in this module that the fashion company works with compliance on all other ethical and social concerns. It would be relevant for SAC to investigate how to include Animal welfare in the Index scope until next update of the module.

Animal welfare would however still not be represented in the focus distribution model as UNEP/SETAC and almost no sector relevant report take it into account. As Animal welfare could be seen as an ethical issue it could arguably be included in the social LCA (S-LCA) framework. Perhaps, as the S-LCA framework from UNEP/SETAC is quite immature and universal, sectorial issues such as this might be excluded. This could be regarded as a criticism towards the S-LCA framework which then only take into account ethical aspects in relation to humans. Furthermore, Animal welfare would not necessarily be naturally included in the environmental LCA framework, in for example the environmental impact category (EIC) Biodiversity, as this EIC does not take into account the ethical aspects of animal husbandry. The concern and work within the fashion industry with regards to Animal welfare could therefore be seen to be totally excluded by both the two LCA frameworks and by the Higg Index 2.0 Brand and Retail Module. Possibly there might then be more issues that the UNEP/SETAC framework "forgets" regarding the fashion industry. There might also be SICs that the fashion industry do not affect to a greater extent, which should then be excluded in the model. As the S-LCA framework is quite new, not many studies have been done regarding fashion and all social impact categories (SICs) are still included in these studies and thus deemed relevant. It might therefore be desirable to do further research into which social and ethical aspects that the fashion industry actually affects and to what extent it is done to achieve a more fine tuned focus distribution model.

Another impact category that was included in the study without full correlation between the UNEP/SETAC and the sector relevant reports was the EIC Energy use. The inclusion was motivated by the consistent use of this EIC in the sector relevant reports. Usually in LCA methodology the EIC Energy use is included as a part of the EIC Resource depletion and not as an individual impact category. However, as the sector relevant reports included the EIC Energy use separately as well as that there was a need for taking the raw material use in the fashion industry into account, Resource depletion was used separately for the latter aspects. Hence the EIC Energy use was separated from the EIC Resource depletion and

the two EICs are used with different scopes. Thus, an EIC, Resource depletion, could be "constructed" to take into account an industry specific issue, i.e. recyclability and reuse as measurements for resource efficiency, which can be argued as being a great issue of concern for the industry. Much of the resources otherwise used for production of virgin material could be used for other more urgent needs such as water for drinking and land for cultivation of food. It is therefore noted to be an important factor to take into account on its own when measuring the sustainability of a fashion product and/or brand. This shows that the focus distribution model has been fine tuned to take sector specific aspects into account. However, with a larger number of sector relevant reports and a more mature S-LCA framework, the model could be even more fine tuned.

10.2 The complexity of relating life cycle impact categories to sustainability issues

As has been described, many of the impact categories correlate with each other resulting in indirect effects, i.e. if one impact category improves it may lead to the improvement of another impact category as well. In the Index for example all social impact cateogries (SICs) for the stakeholder Worker have quite similar focus, while the SDGs have a larger focus on Equal opportunities/discrimination. One could argue that by working on all categories it could in the end lead to equal opportunities and less discrimination. For example, a fair salary for all workers could lead to improved opportunities and decreased discrimination. At the same time, by focusing to a greater extent on the SIC Equal opportunities/discrimination, as the SDGs do, there could be great effects on all remaining categories in the Worker stakeholder. That is, equal opportunities and less discrimination may lead to both fair salary, social benefits and less forced labour. This argument on indirect effects shows that even if the two frameworks approach the issue from different perspectives, the result in the end might be similar. The fact that the SDGs put their largest focus on the SIC Equal opportunities/discrimination is also a great example of how the SDGs target the systematic and structural concerns while the Index has a more "hands on" and direct approach to challenges. On that note, the SDGs thus seem to have a more long term approach; to give people equal opportunities and decrease the existence of discrimination does not happen over night, while the Index targets the most visible problems and provides a direct solution. This does not have to mean that one of the frameworks is better than the other, only that they have different approaches to solving problems. The difference in approach could therefore be utilised by companies to manage sustainability with both short- and long term strategies.

Apart from above examples, other cases of connections and indirect effects among the impact categories have been identified. For example, the close connection between Photochemical ozone creation and Climate change has been identified as they sometimes have the same source of origin: transportation. Transportation also affects many other EICs, for example Ecotoxicity, Human toxicity and Acidification. This example is one of many which shows that environmental impact categories often are connected by having the same origin. Many sources of pollution result in various different environmental impacts, thus addressing the origin of an environmental issue might lead to improvements on several environmental challenges. On the contrary, social issues often have many indirect connections. Thus, by working

with one issue other issues will benefit too, as in the examples above with Equal opportunities/discrimination and the other Worker SICs.

To further elaborate on the complexities of the connections between the different impact categories, the method used in this thesis took only direct connections into account when making connections between the impact categories and the two frameworks. This means that the resulting focus distribution model could have looked different if also indirect effects had been taken into account. The world is always more complicated than may be measured by a LCA and especially as the S-LCA framework, still under development, may include many SICs that measure similar aspects. This means that it might be that some of the impact categories that seem to have been "forgotten" by either of the two frameworks actually could be affected, indirectly, by another impact category. However, to investigate all indirect connections between the impact categories in this thesis, would have been very complex and not possible within the scope of the thesis. Also, if the indirect effects would have been included, it would not have showed how the two frameworks actually prioritise between different sustainability challenges. Therefore the choice to only take direct effects into account do the most justice to the focus *intentions* of the two frameworks, even if working with the frameworks may result in improvements that are not covered by the focus distribution model. To actually solve the social and environmental sustainability challenges in the fashion industry, more research has to be made to understand how different impact categories correlate since many challenges are both global and complex and include many different stakeholders. This knowledge could help a company to know where to use its resources to achieve the most beneficial and optimal result in order to strive towards a more sustainable future.

10.3 Differences between the SDGs and the Index

As has been stated before, the resulting difference in focus distribution from the SDGs and of the Index did in some aspects correlate well with what was found in the literature study and in some aspect it did not correspond quite as well. For the environmental impact categories (EICs), the most expected result with regards to the literature study were that the Index did put a large focus on the chemical related EICs as there are many questions regarding chemicals in the Index, as well as the quite large weighting in the Index of sections including these questions. For example, the "Materials" section in the environmental submodule has a weighting of 25% and includes many chemical related questions. It was neither unexpected that there was a difference in focus between the two frameworks regarding the two EICs Land use and Biodiversity, where the SDGs had a large focus while the Index had a very small focus. This could be explained by the place these EICs have in the fashion supply chain, i.e. further away from the fashion companies where it is difficult to achieve transparency and therefore affect these impact categories.

The result that was unexpected with regards to the literature study and to which no obvious explanation could be found is why the Index does not have as large focus on the EIC Climate change as the SDGs do. The SDGs have a larger focus on Climate change than on many of the other EICs whereas the Index has a similar focus on this EIC as on the other EICs. That is, Climate change is not "forgotten" by the Index, but it is not highlighted

with extra focus as it is by the SDGs. Considering the ongoing debate on Climate change where the climate issue is often identified as the largest environmental sustainability challenge of our time, one could argue that it is strange that the Index has not acknowledged this in the same way as the SDGs have. The questions in the Index that target Climate change specifically without mentioning all the other environmental impact categories (EICs) can be found in the section "Transportation", which is weighted to 7.5% and previous reasoning may thus dispute this relatively low weighting. On the other hand, the production of garments is also very climate change affecting and the stage in the life cycle where this occurs is covered by the "Manufacturing" section which has a weighting of 20%. This section however does not target climate change as an especially important aspect in the same way as it targets chemicals. Why this is is difficult to say. For future evaluation and development of the Index this aspect is crucial to account for when working for a sustainable fashion industry.

One aspect that could have affected the Index's smaller focus on Climate change in relation to the SDG focus is legislation. As noted before in the analysis the legislation regarding chemicals are affecting the fashion industry and is therefore something that the industry has been forced to address and work with for some time now. This creates a knowledge base and cooperation between fashion companies and chemical researchers, such as GANT and Swerea in Sweden. Therefore the capacity to address these issues might be larger than to address the challenge of Climate change, even though it is a crucial aspect to work with in order to strive towards a more sustainable fashion industry. The industry's relative contribution to Climate change is today quite small in comparison to other sectors as for example food and transportation, but is still not an issue to take lightly when talking about sustainable fashion. To work with sustainability can be argued to be to make longsighted decisions. The fashion industry's relative contribution to climate change in the future will be considerably larger than today's if the industry continues with business as usual. To not address climate change today would therefore notably lead to higher costs in the future, where the fashion industry might not just need to decrease their green house gas emissions but also make investments in more drastic technologies such as carbon capture methods.

Regarding the issue of inefficient raw material use within the fashion industry and the EIC Resource depletion, the Index does put a larger focus on this concern than the SDGs do. It could be related to the fact that raw material depletion is a crucial aspect for the industry to create circular flows of textile materials and thus enhance the overall sustainability. However, the sections in the Index referring to this are "Product care & repair" and "End-of-use", which are weighted to 15% and 10% each. These are quite high weightings, but the "Materials" and "Manufacturing" sections outweighs these sections with 25% and 20% each. SAC has influential members in the fast fashion section of the industry and their influence on the Index is of course a factor that needs to be taken into account. One could argue that fast fashion companies do not have the incentives to create clothes that have the longevity and durability to enable end of use systems such as re-use, as they work with fast new trends, meaning that the product does not need to be able to endure years and years of use. There is also the issue of lack of robust legislation regarding end of use streams which might not create motivation for fashion companies to work with these issues to the same extent as with chemicals where the legislation is tougher. These two factors, the lack of legislation and

incentives for fast fashion companies to address these issues, might pose as a barrier for fast fashion companies to actually push innovation towards a fast fashion system decoupled from raw material depletion.

The difference in focus distribution from the SDGs and the Index on the social impact categories (SICs) were quite as expected with regards to the literature study. The SDGs have a systemic perspective approach, focusing to a greater extent on the stakeholders Local community and Society, whereas the Index have their largest focus on individual stakeholders such as the Worker and the Value chain actor. However, an unexpected result was that the SDGs, similar to the Index, have a large focus on the Worker. Although, as many of the targets in the SDGs mention equal opportunities and decreasing discrimination for all individuals, the stakeholder Worker receives many connections to the SDG targets. The SICs within Worker also in many ways relate to human rights and development issues, such as Fair salary, Forced labour and Social benefits. These are aspects that the fashion industry has been aware of and worked with under a long time in their CSR work, contrasting to environmental sustainability work which is not as established. Hence, the large focus on Worker from the Index could be said to be aligned with the resources that the fashion companies are already putting on social concerns for workers in the supply chain.

Another SIC stakeholder is Consumer. The Consumer is quite "forgotten" by both frameworks and has received a small focus. One of the SICs within this stakeholder is Transparency. This SIC has received quite a small focus from both the Index and the SDGs. This small focus is not aligned with the concern raised by consumers; that they want to have more information and transparency regarding the products that they buy in order to make more informed and conscious choices. Many companies do try to be transparent by for example communicating their sustainability efforts with sustainability reports and "sustainable collections". The reason for the small focus from the frameworks has been derived from the low weighting of the questions regarding transparency towards consumers in the Index and the lack of focus on consumers in the SDGs. However, the Index actually highlights transparency with a small section in the social/labour submodule called "Transparency and public disclosure", but this falls short in the focus distribution model because of the low weighting. From a consumer perspective transparency is a key to choosing more sustainable products. Consumers also express a wish to act this way. These aspects are closely linked to SDG 12, Responsible consumption and production. This goal could therefore benefit from including a target on transparency, putting this issue on the sustainable development agenda for nations and businesses.

On the other hand, regarding sustainable consumption and the demands of transparency from consumers, consumers do not always act more sustainable even if they have the transparency and knowledge, i.e. there is a values-action gap. This makes the transparency issue hard to actually turn into a profitable business case and it may be difficult for the businesses to know how much resources they should allocate to consumer facing transparency. One may argue that transparency towards external stakeholders always is beneficial to drive for improved sustainability. This since it probably gives incentives for the businesses to ensure that their activities are done in a sustainable way. There is a reason to why transparency

is regarded as an difficult problem to tackle within the fashion industry as it is hard and complex to achieve transparency all the way upstream to the raw material extraction. Lacking of robust regulation regarding transparency in global supply chains is also a contributing factor. The EU initiative of sustainability reporting might lead to further improvement within transparency. However, following the previous discussion on consumer behaviour there is probably a fine line between how much transparency that a business actually makes a profit out of and how much work that is put on to this in "vain", creating more incentives to actually do business-as-usual rather than implement change. Although, recent studies have shown that this consumer values-action gap trend is turning and that more and more consumers actually act in line with their values, which could lead to more transparency towards consumers in the future if transparency turns out to be a profitable business case.

10.4 The Index as a management tool to work strategically towards the SDGs

Aligning a fashion company's work towards the Sustainable Development Goals (SDGs) can to some extent be done with the Higg Index 2.0 Brand and Retail Module. As previously mentioned in the analysis, the Index gives room for continuous improvement with regards to environmental concerns in the work towards the GANT prioritised Goal 6, Clean water and sanitation, and Goal 14, Life below water. However, the Index focuses to a lesser extent on issues with regards to the Local community and Society and thus is not an optimal management tool to use when addressing the social concerns within Goal 4, Quality education and Goal 6, Clean water and sanitation. Here, complementary systems might be needed. By reviewing the focus distribution model, a company may define which sections in the Index that they would need to prioritise in order to focus on a certain sustainability issue and which SDGs that the work would affect. Thus, sustainability aspects that need complementary systems or tools in order to reach the SDGs can be identified. The model may also be used to target specific impact categories, i.e. if a company wants to work on their energy use they may use the model to see which sections in the Index that they could work with and which SDGs that they may strive towards by working on this impact category.

Regarding the Index, the results show that there is a clear connection to both Environmental Management Systems (EMS), Corporate Social Responsibility (CSR) and life cycle analysis (LCA). A company using the Index to manage their sustainability work would find room for continuous improvement in how they work with social and environmental concerns that the production causes, since the intention of the Index is to create incentives for improvement and create ambition by benchmarking the Index score against other companies, and as it should not be possible to achieve the maximum score. Hence the connection to EMS. As the Index does not always take results into account it does not completely replace an EMS but could be used as a complement to this system. The Index also connects to many aspects in the CSR work of a fashion company, since it also includes social sustainability concerns in its scope. However, as has been stated before, the Index lacks focus on some sustainability issues that the fashion sector has targeted as important, as anti-corruption and transparency. Furthermore, the connection between the CSR perspective and the EMS perspective of the Index could be challenged as the general benchmarking score for fashion companies already

reaches 60 for the social/labour submodule. There is therefore not much room for continuous improvement with regards to increasing the benchmarking score. For the environmental submodule this differs, the general benchmarking score is 28, which implies a large potential for continuous improvements with regards to increasing the benchmarking score. However, the Index has a large focus on chemicals, an issue which is already quite well covered by REACH and the Biocidal Product Regulation. Furthermore, the LCA perspective that SAC has stated is used in the Index can be challenged. The Index focuses to a large extent on the closest segments to the company in a fashion supply chain, i.e. tier 1 and 2, and to a small extent on tier 3. The use and end-of-life phase is somewhat represented in the environmental submodule in the Index sections "Product care and repair" and "End-of-use", but here too the focus is less than on tier 1 and 2. Thus, the Index does not cover end-of-life well which may be a problem since there also is a lack of legislation on this area. This shows that the Index is harmonized with the current legislation and one could argue that this shows a lack of ambition towards going beyond legislation, even if some of the questions regarding chemicals actually give points for being beyond the law. Nevertheless, it is not strange that the Index puts focus on the same issues as the EU has acknowledged to be important, which could show that legislation is important for the development of the Index.

Following on the Index's life cycle perspective discussion, the lack of focus on consumers shows that the Index may not take the issue of over consumption into consideration to the same extent as it covers how the products are produced. This is not very surprising as many fashion brands' business model is aligned with the take-make-waste structure of fast fashion. If the Index took this over consumption issue more seriously, by for example increasing the weighting on the questions regarding how long a garment should last, SAC would show that they acknowledge over consumption as a problem and that many brands actually need to change their business model in order to be more sustainable. Some business models could therefore benefit from that these questions are not scored with high points in the Index and one may speculate that companies in the sector have had a large influence on the Index creating prerequisites which may be beneficial for them but not necessarily for all companies in the sector.

If a company decides to use the Index and utilise it as a management tool to strategically work towards the SDGs, it is important to take the above discussed limitations into account and be aware of that some important sustainability issues may not be included or well represented in the Index. It is therefore crucial to identify which complementary systems or tools that are needed in order to reach the company's prioritised SDGs. The focus distribution model aims to get an understanding on how the two frameworks, the Higg Index and the SDGs, focus on sustainability issues and how a company can use their resources to target a specific sustainability challenge. The model also tries to create an understanding of how these challenges interact and to untangle the complexity of how to make the fashion sector more sustainable. Since the sector is expected to grow tremendously it is important to address these issues now and decouple sustainability issues from economic growth.

10.5 Responsibility and legislation

To return to the argument previously made regarding the Index's alignment with already existing legislation, one could argue that the Index does not take tier 3 and the user and end of life phase into account due to lack of legislation. Lack of regulation for businesses is also what is stated as criticism against the Agenda 2030 take on how businesses should contribute to sustainable development. It may be difficult for companies to both regulate themselves regarding sustainability and at the same time create profit, which is a prerequisite for the business to exist at all. It can therefore be interesting to discuss to what extent the company should regulate themselves, and how beneficial it is to do so in the long run. The industry has requested a more harmonized system to align their sustainability work and this might be done with a legal framework thus creating a level playing field. This might then trigger innovation regarding for example circular material systems, supply chain mapping and transparency.

The issue of regulation is also coupled to the issue of responsibility. To what extent is it plausible that a fashion company can regulate suppliers and other external stakeholders regarding certain environmental and social impact categories. The UN has targeted the business sector as an important actor in the development agenda, but as seen in the focus distribution model they are very angled towards Society and Local community, thus stating that it is with regards to these social impact categories (SICs) that most development work should be done. The Sustainable Development Goals (SDGs) do not include any obligatory elements and limitations towards business and therefore one may argue that the Agenda puts the responsibility of business regulation on nations. As mentioned before, many companies used to work with philanthropy as their only sustainability work while many companies today are conducting materiality analyses to make sure that they target their day to day activities and use their resources where they benefit the most. This means both to create business cases where sustainability means profit but also where the company may affect the society in a positive way. This could be said to demonstrate a greater understanding of how a fashion company affects the world around it and acknowledges the challenges in making their business more sustainable. The Agenda 2030 has in some ways succeeded in helping companies with this and integrated the national and business sector, this as many companies today work with the SDGs and have targeted some specific SDGs. Although, it could be difficult for a company to know which SDGs that are material to work towards. It is therefore very important to complete the work started by UNECE to target SDGs for the fashion industry, so that companies actually strive towards SDGs that they affect with their day to day activities. Hence, one could argue that the SDGs may be a way of concretise the aim of the sustainability work, and the Index could be a way of reaching this aim.

As previously mentioned the Index places a fashion company's responsibility on tier 1 and 2, hence the segments closest to the company. It also however, has some very ambitious questions regarding for example the responsibility of a company towards the community if the company withdraws business. One may argue that such responsibility might rather fall on the nation to provide with social benefits security, which is an aspect that the SDGs take into account. However if a company works in a very undeveloped country there might not be any legislation regarding this or other sustainability issues. If a company still chooses to work in such a country the economic activity that this entails might actually lead to further development, but it is also important that the company works with for example social benefits issues to complement the non existing legislation. This example shows that depending on where a company chooses to work the responsibility of sustainability issues might fall on the company or the nation. It might however be very difficult for a company to take on this kind of responsibility without the support from governing forces and sometimes it is even so that the governing forces are the ones violating human rights or encouraging environmental degradation. In that case it might be very difficult for the fashion company to promote sustainable practices to partners in the supply chain. Hence, it is very important to work with a universal global developing agenda where companies and nations work together towards a sustainable future.

11 Conclusion

The aim of this thesis was to analyse the difference in focus, from a life cycle analysis perspective, between the Higg Index 2.0 Brand and Retail Module and the UN Sustainable Development Goals (SDGs), this to investigate if a fashion company could use the Index to work strategically towards the SDGs. The resulting focus distribution model showed that a fashion company could use the Higg Index 2.0 Brand and Retail Module to work strategically towards the SDGs. However, there are some focus distribution differences between the two frameworks, which means that to work towards certain SDGs a company might need complementary management systems or tools. Especially SDGs referring to Climate change, Biodiversity and Land use, as well as the social stakeholders Local community and Society are such SDGs. The Index in turn focuses to a large extent on chemical pollution impact categories and on the stakeholder Worker. The difference in focus between the two frameworks could be explained by the difference in scope and aim. The SDGs are universal and should be applicable to all nations, businesses and civil society while the Index targets fashion companies and workers in the supply chain.

The case study at GANT showed that the Index gives incentives to improve the work with almost all impact categories that can be linked to the fashion industry. The case study also showed that by targeting one SDG there is a connection to many different impact categories, implying that sustainability challenges often are complex and interlinked and that there are many ways of working with a specific sustainability challenge. However, the case study did show that the focus distribution model can be used by a fashion company to see how they could use the Index in their work towards their prioritised SDGs.

Regarding the environmental and social life cycle impact categories that were relevant for the fashion industry, it was concluded that the UNEP/SETAC framework for environmental LCA and S-LCA could be used to almost full extent. The exceptions were Energy use, which was included even though it is not included in the UNEP/SETAC framework, and Ozone depletion, which was excluded since it was not used in fashion related LCAs. The result was eleven environmental life cycle impact categories and 30 social life cycle impact categories, divided into five different stakeholders, that were deemed relevant for the fashion industry. It was also concluded that the S-LCA framework is underdeveloped and could exclude some, for fashion, relevant impact categories, as for example Animal welfare.

Furthermore, there are some limitations to the Index that have been discussed in this thesis. For example, the small focus on transparency towards consumers could create barriers for sustainable consumption. The LCA perspective of the Index could be challenged due to its larger focus on segments close to the fashion company. This could be explained by the lack of transparency within global supply chains. Another explanation may be that these parts of the supply chain are where the Index claims that a fashion company today not necessarily should take responsibility for sustainability aspects. Such responsibility might rather fall on the nation to provide with for example social benefits security, which is an aspect that the SDGs take into account. Thus, depending on where in the world and what kind of production a company has, the responsibility may fall either on the company or the nation.

Hence, it is very important to work with a global developing agenda where companies and nations work together towards a sustainable future. Furthermore, the results show that the Index is partly aligned with current EU legislation. As it is supposed to create incentive for continuous improvement it could be questioned if the Index is such a forefront runner as it claims when it rewards companies for being compliant with existing law. This may also be seen in practice, as the general score for companies in the Social/labour submodule is 60 out of 100, which is a quite high score if all companies are supposed to be encouraged into improving their sustainability work by increasing their score. The sector has asked for a more harmonized streamlined system that gives equal opportunities to all fashion companies and is fair to all business models and in some areas one may argue that the Index has delivered this. However, in other areas, such as for driving for continuous improvement, the level of ambition of the Index and to what extent SAC members have influenced this ambition could be questioned.

A final conclusion is that there is a need for further research on how the different impact categories are interlinked to achieve an understanding of the complexity of how sustainability issues are related to the fashion industry. Therefore it is important that UNECE continues its work with targeting SDGs for the fashion industry to work towards. Regarding the Index it is still under development, in need of further review on for example weighting and LCA perspective, i.e. where should the index focus in order to address the most severe sustainability issues related to the fashion industry.

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Appendix

Figure 22 and *Figure 23* shows the identifying method of the environmental and social impact categories.

Identifying environmental impact categories

Figure 22: *Identifying relevant environmental life cycle impact categories by comparing the impact categories in the UNEP/SETAC framework and the ones found in the sector relevant reports. The table shows which impact categories that are included in this thesis.*

Environmental impact categories	UNEP/SEPAC EIC (2011)	Reference	Include
	Resource depletion		X
Non-renewable energy sources		Mistra (2015), Zamani (2016)	X*
Renewable energy consumption		Global fashion agenda (2017), Muthu (2014)	
Energy requirements		Muthu (2014)	
Carbon footprint	Climate change	Mistra (2015)	X
GHG emission		Muthu (2014)	
Climate change		Zamani (2016)	
Global warming		van der Velden (2013)	
CO2 emissions		Global fashion agenda (2017)	
Acidification	Acidification	Mistra (2015), van der Velden (2013)	X
Terrestrial acidification		Zamani (2016)	
	Ozone depletion		
Freshwater ecotoxicity	Ecotoxic effects	Mistra (2015)	X
Ecotoxicity (as emission to ground, water, air)		van der Velden (2013)	
Toxicity		Global fashion agenda (2017)	
Fine dust (as emission to ground, water, air)		van der Velden (2013)	
Usage of pesticides		Muthu (2014)	
Human toxicity, cancerogenic	Human toxic effects	Mistra (2015), van der Velden (2013)	X
Usage of pesticides		Muthu (2014)	
Toxicity		Global fashion agenda (2017)	
Fine dust (as emission to ground, water, air)		van der Velden (2013)	
Photochemical ozone creation	Photochemical ozone creation	Mistra (2015)	X
Summer smog/photochemical oxidant formation (as emission to ground, water, air)		van der Velden (2013)	

Freshwater eutrophication	Eutrophication	Mistra (2015), Zamani (2016)	X
Eutrophication		Zamani (2016)	
Marine eutrophication		Zamani (2016)	
Terrestrial eutrophication		Zamani (2016)	
Eutrophication (as emission to ground, water, air)		van der Velden (2013)	
Usage of fertilizers		Muthu (2014)	
Output and processing of wastewater	Water use	Global fashion agenda (2017)	X
Freshwater consumption		Mistra (2015), Zamani (2016), Global fashion agenda (2017)	
Water requirements		Muthu (2014)	
Land use	Land use	Muthu (2014)	X
Land transformation		Zamani (2016)	
Land occupation		Zamani (2016)	
Agricultural land occupation		Mistra (2015)	
Biodiversity loss	Biodiversity	Zamani (2016)	X

Identifying social impact categories

Figure 23: *Identifying relevant environmental life cycle impact categories by comparing the impact categories in the UNEP/SETAC framework and the ones found in the sector relevant reports. The table shows which impact categories that are included in this thesis.*

Social impact categories	**UNEP SIC (2009) /SETAC**	**Reference**	**Include**
Freedom of association and collective bargaining	Freedom of association and collective bargaining	Zamani B (2016), Global fashion agenda (2017), Lenzo et al (2017)	X
Worker involvement		Global fashion agenda (2017)	
Child labour	Child labour	UNEP (2009), Zamani B (2016), Global fashion agenda (2017), Lenzo et al (2017)	X
Fair salary	Fair salary	Zamani B (2016), Lenzo et al (2017)	X
Compensation		Global fashion agenda (2017)	
Working hours	Working hours	Zamani B (2016), Global fashion agenda (2017), Lenzo et al (2017)	X
Forced labour	Forced labour	Zamani B (2016), Lenzo et al (2017)	X
Equal opportunity/ Discrimination	Equal opportunity/ Discrimination	Zamani B (2016), Lenzo et al (2017)	X
Gender equality		Global fashion agenda (2017)	
Health and safety	Health and safety	Zamani B (2016), Lenzo et al (2017)	X
Worker treatment		Global fashion agenda (2017)	
Facility standards (fire doors, sufficient emergency exits etc; established emergency procedures/training),		Global fashion agenda (2017)	
exposure to chemicals and dangerous equipment		Global fashion agenda (2017)	
Social benefits/ Social security	Social benefits/ Social security	Zamani B (2016), Lenzo et al (2017)	X
Workers right to vacation		Global fashion agenda (2017)	
Feedback mechanism	Feedback mechanism	Zamani B (2016), Lenzo et al (2017)	X
engagement with external stakeholders and consumers		Global fashion agenda (2017)	
Consumer privacy	Consumer privacy	Zamani B (2016), Lenzo et al (2017)	X
Transparency	Transparency	Zamani B (2016), Lenzo et al (2017)	X

End of life responsibility	End of life responsibility	Zamani B (2016), Lenzo et al (2017)	
engagement with external stakeholders and consumers		Global fashion agenda (2017)	X
Access to material resources	Access to material resources	Zamani B (2016), Lenzo et al (2017)	X
Access to immaterial resources	Access to immaterial resources	Zamani B (2016), Lenzo et al (2017)	X
Delocalisation and migration	Delocalisation and migration	Zamani B (2016), Lenzo et al (2017)	X
Cultural heritage	Cultural heritage	Zamani B (2016), Lenzo et al (2017)	X
Safe and healthy living conditions	Safe and healthy living conditions	Zamani B (2016), Lenzo et al (2017)	X
Respect for indigenous rights	Respect for indigenous rights	Zamani B (2016), Lenzo et al (2017)	X
Community engagement	Community engagement	Zamani B (2016), Global fashion agenda (2017), Lenzo et al (2017)	X
Local employment	Local employment	Zamani B (2016), Lenzo et al (2017)	X
Secure living conditions	Secure living conditions	Zamani B (2016), Lenzo et al (2017)	X
Public commitment to sustainability issues	Public commitment to sustainability issues	Zamani B (2016), Lenzo et al (2017)	X
engagement with external stakeholders and consumers		Global fashion agenda (2017)	
Contribution to economic development	Contribution to economic development	Zamani B (2016), Lenzo et al (2017)	X
Prevention and mitigation of armed conflicts	Prevention and mitigation of armed conflicts	Zamani B (2016), Lenzo et al (2017)	X
Technology development	Technology development	Zamani B (2016), Lenzo et al (2017)	X
Corruption	Corruption	Zamani B (2016), Global fashion agenda (2017), Lenzo et al (2017)	X
Fair competition	Fair competition	Zamani B (2016), Lenzo et al (2017)	X
Promoting social responsibility	Promoting social responsibility	Zamani B (2016), Lenzo et al (2017)	X
engagement with external stakeholders and consumers		Global fashion agenda (2017)	
use of models and imagery that sets a poor standard		Global fashion agenda (2017)	
Supplier relationships	Supplier relationships	Zamani B (2016), Lenzo et al (2017)	X
Respect for intellectual property rights	Respect for intellectual property rights	Zamani B (2016), Lenzo et al (2017)	X
Animal welfare		Global fashion agenda (2017)	