Towards a
Brighter Blue

CREATING AN IMPACT INDEX TO INCREASE
ADOPTION FOR SUSTAINABLE JEANS

MASTER THESIS | LAUREN EBBERS | AUGUST 2019

TOWARDS A BRIGHTER BLUE: CREATING AN IMPACT INDEX TO INCREASE ADOPTION FOR SUSTAINABLE JEANS.

Master graduation thesis | August, 2019

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Coverphoto illustrates denim waste at Saitex (source: Jornaldenegocios, 2019)

"I HAVE OFTEN SAID THAT I WISH I HAD INVENTED

BLUE JEANS: THE MOST SPECTACULAR, THE MOST

PRACTICAL, THE MOST RELAXED AND NONCHALANT.

THEY HAVE EXPRESSION, MODESTY, SEX APPEAL,

SIMPLICITY – ALL I HOPE FOR IN MY CLOTHES."

Yves Saint Laurent

PREFACE

Dear reader,

About a year ago, after seeing multiple documentaries on the impact of the fashion industry, I started my journey to decrease the impact of my own wardrobe. As a serious fashion lover, I did not expect it to be easy to change my habits and buy less and better products. Because after all there should be lots of better choices out there, right? Soon I discovered that compared to the easy accessible low impact food industry with more vegan options popping up in supermarkets and restaurants, low impact fashion is not at all easy and accessible and actually requires a lot of research and study of certification marks. Frustrated and intrigued by the contrast between these two industries, I decided I wanted to work on a project on the impact of fashion during my graduation.

During one of the train rides from Fronteer back to Delft, my fellow intern Maarten (thanks Maarten!) introduced me to a project James had started to work on and what became the research you are about to read: *How might we help consumers buy better jeans?* The last couple of months I discovered everything there is to know about denim (I think indigo blue might even be my new favourite colour) and the impact that it has on our precious people and planet. This graduation project not only became a very challenging and professional journey but a personal one as well: reading about all this impact and industry stakeholders that have the knowledge to change but decide not to act on it was confronting at times but inspired me even more.

I feel lucky I got the chance to talk to a lot of industry experts that are working very hard to make sustainability work and that inspired other industry players and myself with their visions of change. I would like to thank all of the denim experts for sharing their knowledge, inspiration and positive energy: without you this result would not have been possible!

But most of all I would like to thank the people that supported me through this project: James, during our meeting you always inspired me with the things you said and your enthusiasm about this project. Thank you for trusting my approach and for all the opportunities to talk and even present to the top players of the industry; a once in a lifetime opportunity! Femke, thank you for your criticism and support during the process; you always inspired me to think about why I was doing the things I was doing and if there might be a better way to achieve my goal. Erik Jan, thank you for challenging my way of thinking and enthusiasm for my project. Your eye for detail has certainly brought my work to a higher level. Additionally, I would like to thank Lieke for being my partner in crime and working together on the interviews; without you it would have been a lot less fun! Mariette, thank you for your support and inspiration during the project and all the opportunities to network with industry experts! Last, I would like to thank Remco for supporting me during the project and reading everything I wrote: you always found a way to cheer me up!

I hope my thesis will inform and inspire you as much as it did myself and show you that better choices do not always have to be that hard;)

Enjoy the read!

Lauren Ebbers

FASHION US HERE

PASSION LED US HERE

EXECUTIVE SUMMARY

The fashion industry is the second most polluting industry in the world, mostly due to the many ways fashion is polluting the environment (Fischer, 2015). First of all by the CO_2 emission produced in manufacturing and logistics, second the massive amounts of water used in dyeing processes and production of natural resources, third the pollution of groundwater and rivers by pesticides and dyes and last but not least the enormous amount of waste created by fast fashion items that are only worn once.

One of the most impactful garments in this industry is something most of us wear every day: a pair of jeans. The production of a single pair uses on average 8000 litres of water (Water Footprint Network, 2016). Besides water, toxic and corrosive chemicals are used to dye and 'wash' the jeans to its desired style. Every year, more than 2 billion pairs of jeans are produced worldwide, adding to its yet existing footprint (Greenpeace, 2016).

Some brands in the industry are already putting a lot of effort into the production of sustainable denim. However, reducing the impact of the denim industry is not just up to denim brands and manufacturers anymore: consumers have to play their part as well.

To raise awareness and higher the demand for sustainable jeans amongst consumers, this graduation project for House of Denim focusses on solving the following challenge: how might we help consumers buy better jeans?

To raise the demand for sustainable jeans, the impact of a jeans has to become more transparent and understandable for consumers. In an attempt to achieve this, a jungle of certifications has popped up in the fashion and jeans industry, resulting in more confusion than transparency; many consumers are not familiar with any of these existing certifications. Besides awareness, understanding what a certification stands for demands quite some knowledge of materials or manufacturing from consumers.
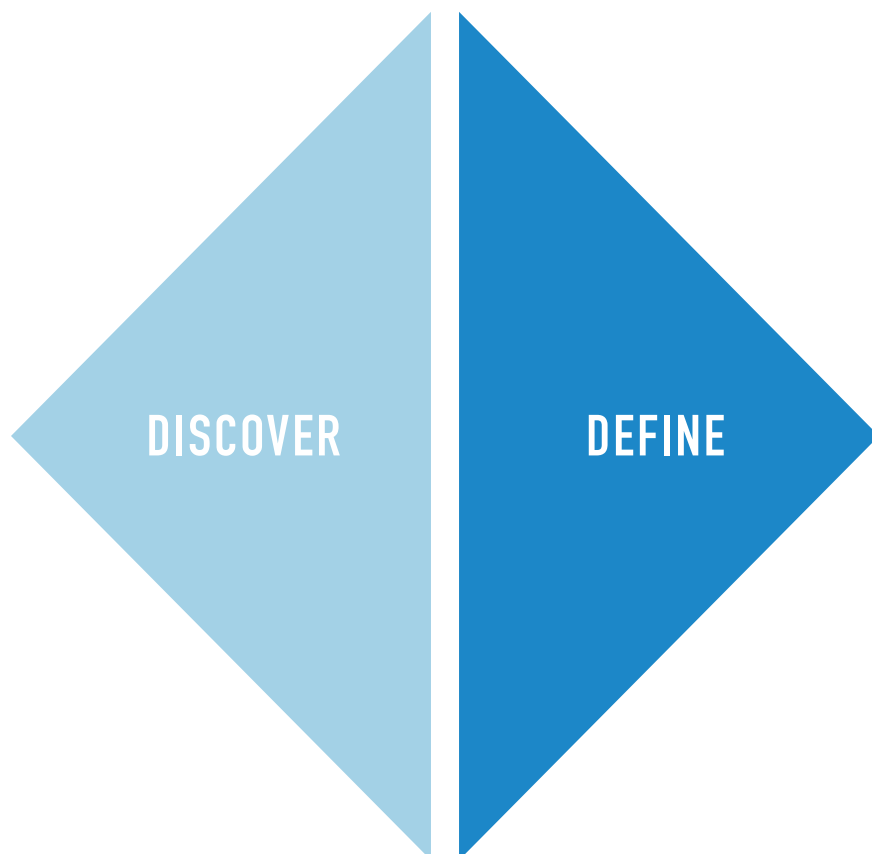
To make it easier for consumers to make a positive choice, Brighter Blue, a product rating tool, was developed in cooperation with denim experts and consumers.

To accomplish this, the project used an inside-out approach to research the impact of a pair of jeans, to see what factors contribute most to this impact and to explore how this impact could be minimised. Afterwards, a case study was used as a parallel perspective, to see and learn how indices in other industries help change behaviour. Qualitative interviews with eight denim experts and a literature study on green consumer behaviour defined the most important challenges and design guidelines for Brighter Blue. These guidelines were further developed into a first minimum lovable prototype of the rating: the impact index. From this moment and outside-in approached was used to develop this concept using lean methodology. Through three design interventions with important industry stakeholders and (expert) consumers, the rating was developed into the final concept Brighter Blue.
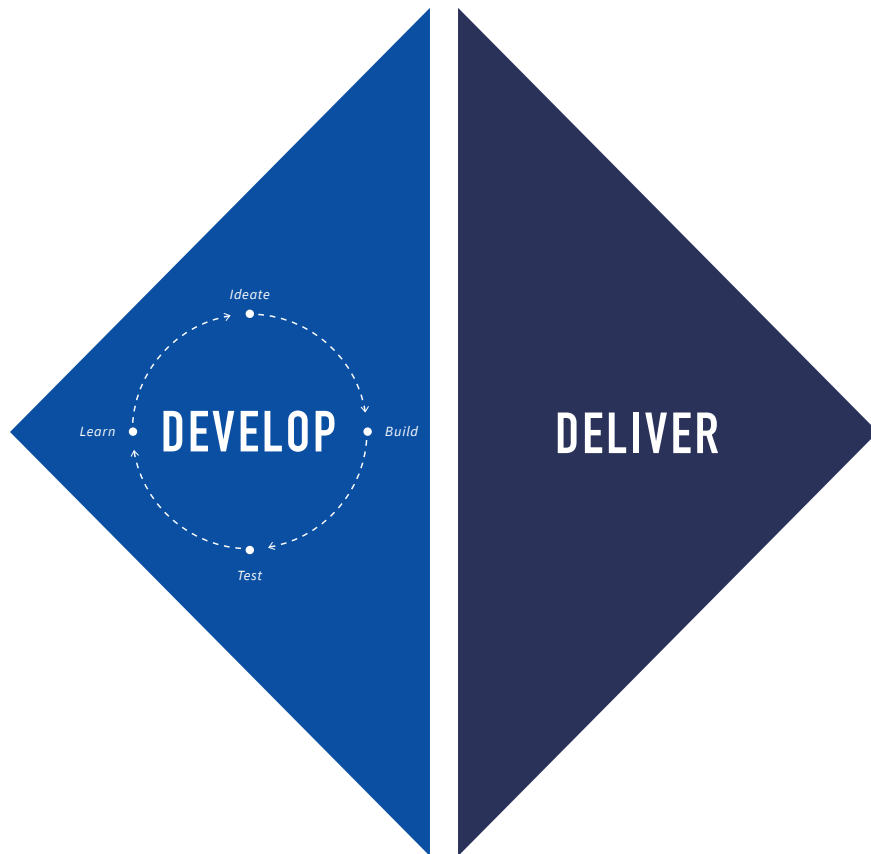
Brighter Blue is a positive and easy indicator of the best jeans out there: accessible on various levels to serve as many consumers as possible. By means of a hangtag and Google extension, the ratings are communicated to consumers, so they can look good and feel confident that they have made the right choice. An overarching platform conveys the message that sustainable choices do not have to be that hard or complicated: everyone can vote with their money. Brighter Blue helps consumers regain their power to decide and gives a little push to young conscious consumers that want to make better choices but not always know how.

This thesis presents the development and final concept of Brighter Blue, including the rating methodology, working mechanism, benchmarks, prototypes of the various consumer tools, and a detailed plan for further implementation and market launch.

DISCOVER

DEFINE

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DEVELOP

Ideate

DEVELOP

Learn · · *Build*

Test

DELIVER

Appendices can be found in additional Appendix report

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INTRODUCTION TO DENIM

1.1 THE HISTORY OF DENIM

Although the first jeans with rivets (those little nails attached to your pockets) were originally patented as workwear by Levi Strauss and Jacob Davies in 1873, the actual fabric of the jeans is much older. The origin of the fabric lies in Europe, wherein the 18th century two cities were known for its production: Nimes in France and Genoa in Italy. Both cities claim they invented the cotton twill fabric that is now known as 'denim'; from *"Serge de Nimes"* which translates as "fabric from Nimes". Although the name 'denim' refers to its origin in Nimes, the term 'jeans' originates from a fabric what the French would call 'bleu de Genes' or 'blue fabric from Genoa', a sturdy and durable fabric dyed blue that was used in uniforms for mariners and dockworkers (Annapoorani, 2017).

Since modern jeans were first introduced by Strauss and Davies, denim has crossed over different classes, cultures and political lines, becoming the most meaning-full textile in the fashion industry (Szmydke-Cacciapalle, 2018). The first modern jeans were adopted by gold miners and cowboys because of its durability and only became famous in the 1930s when Hollywood produced the first cowboy motion pictures with actors dressed in jeans (Annapoorani, 2017). The romanticised image of perceived freedom and individuality inspired eastern citizens and set a new social trend. Featuring a cover of *Vogue*, it even led to the introduction of the first lady Levi's in 1938.

During the second world war, American soldiers began wearing jeans when they were on leave, and after the war, movies like "Rebel Without a Cause" and "The Wild One" (featuring a Levi's 501) turned jeans into an item with attitude. Teenagers began wearing denim as a sign of defiance and some public places even banned jeans because of what they symbolised. Flared vintage jeans became the favourite of hippies during the Sixties and Woodstock can hardly be remembered without them (Szmydke-Cacciapalle, 2018).

In Europe, jeans only re-entered after the second world war and became a sign of freedom. During the liberation of World War II, modern jeans were imported by American soldiers and quickly spread across the continent afterwards. However, jeans brought by American soldiers were vintage and hard to come by. To meet the growing demand, local tailors started to produce their own jeans, like the dark and raw (unwashed) originals.

These raw jeans were not liked very much in Europe and designers like François Girbaud started to experiment with new techniques to give the jeans a more worn-in appearance. Stonewashing was invented to recreate the vintage look, something Girbaud would later describe as "an ecological disaster" (Szmydke-Cacciapalle, 2018). Girbaud played with new constructions and designed the baggy jeans; an instant hit in the upcoming hip hop and R&B scene of the nineties. At the same time, "the Godfather of Denim" Adriano Goldschmied, experimented with new washes, cuts and constructions and with his drive for creativity and innovation, Goldschmied drove the premium denim market to a higher level.

Over the years, denim has kept its rebellious attitude as trendsetter or political statement and is now worn by almost everyone: making it one of the most accessible fashion pieces of all time.

1.2 HOUSE OF DENIM FOUNDATION

Because of the popularity of the pre-washed jeans and the chemicals involved in the process, jeans are now one of the most polluting garments in the fashion industry. According to Greenpeace (2016), 2 billion pairs are made each year. The production of a single pair uses on average 8000 litres of water (Water Footprint Network, 2016). Besides water, toxic and corrosive chemicals are used to dye and 'wash' the jeans to its desired style.

In 2009, House of Denim was founded by James Veenhoff (former director and initiator of the Amsterdam Fashion Week) and Mariette Hoitink (owner HTNK Fashion recruitment & consultancy) as an independent, non-profit organisation to transform the denim industry for the future: making it more sustainable, innovative and collaborative. Their mission to take denim 'Towards a Brighter Blue', raises the bar through education, advocacy and collaboration projects, to reduce environmental impact and stimulate adoption of more sustainable innovations (Denimcity, 2018).

In order to innovate the denim industry, education was a crucial starting point. However, a specialised jeans-education appeared to be lacking. In cooperation with the ROC Amsterdam and a number of leading jeans brands and experts from the industry, House of Denim opened the doors of the first and only Jean School in the world. Since 2015 the Jean School is part of Denim City in Amsterdam: an innovation campus founded by House of Denim Foundation with a clear mission: to connect and inspire stakeholders, and bring the industry 'Towards a Brighter Blue'.

Denim city and the Jean school are only two examples of House of Denim initiatives to innovate the denim industry: twice a year they host a leadership breakfast during the Amsterdam Kingspins show, where a number of leading jeans brands are invited to think about sustainability and innovation of the denim industry. During the breakfast in October last year, House of Denim announced a new project; the development of a new jeans rating to make it easier for consumers to buy better jeans. This project will be the subject of this thesis and as a stakeholder, House of Denim will act both as client and industry advocate.

HOUSE OF DENIM INITIATIVES

- 2011 - Jean School pilot & Berlin Indigo Embassy
- 2012 - Launch of the Jean School & Indigo Embassy Istanbul
- 2013 - Mayor's Breakfast & Kingpins Amsterdam.
- 2014 - Opening of Denim City & Blue Lab, First edition of Global Denim Awards
- 2015 - Amsterdam Denim Days kick-off
- 2016 - Jean School International Course starts, Denim Academy & store launched
- 2017 - Denim Days New York first edition
- 2018 - Advisory Board formed, on course for new 5-year plan
- Fall 2019 - Opening Denim City Sao Paolo Brazil

HOUSE OF DENIM
A BRIGHTER BLUE

JEAN SCHOOL

DENIM CITY

TOWARDS A BRIGHTER BLUE
With their mission to connect and inspire denim stakeholders, HoD initiates platforms, projects and events to make denim dry, clean and smart.

ADVOCATE THE GOOD
Promoting best practices and give a voice to our industry as a whole: Denim Diplomacy, events, projects & Industry Networking

COLLABORATE FOR THE BETTER
Building a network for industry-wide collaboration for a dryer, cleaner and smarter industry

EDUCATE THE BEST
Training a new generation of talents and raising the bar on knowledge, skills and innovation throughout the industry (House of Denim, 2019).
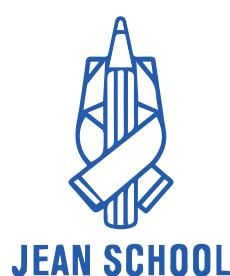
Since 2012 Jean School of ROC Amsterdam educates young, creative and driven people to learn the craftsmanship of denim design and development.

With a classroom located in Denim City, they practice in the workshop and lab area where they learn from all aspects of the jeans: yarns, fabric, pattern, production, laundry, commerce, innovation and sustainability. Many leading denim brands are involved in the programme, offering materials & machinery, assignments, guest lectures, company visits and internships (Denim City, 2018).

Denim City is an innovation campus founded by House of Denim Foundation located in de Hallen in Amsterdam. By bringing together future industry stakeholders, brands, producers, mills, launderers, academics and students under one roof, Denim City aims to raise the bar, reduce environmental impact and stimulate adoption of more sustainable innovation.

Denim City houses a workshop, knowledge centre jeans archive, a laundry called the Blue Lab, a Jean School classroom and a store that communicates all these activities towards the final consumer (Denim City, 2018).

PROJECT AIM & APPROACH

2.1 CHALLENGE

The fashion industry is the second most polluting industry in the world, mostly due to the many ways fashion is polluting the environment (Fischer, 2015). First of all by the CO2 emission produced in manufacturing and logistics, second the massive amounts of water used in dyeing processes and production of natural resources, third the pollution of groundwater and rivers by pesticides and dyes and last but not least the enormous amount of waste created by fast fashion items that are only worn once.

One of the most impactful garments in this industry is something most of us wear every day: a pair of jeans. The production of a single pair uses on average 8000 litres of water (Water Footprint Network, 2016). Besides water, toxic and corrosive chemicals are used to dye and 'wash' the jeans to its desired style. Every year, more than 2 billion pairs of jeans are produced worldwide, adding to its yet existing footprint (Greenpeace, 2016).

Some brands in the industry are already putting a lot of effort into the production of sustainable denim. However, reducing the impact of the denim industry is not just up to denim brands and manufacturers: consumers have to play their part as well.

To be able to clean up the industry, higher demand for sustainable jeans is needed. Without this demand, brands can not bear to pay the higher prices necessary to produce more sustainably. Knowledge and know-how in more sustainable manufacturing in the denim industry are available for quite some time now, but without consumers spending more on sustainable products the business case to invest in these new techniques and alternative materials stays weak.

To raise awareness and higher the demand for sustainable jeans, House of Denim is focussing on a new project: how might we help consumers buy better jeans? Aim of this project is to create a rating tool to benchmark the impact of jeans and create a positive action perspective for consumers.

2.2 PROJECT SCOPE

The first step towards a higher demand for sustainable jeans is to make the impact of jeans more transparent and understandable for consumers. In an attempt to achieve this, an increasing amount of certifications pop up in the fashion and jeans industry, resulting in more confusion than transparency: many consumers are not familiar with any of these existing certifications. Besides awareness, understanding what a certification stands for demands quite some knowledge of materials or manufacturing from consumers.

To make it easier and more accessible for consumers to make a positive choice, a product rating tool (the impact index) will be developed to benchmark the impact of a pair of jeans and turn it into something understandable to get consumers more actively involved. This index, in contrast to other existing (sustainable) indexes used in the fashion industry like the 'Higg Index' (Sustainable Apparel Coalition) and the 'Fashion Transparency Index' (Fashion Revolution), will focus directly on consumers instead of brands and manufacturers.
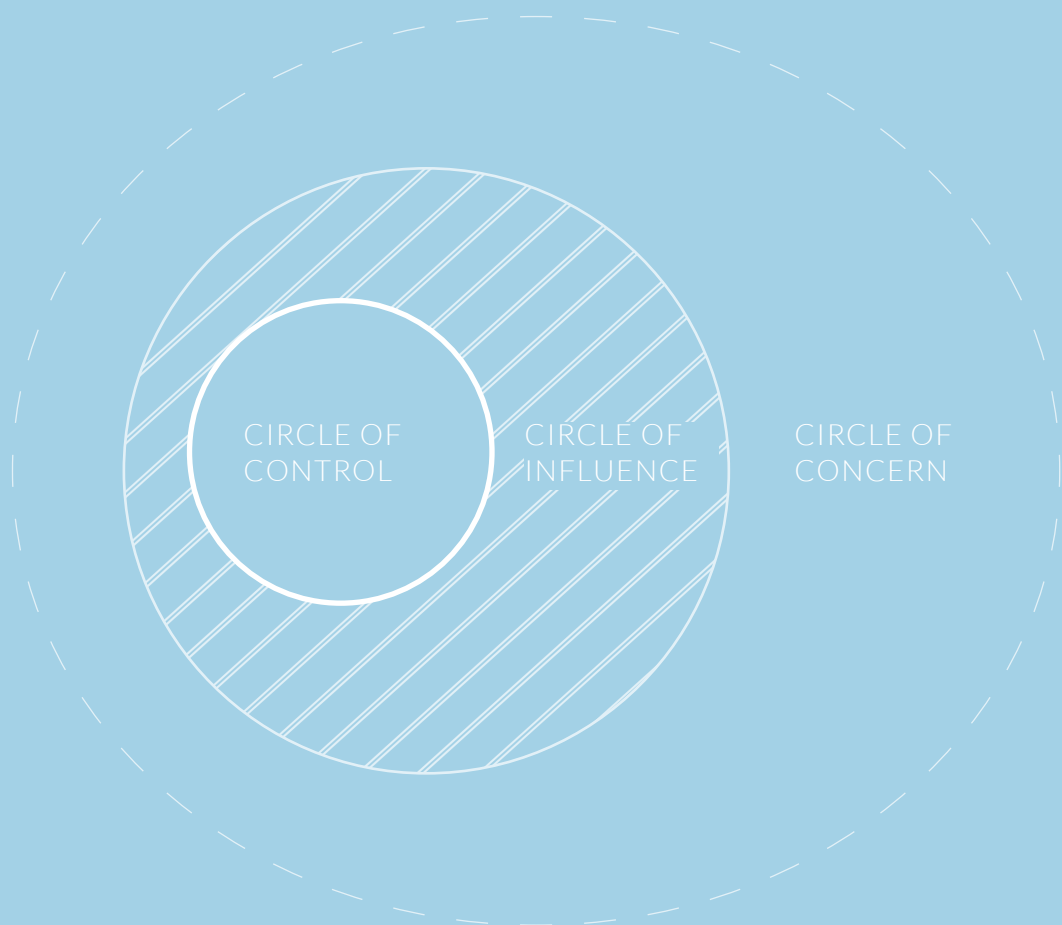
CIRCLE OF
CONTROL

CIRCLE OF
INFLUENCE

CIRCLE OF
CONCERN

Figure 1: Stephen Covey's (2004) circle or control, influence and concern used in this thesis.

Although the total impact of a jeans is defined by production as well as its use and disposal, only the impact of production will be taken into account in this thesis. After all, the aim of this research is to create a more proactive behaviour towards the consumption of sustainable jeans, not towards influencing the behaviour of use and disposal.

2.3 RESEARCH QUESTIONS

To develop a product rating tool, the following research question needs to be answered:

How do we create an impact index that contributes to the choice for more sustainable jeans?

To make the project more concrete, this question is divided into three sub-questions:
- How do we create an index that sincerely represents the impact of jeans?
- How could an impact index influence the purchase of jeans?
- How do we brand the impact index to get consumers actively involved?

In this thesis, 'sustainable' or 'better' products are defined as products *"meeting the needs of the present without compromising the ability* of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

2.3 PROJECT AIM

This project aims to develop a product rating tool and implementation strategy for House of

Denim, which can contribute to the demand for more sustainable jeans.

To contribute to the demand for more sustainable products, this research will explore how consumer behaviour towards sustainable products can be influenced. Since sustainability is a topic that is hard to grasp for most consumers, the theory of Stephen Covey's (2004) circles of influence, also used by DGTL festival (Landsman, 2018), can be used to explain how people deal with issues that they feel are hard to control. Within this theory, three circles are used: the circle of control, circle of influence and circle of concern (figure 1). According to Stephen Covey, all things that we can directly change by ourselves are in our circle of control, things that we can only change with the help of others are in our circle of influence and things that we want to change but are not in our power to change (like climate change) are in our circle of concern. So, in order to make people feel they can do something about the impact of clothing - or jeans in this case - on the environment, an intervention like a product rating is needed to stimulate proactive behaviour.

Therefore, the aim of the product rating tool is to transform the purchase behaviour of sustainable jeans from **reactive** (waiting for all jeans to become sustainable) to **proactive** (choosing sustainable products) in a transparent, accessible and positive way.

To accomplish this, this project will explore what variables should be included in a rating system, how they can be quantified, how the impact can be benchmarked, how different stakeholders will interact with the tool and how a product rating can create a positive buying perspective.

2.4 APPROACH

The approach of this graduation project is based on the Double Diamond model of the Design Council, and consists of four phases: discover, define, develop and deliver (Design Council, 2005). The first two phases discover and define, have an inside-out approach to understand the impact of the denim industry and explore which innovations contribute most to sustainable production. In the development phase, an outside-in approach is used to uncover stakeholder and consumer value following the 'Lean startup' methodology (using repetitive iteration cycles of build-measure-learn). During development, prototypes were used as soon as possible to learn and improve by stakeholder testing (Ries, 2011).

DISCOVER
During the discovery phase of the project, initial desk research was used to understand the production process of a pair of jeans and to discover the current impact, developments, sustainable initiatives and innovations of the denim industry. Afterwards, an interview with industry expert Maarten Wentholt was used to verify information found in desk research, to brainstorm on the project and to experience the jeans production process in person during a two-day denim academy course. The discover phase was finalised with a case study on rating systems used in other industries, exploring the problem through a parallel perspective.

DEFINE
To define the design guidelines of the product rating tool, qualitative interviews with industry experts were used to identify main stakeholder challenges and collect insights on what would be needed to make the initiative a success. Afterwards, a literature review was used to explore consumer trends and behaviour towards sustainable products. From this review, barriers for green consumer behaviour were identified and translated into key factors to influence. Both the stakeholder insights and existing barriers to green consumption were used to set up design guidelines for the product rating tool and a first draft of the strategy.

DEVELOP
These guidelines were subsequently developed into a first version of the product rating tool, consisting of five questions to indicate the impact, a benchmark rating for each of the questions and a hangtag to communicate the rating towards consumers. This version was presented to the advisory board of House of Denim as a first design intervention with the industry. Learnings of this intervention were used for a small iteration presented to expert consumers during the second design intervention. Afterwards, during the third design intervention, a survey was used to gather insights on the customer journey and emotional benefit of the impact index. These insights were developed into a last iteration before the development of the final concept.

DELIVER
In the last phase of the project, all research findings and iterations were translated into a final concept and strategy for implementation. The final design was evaluated on its viability, desirability and feasibility, and the research questions were answered. The deliver phase concludes with some final recommendations to House of Denim and a personal reflection on the results and process.
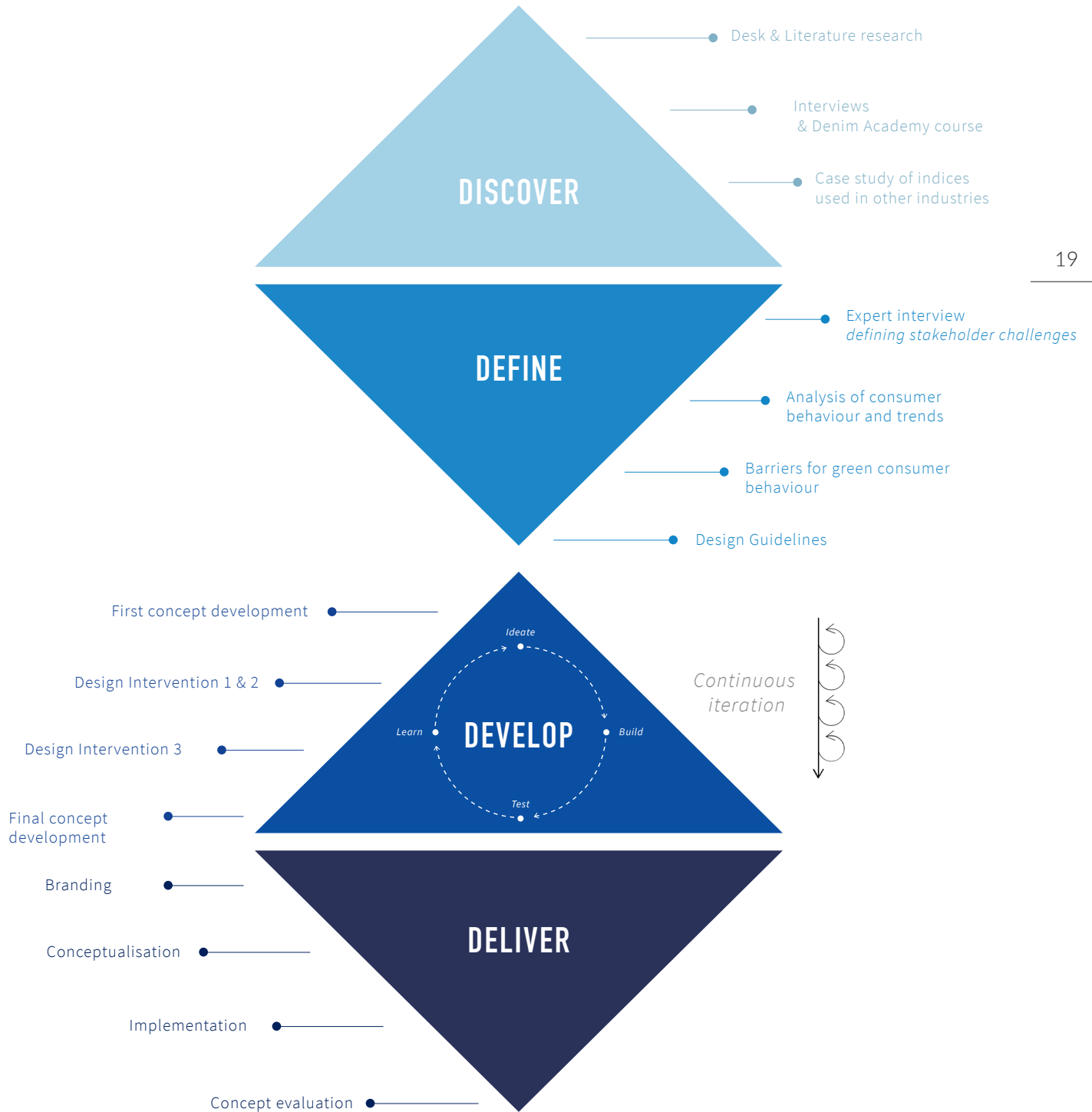
DISCOVER

Desk & Literature research

Interviews
& Denim Academy course

Case study of indices
used in other industries

DEFINE

Expert interview
defining stakeholder challenges

Analysis of consumer
behaviour and trends

Barriers for green consumer
behaviour

Design Guidelines

First concept development

Design Intervention 1 & 2

Design Intervention 3

Final concept
development

Branding

Conceptualisation

Implementation

Concept evaluation

Ideate

Learn **DEVELOP** *Build*

Test

*Continuous
iteration*

DELIVER

Figure 2: Approach of this thesis using the double diamond model of the Design Council (2005).
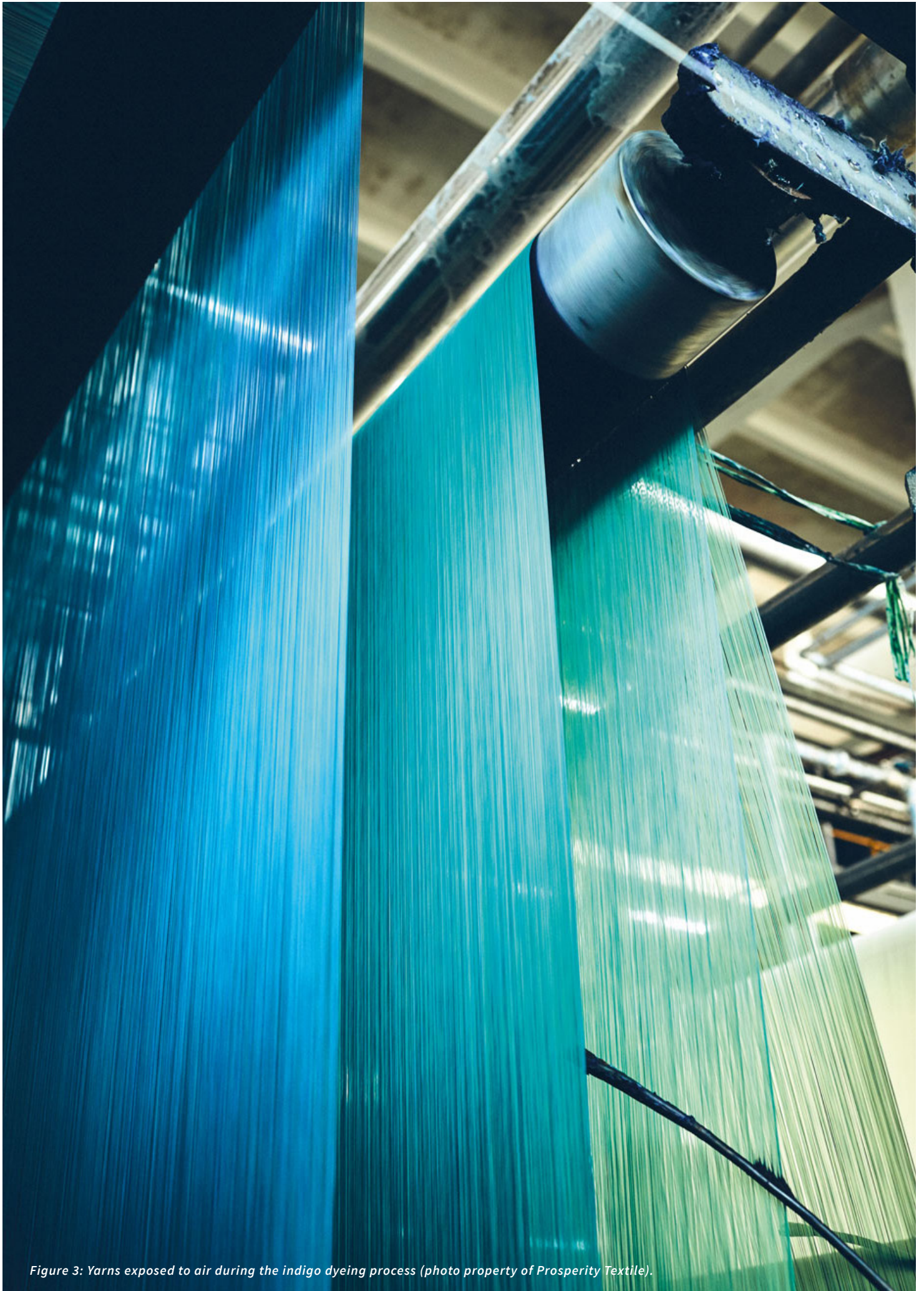
DISCOVER

Figure 3: Yarns exposed to air during the indigo dyeing process (photo property of Prosperity Textile).

PRODUCTION &
IMPACT OF JEANS

The production of a pair of jeans can be seen as an art just as much as a science. After the garment is designed, many suppliers and techniques are involved in its production process. To design for a rating system that can represent the impact of jeans, it is important to understand how jeans are made, what the impact of production looks like and what options are currently available to minimise this impact. This chapter will describe the production process of a jeans and its impact from crop to shop, with an illustration of the process on page 25.

3.1 HOW JEANS ARE PRODUCED

The first step in the production of a jeans is the **production of the fibre.** Today most jeans are still made from cotton fibres, making up 35 per cent of the global cotton production (van Rhoon, 2016). Cotton grows in more than 80 countries worldwide, and according to the WWF, it can take between 7.000L and 29.000L water to produce one kilogramme of cotton - depending on location and weather conditions (WWF, 1996).

After 25 weeks of growing, the cotton is ready to be **harvested**. About 70% of the global cotton production is harvested by hand. This is still prefered by many farmers because it assures the best and cleanest quality of the fibre. Picking by hand is a slow and exhausting process often executed by women and children, sometimes even forced (McLoughlin, Hayes and Paul, 2015).

After manual or mechanical harvest, cotton fibres need to be separated from the cotton seeds. **Ginning** will clean the fibres from the seeds and prepare the fibres for textile mills and other applications. Once the cotton has been ginned, it is transported in bales to the cotton textile mills for further processing (McLoughlin et al., 2015).

At the denim mills, the fibres will be cleaned further and divided into smaller pieces, which are fed to the **carding** machine, for final subdivision into individual fibres. In the carding machine the fibres are categorised by fibre length to achieve an optimal blend in the yarns. After carding, the fibres form a sliver that is further blended and **spun into a yarn**.

Once the yarn is spun, multiple smaller cones of yarn will be wound onto a bigger beam: the warp. Beam **warping** winds on average 4500 yarns parallel to each other onto a wider beam. This way, the yarns form a sort of open sheet, allowing all yarns to be indigo dyed at the same time (McLoughlin et al., 2015).

To ensure that the indigo dye will penetrate the yarns in an evenly manner, the yarns are wetted and rinsed first with caustic soda (a very corrosive chemical) to eliminate any remaining grease and dust that may still be present before entering the **dyeing** process. (Szmydke-Cacciapalle, 2018).

The indigo is mixed in the dyeing baths with sodium hydrosulfite and caustic soda to make the indigo soluble in water. To achieve different hues of denim, the yarns are dipped in a series of baths with the dissolved indigo dye. Depending on the final shade, a dyeing chain can be made up to a number of eight baths. After each bath, the yarns are exposed to the air so the dye can oxidise from a green to blue colour, as can be seen in figure 3.

However, the indigo dye will not penetrate the fibres completely: it will only bind to the outer layers of the yarn, giving it the authentic property to fade over time or in the laundry. The dyeing chain concludes with a number of water baths to wash off the excess dye and neutralise the chemicals. To cast different colour shades like turquoise or black, sometimes the yarn is pre-dyed with sulfur before entering the indigo baths (Szmydke-Cacciapalle, 2018).

To prepare and strengthen the yarn for the weaving process, the yarn will receive a protective layer called a **sizing** agent, made from (corn) starch.

After the dyeing and sizing process, the yarns are dried to prepare for **weaving**. Traditional denim is made on a shuttle loom where the weft yarn (a white thread that weaves through the blue threads) travels from left to right inside a shuttle, skipping three blue threads at a time. Instead of being cut off when reaching the end, the shuttle turns around producing a clean, closed edge called the self-edge or 'selvedge'- a term still used in premium denim. Because shuttle looms are limited in fabric width and production speed, nowadays they are used for premium denim, 'regular' denim is produced on much faster looms: projectile, rapier or air-jet looms. These looms can weave 20 meters of fabric per hour and therefore a better fit for large-scale production. Unlike the shuttle loom, the weft yarns are cut when reaching the end, enabling more threads to be woven simultaneously, but leaving an open edge to the fabric (Szmydke-Cacciapalle, 2018).

When the denim fabric is woven, additional processes are needed to give the 'loom state' fabric more stability and a softer look and feel:

• **Singing** burns the surface hair of the fabric to give it a smoother look.
• **Skewing** will fixate the fabric in the opposite direction of the woven twill to prevent the legs of the jeans from twisting after wash.
• **Sanforizing** pre-shrinks the fabric, to prevent it from shrinking during laundry.
• **Thermofixation** is used to control the performance of stretch denims.

After these basic finishes, the denim fabric is called 'raw denim', a term G-star uses in its brand name. Since many consumers find raw denim too dark and stiff, most denim is **desized** (to remove the starch used in the weaving process) and treated with an **additional coating** before traveling to a garment factory for further assembly.

Once the denim is **transported** to the garment factory, factory workers will plot the different patterns of denim garments, like jeans but also jackets, skirts and blouses, onto the fabric. To optimise the total use of the fabric, the **patterns are spread** using (nowadays AI-driven) computer programs. Once the patterns are projected onto the fabric, a saw will **cut the patterns** from several layers of denim at the same time. This is mostly done by hand, with the protection of a steel glove to prevent potential injuries.

Once the denim is cut into patterns, the jeans is ready to be put together. In only a few minutes time jeans are sewn together on a **sewing** machine. After sewing, the jeans will be inspected on its intended quality and additional **rivets, buttons, zippers and a leather patch** will be attached to the jeans. The jeans is now ready to be packed and sold, but most jeans will be pre-washed first to mimic natural ageing.

JEANS PRODUCTION

FARMING **HARVESTING** **GINNING** **TRANSPORT** **WAREHOUSE**

SINGING & SKEWING **WEAVING** **DYEING & SIZING** **SPINNING & WARPING** **CARDING**

QUALITY CONTROL **FABRIC ROLLS** **PATTERN SPREADING** **CUTTING PATTERNS** **SEWING**

DRYING **STONE WASH** **PP SPRAY** **DISTRESSING** **RIVETS & BUTTONS**
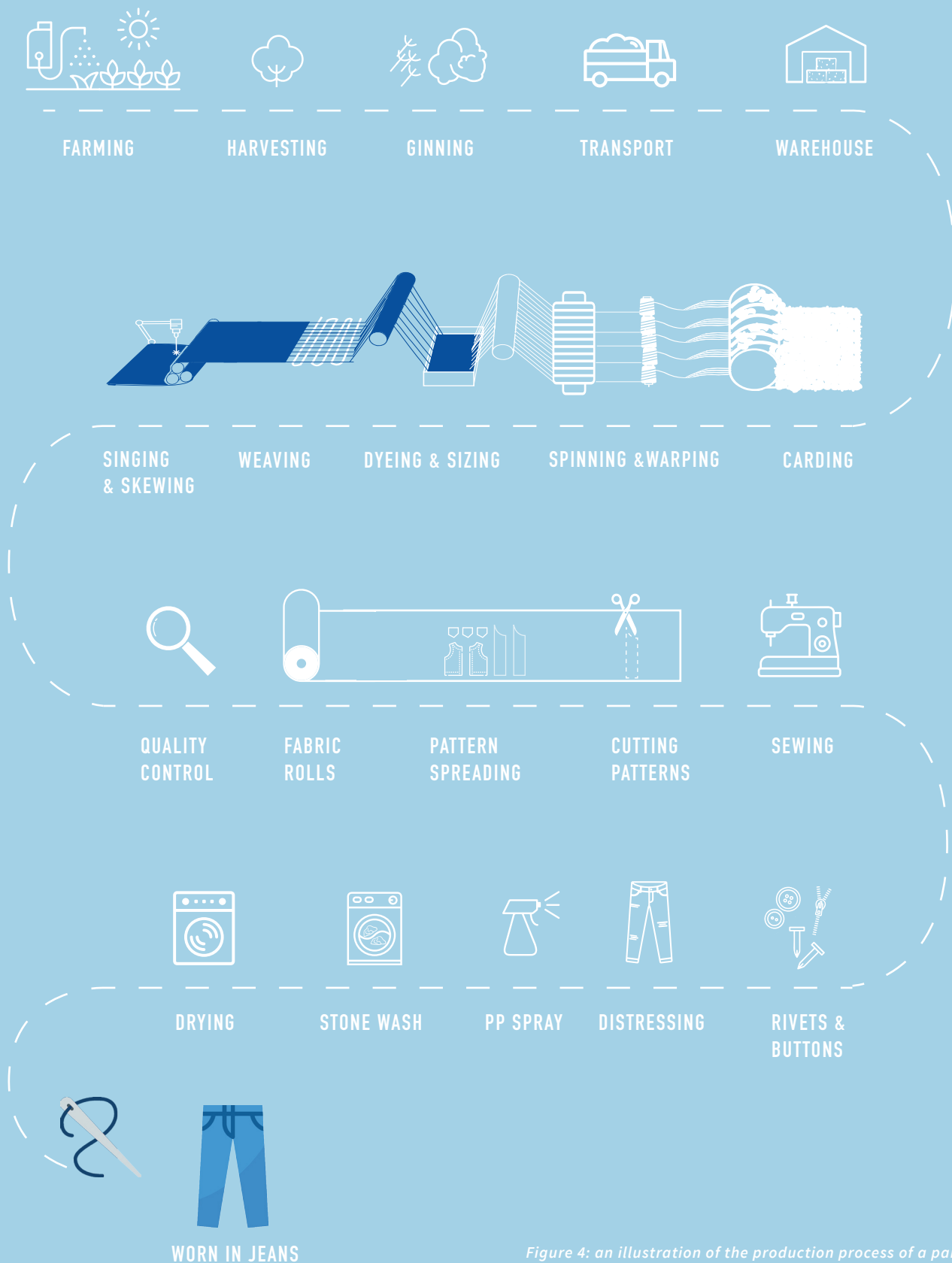
WORN IN JEANS

Figure 4: an illustration of the production process of a pair of jeans.

Figure 5: a garment worker sanding the backside of a jeans (Photo from dandc.eu, 2015)

Figure 6: Indigo coloured water in stonewash at Saitex (photo from Everlane, 2019)

The pre-washing of the jeans happens in two stages: first, **'dry-processing'** will add whiskers (crease lines in the crotch area), honeycombs (crease lines at the back of the knees and on the bottom of the legs) and local worn-out areas. Dry-processing is mostly done by hand using sandpaper, power tools and potassium permanganate (PP) spray - a heavy and dangerous bleaching agent - but can also be done by using a laser technique. Second, **'wet-processing'** or washing will give the jeans a more overall fade. Original techniques used in wet processing are the stonewash (sometimes combined with acid), bleach, acid and the enzyme wash (often several techniques are combined), more modern and sustainable alternatives are an ozone wash or stonewash by abrasive drum (noStone) (Wentholt, 2019).

Once the jeans are washed to its desired style, they will be washed once more in a regular machine to remove any remaining fibres and chemicals, before they are dried, flattened, packed and ready to be shipped.

3.2 THE IMPACT OF JEANS

Now that we know how jeans are produced, we will dive further into the impact of jeans. The impact of jeans can be seen from a social and environmental perspective. Since both social and environmental impact is important to *"meet the needs of the present without compromising the ability of future generations to meet their own needs",* both sorts of impact will be explored.

SOCIAL IMPACT

To determine the social impact of a jeans, working conditions and wages were looked at during three stages of the production process: the production of raw materials, the manufacture of fabric and garment assembly.

According to the cotton strategy of TextileExhange (2016), approximately 100 million farmers are working in the cotton industry - a third of which is used for denim (WWF, 1996). Most of these farmers grow conventional cotton, often using genetically modified (GMO) seeds, because of its higher yield and better economic prospects. However, growing conventional cotton has many downsides. Toxic pesticides and herbicides are sprayed onto the cotton every day, contaminating both the soil and health of the farmers. As various pests become resistant over time, cotton needs even more and heavier pesticides, leaving farmers at greater danger for their personal health and financial risk. Agricultural chemicals can take up to 60% of a farmer's production budget (People Tree, 2009) and since many farmers are not able to pay back these loans they get trapped in a downward spiral of debt; sometimes even resulting in suicides (Rieple & Singh, 2009).

Luckily there are alternatives for conventional cotton, like Better cotton (BCI), Organic cotton (GOTS, OCS), Fairtrade cotton and cotton Made in Africa (CMiA). These initiatives vary a bit in their approach, but most are focussed on helping and educating farmers to grow

cotton in a way that reduces stress on the local environment and improves the livelihoods and welfare of farming communities (BCI, 2019). Some of these initiatives like organic cotton focus more on environmental and therefore human health and safety and others on better economic compensations like BCI and Fairtrade.

The second factor determining the social impact is the conversion of cotton to fabric in textile mills. Although many denim mills today are (partly) automated, mill workers can be exposed to the dusty atmosphere of the spinning process, that can be dangerous if inhaled. Besides the dust, some workers (mostly in less developed countries) are still exposed to the chemicals and fumes from the dyeing process. Very little textile mills comply with basic standards on working conditions and minimal wages, as pointed out by Andrew Olah, CEO of Olah Inc. and founder of Kingpins (denim supply chain shows): *"Virtually none of our denim mills have an SA8000 or a WRAP (both social compliance) certification, which is disappointing"*. According to Olah, the reason for this is that textile mills are not as heavily scrutinised as garment factories and are simply not asked to have a standard.

Finally, the last determining factor of social impact are the working conditions and wages in garment factories. TextileExchange estimates that between 60 to 70 million people work at factories in the garment industry worldwide (TextileExhange, 2016). After the Rana Plaza collapse in Bangladesh in April 2013, where more than 1.100 garment factory workers were killed, trade unions, clothing brands and NGOs agreed on strict rules for future manufacturing in the Bangladesh

Agreement (Modint, 2018). The Agreement ensured better safety and working conditions for garment factories workers. Now, six years after the collapse, many denim factories comply with the requirements of audits and certifications, but most brands do not pay more than the minimum living wages required.

ENVIRONMENTAL IMPACT

In 2012, the American Chemical Society was one of the first to declare that the production of a single pair of jeans consumes more than 8000 litres of water, half a kilogramme of chemicals and a huge amount of energy, as illustrated in figure 8, p. 30. This multiplied by the 2 billion pairs of jeans produced every year put the question of sustainable production on the map of the textile industry (Amutha, 2017).

Since then, the denim industry is associated with several problems of environmental impact. First, there is the problem of environmental pollution caused by the production process, figure 7. Wastewater and effluent from dyeing processes are often dumped in rivers and waterways used by local inhabitants as a primary source of water, making the water not only polluted but sometimes even toxic and killing most of its aquatic life (Greenpeace, 2011).

The second problem in the denim industry is the production of waste. During the production process, cotton fibres and scraps of fabric are often discarded instead of reused. This waste created during the production process is referred to as pre-consumer waste and can be directly recycled into new materials. Textile waste that is discarded after its use

Figure 7: Photos showing the environmental pollution of the denim and cotton industry. (photos from Greenpeace, Getty Images)

by consumers is called post-consumer waste. Most of this waste ends up incinerated or in a landfill. Although some is donated to third world countries or recycled into isolation materials, only less than 0,1% is used to upcycle post-consumer waste into new raw materials (Wieland textiles, 2019).

Finally, the third problem is the overproduction of denim. Since production is often cheaper in bigger volumes (economies of scale), brands produce as much as needed to keep their production prices below a certain level (Wentholt, 2019). Not only does overproduction lead to huge inventories, when a new trend is introduced, stock that is already available becomes unsellable (Amutha, 2017). Last year, this caused problems for H&M, having an inventory of unsold clothes worth $4.3 billion dollars (New York times, 2018).

However, these are not the only sustainability issues of the denim industry causing an impact. The huge amounts of raw materials, water, energy and chemicals needed to produce only one pair have taken its toll on the environment. An overview of the sustainability issues per topic can be found in figure 9, p. 31 and will be further discussed in the following paragraphs.

WATER
For every pair of jeans on average 8000 litres of water are used for production: the equivalent of producing 6 kilogrammes of meat or more than two months of daily water use for one person living in the Netherlands (Vitens, 2016). Estimated is that 40% (3200L) of this water is used to grow cotton, 20% (1600L) for fabric production and the indigo dye process and another 40% (3200L) is used in the laundry to give it its pre worn look (Giuliani & Wentholt, 2019).

To reduce this enormous impact, there are three essential choices to make:
• What materials are used
• How the fabric is dyed
• What techniques are applied during laundry

For example: if chosen for BCI cotton, up to 20% (640L)of the water used for cotton can be saved, for organic cotton this number is even 92%, leaving just 182L of water needed to grow cotton (Textile Exchange, 2016). When looking at the dyeing process, almost all water can be reused as new if chosen for dyes like pre-reduced indigo or Crystal clear® Indigo (Dystar x Gstar) that do not contain any salts, sulphates, 15% less indigo and 70% less chemicals. The same goes for the laundry; with the right techniques like laser or ozone wash only 1,5L water is required to produce a jeans (Saitex, 2019).

This example shows that by choosing the right techniques and ingredients, the average water footprint of a jeans could already be reduced by 97%.

CHEMICALS
More than half a kilogramme of chemicals is used per jeans in the production process. These chemicals are not only often made from precious resources, but also dangerous and sometimes even toxic for people and planet. Most chemicals require to be filtered from wastewater before they are released into public waterways, but this is a costly and intensive process and most of the time dumped without any reduction of chemicals (Greenpeace, 2011).

But not only chemicals used in dyeing and washing are a problem; 85% of cotton produced is still conventional cotton, meaning there is no restriction of using chemical pesticides and herbicides.
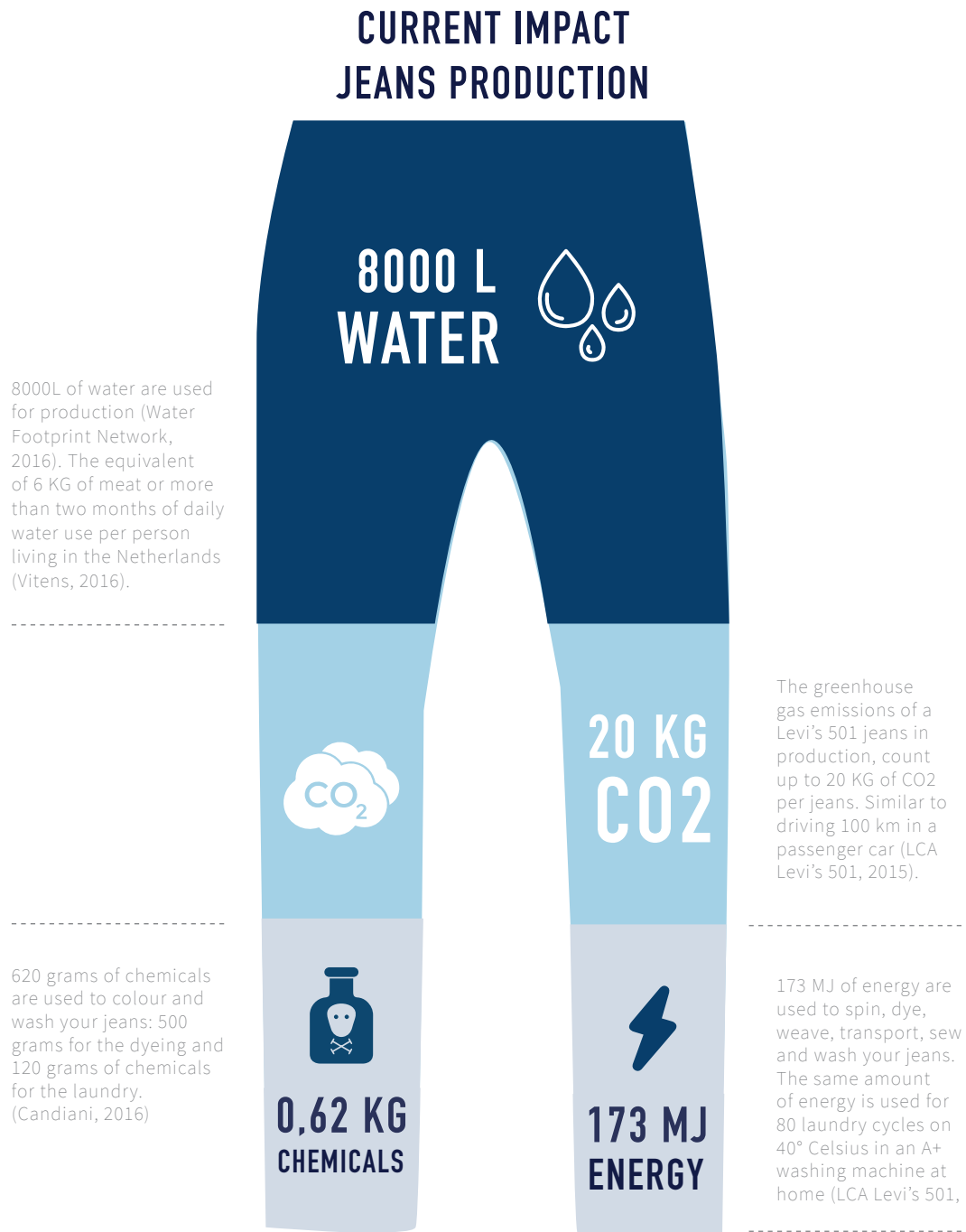
CURRENT IMPACT
JEANS PRODUCTION

8000 L WATER

8000L of water are used for production (Water Footprint Network, 2016). The equivalent of 6 KG of meat or more than two months of daily water use per person living in the Netherlands (Vitens, 2016).

20 KG CO2

The greenhouse gas emissions of a Levi's 501 jeans in production, count up to 20 KG of CO2 per jeans. Similar to driving 100 km in a passenger car (LCA Levi's 501, 2015).

0,62 KG CHEMICALS

620 grams of chemicals are used to colour and wash your jeans: 500 grams for the dyeing and 120 grams of chemicals for the laundry. (Candiani, 2016)

173 MJ ENERGY

173 MJ of energy are used to spin, dye, weave, transport, sew and wash your jeans. The same amount of energy is used for 80 laundry cycles on 40° Celsius in an A+ washing machine at home (LCA Levi's 501,

Figure 8: Illustration of resources used for the production of a single pair of jeans.
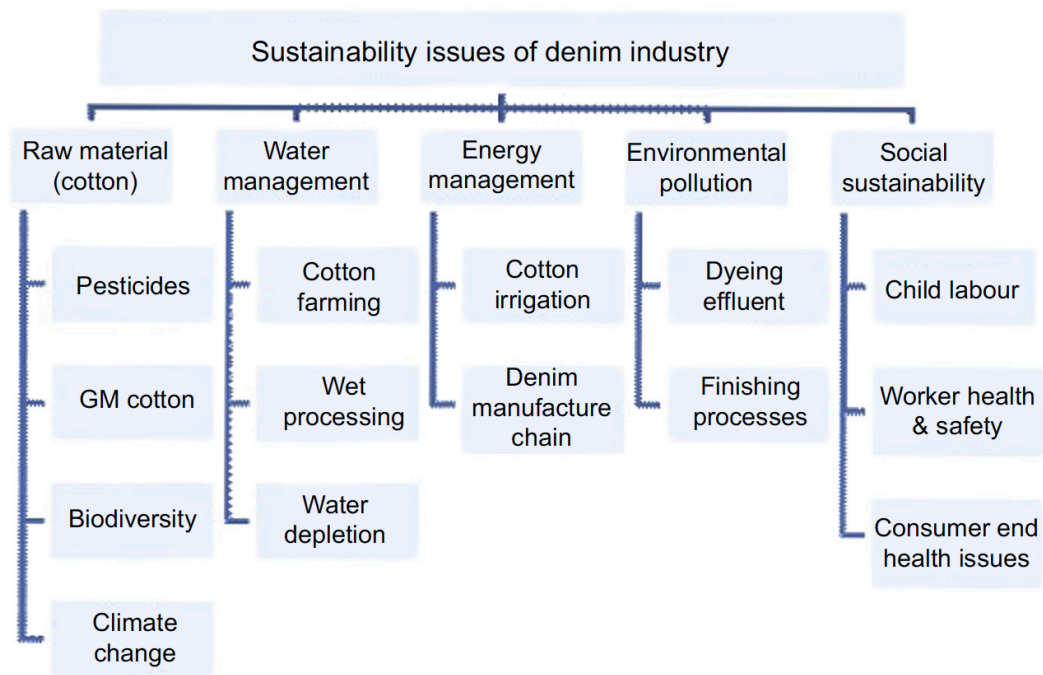
Figure 9: Sustainability issues of the denim industry. GM is genetically modified. (from Amutha, 2017)

Exact numbers of chemicals per kg of cotton are lacking, but most chemicals used in cotton farming are causing severe problems in soil erosion and human health.

By choosing materials with less or no chemicals or pre-reduced indigo dyes and non-chemical washing techniques, the impact of chemicals on the environment can be reduced by more than 65%.

RAW MATERIALS
Cotton is one of the most used fibres in the manufacturing of denim. Additional to the water and chemicals used for farming, a lot of land is needed to yield the amount of cotton asked for today. Land that could otherwise be used for other crops and vegetables.

Apart from cotton, many other fibres can be used with similar qualities. In the first place, raw cotton can be replaced by both pre- and post-consumer recycled cotton. At the moment some experts even say there is so much produced textile already that the production of new sources should not be necessary anymore. However, current recycling technologies shorten the fibres of the cotton, making them

less durable and less good looking, resulting in a need for virgin cotton or other fibres to reinforce recycled fibres.

Even other natural fibres can be used in denim, like linen, hemp and nettle as well as viscose and lyocell fibres made from basts like Lenzing's Tencel®, Modal® and Refibra®. These fibres often offer additional properties but are more expensive than cotton.

ENERGY
Since the process of denim includes many machine intensive steps, a lot of electricity is used in the irrigation of cotton, spinning and dyeing the yarns, washing and drying cycles. To reduce this impact, factories are increasingly equipped with solar panels. But even so, the techniques and machines used in production processes can make a huge difference. A projectile loom, for example, uses less energy than the (less expensive) rapier or air jet-looms and ascending heated air from production machinery can be used to dry jeans hanging from the ceiling.

Figure 10: An example of a transport journey used to produce a Levi's 501 (Levi's, 2015)

TRANSPORT

In between production processes, unfinished goods are transported from supplier to supplier. According to the LCA of a Levi's 501, a jeans could be made with cotton from Brazil, that was spun in China, sewn and finished in Pakistan and then sold in Europe, travelling many kilometres in the process (figure 10). To reduce the impact of transport, jeans should be more locally produced or at least more around the area where the jeans will eventually be sold.

3.3 CHAPTER CONCLUSION

In this chapter, the production and impact of a jeans were described from crop to shop to give an impression of the current system and technologies used in jeans production. Not only is this production very complex; many different stakeholders are involved across the value chain. The more stakeholders are involved, the harder it becomes to get a full grip on the system and to change it towards more sustainable practices.

Therefore, the total impact of a jeans is profoundly complicated: like described in the previous paragraphs, many factors contribute to its final impact. However, not all of these factors can be influenced on product level; like waste management, energy use and transport. Moreover, their contribution to the total impact is minor compared to other factors and therefore not taken into account for this product level jeans rating.

The remaining impact factors (water, chemicals, raw materials and social impact) are assessable on product level but not independently: these are influenced by decisions made during the development of a jeans - *what materials are used, how the denim is dyed, how the jeans are laundered, where the jeans are produced and under what working conditions.* As shown in previous examples, these decisions (like the choice for organic cotton) have a considerable effect on the total impact - *in the case of organic cotton even a possible water footprint reduction of 97%.* Furthermore, they are made on product level, meaning these decisions are unique for every single jeans developed and assessable on product level.

Not only do these decisions simplify the way of assessing the impact of a jeans, for the development of a product level jeans rating, these choices (materials, dyes, washing techniques and working conditions) are important factors to represent the total impact and will be the starting point for further development.

SUMMARY

Producing a pair of jeans is an art just as much as a science. Many stakeholders contribute to its final look and complexity of the supply chain. The more suppliers involved, the harder it is to stay in full control and manage production. Unfortunately, this is how 'mistakes' in sustainability are easily made.

The most significant and best-known impact of a pair of jeans is the use and pollution of water. Planet and people are suffering from water depletion and the chemicals used in dyes and washes. But not only water and chemicals make up its impact: the use of energy, waste production, transport and working conditions are starting to get attention as well.

Not all of these factors can be influenced on product level, therefore only water, chemicals, raw materials and working conditions will be used for the development of the impact index.

KEY INSIGHTS

The impact of a pair of jeans is influenced by many individual factors. Most factors that are contributing to this impact are influenced by processes or choices made during development. For example, water use is probably the most impactful factor in denim production but is influenced by choice of materials, the type of dyes and amount of washes used during production.

Therefore, **choices made in design and production define the total impact.** To reduce this impact, we should ask ourselves at every 'stage': What is the most clean & fair option?

To assess the impact of a jeans, the following choices will be evaluated:

- What materials are used
- How the fabric is dyed
- What techniques are applied during laundry
- What are the working conditions of suppliers

NEW SOLUTIONS & INNOVATIONS

To assess whether or not a jeans is produced in a sustainable way, the landscape of sustainable alternatives has to be examined. Since Greenpeace launched its 'Dirty Laundry' report in 2011, many new technologies were introduced to decrease the use of water and hazardous chemicals in denim manufacturing. To get an overview of how these new technologies can help reduce impact, I attended a denim academy course by Maarten Wentholt (see Appendix A) and executed desk research. An overview of the most important technologies for the development of the impact index will be discussed in this chapter.

4.1 CLEANER PRODUCTION

ALTERNATIVE OR RECYCLED FIBRES

To replace impactful cotton in jeans production alternative or recycled fibres can be used. However, to achieve a desired quality it is often better to blend these alternative or recycled fibres with virgin cotton. This way, blending new fibres with recycled or alternative fibres will not only reduce the impact, it also enables future recycling opportunities since a blend reinforces the fibres in the material. Today, alternative fibres used in jeans are post-consumer recycled (PCR) cotton, linen, hemp, nettle, Tencel® and Refibra® (a new fibre consisting of Tencel® and recycled cotton).

PRE REDUCED INDIGO

Without blue dyes, there would be no blue jeans. But since the pigments in the indigo dyes are not naturally soluble in water, many chemicals are needed to attach the indigo dye onto the cotton fibres of the denim fabric: a process called pre-reduction. The impact of

these chemicals can be drastically reduced in lab settings by hydrogenation, that only produces water as a by-product rather than the sulfites and sulfates in the regular indigo dyeing process (Szmydke-Cacciapalle, 2018). According to Dystar, one of the producers of pre-reduced indigo, these dyes are easier to handle, less risky for the health of workers and use up to 70% fewer chemicals and 15% less indigo (Szmydke-Cacciapalle, 2018).

However, pre-reduced indigo dyes are not the only greener dyeing methods. In a partnership between Dystar and Artistic Milliners (a denim mill in Pakistan) Cadira denim was invented: a combination of Dystar's 40% pre-reduced indigo with an organic and biodegradable reducing agent that replaces the need for sodium hydrosulfite completely. Since this new reducing agent causes no salts as a by-product, the effluent is easier to remove from the wastewater. Almost 100% of the water can be recycled, solving one of the biggest challenges in the recycling of water in dyeing processes (Szmydke-Cacciapalle, 2018).

LASER

Fifteen years ago, the first laser machines entered the denim industry to replace the manual dry processing techniques used in laundry facilities. Powerful light beams of laser machines were used to abrade upper layers of the fabric and produce locally faded surfaces as well as whiskers without damaging its quality. A highly precise technique that is easy to reproduce using guided software (Stege Bojer, 2017).
However, the first laser machines gave a rather fake appearance and were therefore not really successful. Since then, laser technology has been developed into patterns and designs that

Figure 11: Saitex' worker opens one of their stonewash machines (photo property of Saitex).

- INDUSTRY TRANSFORMERS -

CANDIANI SPA

Candiani SpA has been operating for more than 80 years. As a real family mill, four generations of denim weavers have lived and worked on these grounds, each bringing their own signature to the family business. Their location right in the middle of a natural reserve near Milan has influenced the mill's green mindset and is even known as "The greenest mill in the blue world".

Alberto Candiani, currently leading the mill's sustainable revolution, teamed up with a competitor; Canepa, that provides him with Kitotex®. This novel sizing agent made from shrimp shells replaces the usual mix of starch and PVA to prevent microplastics from ending up in the wastewater.

Candiani believes that when it comes to innovation, you have to collaborate to come up with something good, and never think about the cost first. The mill's unique range of dyes includes the eco-friendly N-denim®, which increases the penetration of the dye in the yarn, meaning less chemical agents are needed to achieve a deeper colour. Indigo Juice® that penetrates the yarn superficially, is used when a faded, vintage look is preferred, saving 2,3 million litres of water per year (Szmydke-Cacciapalle, 2018).

SAITEX INTERNATIONAL

Founded by Sanjeev Bahl, Saitex International is one of the cleanest denim manufacturing facilities worldwide; the LEED-certified facility recycles 98% of its water, uses alternative energy sources and repurposes byproducts such as sludge into bricks so new houses can be built (Everlane, 2019).

A few years back, Sanjeev found himself dissatisfied with the state of the industry, its environmentally damaging practices and the pointing fingers mentality that existed. He decided to tear down Saitex's previous building and rebuild their current facility, aiming to make Saitex the cleanest, most sustainable, denim manufacturing facility on the planet (Everlane, 2019).

Not only does Saitex recycle 98% of all water used into drinking water quality, they also use renewable energy resources like solar power to reduce energy consumption, offset their emissions by planting trees and air-dry their jeans, using air recycled from hot factory machinery. The toxic sludge is turned into bricks to build affordable homes, and part of the revenue is donated to a nearby orphanage for education.

are indistinguishable from manual techniques, and today there is nothing as good as a laser to get rid of harmful dry processing techniques used in laundries. Jeanologia and Tonello are best known for providing these lasers, and both of them work closely together with industry partners to keep improving their techniques.

OZONE

Laser technology and ozone processing are probably the most significant advancements to cleaner production in the denim industry. Ozone gas was first applied in laundry processes to get rid of redeposition (dye pigments released in the water that can back stain denim in the same way a red sock can ruin a load of white laundry). Later it was discovered that it was not only useful to remove redeposition but to fade the denim shade completely (Stege Bojer, 2017). Because of its high oxidation abilities, ozone can replace harmful chemicals used to bleach jeans and since the ozone gas can be removed from the water by UV radiation, all water used in the process can be fully recycled - saving up to 30 litres per pair of jeans (Szmydke-Cacciapalle, 2018). Thanks to the sterilizing effect of ozone the fabric even gets cleaned in the process. The only downside of this technique is that the ozone, mostly reacts with the blue indigo pigments and leaves the yellow and green pigments behind, casting a bid of a greyish look on the denim.

NO STONE

One of the most popular denim looks over the years is probably the stonewashed jeans. Stonewashing is achieved (like the name says) through washing jeans with pumice stones, creating a vintage, worn-out effect. While many brands today still use traditional methods, it is possible to achieve the same effects with a much lower impact. In 2015, Tonello and Levi's collaborated on the mechanical No Stone® technology, declaring the end of "the Stone Age" in denim. This No Stone® technology replaces the use of pumice stones with an abrasive drum (a laundry drum with a surface comparable to sand paper) that is attached to

the inside of the washing machine, mimicking the contact of stones on fabric (Szmydke-Cacciapalle, 2018). The biggest advantage of this technique is that the garments need less additional rinses afterwards to remove the stones and machinery will last longer due to less intensive washes.

ENZYMES

Another way to mimic a stonewashed look is by using enzymes. As Alberto De Conti, a chemical expert in jeans, explains:

"Both enzymes and pumice stones break down cotton fibres and free up the indigo molecules. The breaking is physical in the case of stones and chemical in case of the enzymes. The problem with enzymes is that the freed indigo tends to go back and re-deposits on the surface of the cotton returning that undesirable effect called "backstaining" (Szmydke-Cacciapalle, 2018)."

To eliminate this aesthetic trade-off, a chemical compound based on enzymes was developed to remove the redeposition from the water. As a result, wastewater is easier to treat, costs are lower and the performance more consistent, while rivets and buttons stay protected. Since enzymes are proteins that are present in all living cells, they are biodegradable, leave no waste products and are accepted under Bluesign, one of the most strict certifications in the field (Szmydke-Cacciapalle, 2018).

4.2 CIRCULAR JEANS

Incorporating these new cleaner technologies, several brands prove the future of jeans is not only sustainable but even circular. G-star, C&A and Mud Jeans are some of the brands currently working on new concepts to take the denim industry to a higher level: cradle to cradle jeans and jeans as a leasing service.

CRADLE TO CRADLE JEANS

Cradle to cradle is a form of regenerative design, introduced in 2002 by McDonough Braungart Design Chemistry consultants, as a holistic, economic, industrial and social

framework that aims to create systems that are not only efficient but also waste-free (Hunter Lovins, 2008). In the cradle to cradle philosophy, a product should not only be designed with the least impact possible but also allow future re-use, repurpose and remanufacturing so its resources will not be wasted like in cradle to grave scenarios. This philosophy transformed into a certification system to certify products that follow this philosophy on different levels: bronze, silver, gold and platinum, each level having more stringent requirements.

The certification system is considered the most stringent certification for sustainability and based on the following five criteria:
- Material health
- Material reutilisation
- Renewable energy & carbon management
- Water stewardship
- Social fairness

The final product score is based on the lowest-rated criteria. So, for example, if most criteria score gold, but social fairness scores bronze, then the final product score will be bronze (Cradle to Cradle Products Innovation Institute, 2019).

Both C&A and G-star have managed to develop jeans that match these criteria to the gold level standard, meaning these jeans do not use any hazardous chemicals, are designed for recyclability, use at least 50% of renewable energy, generate clean wastewater and have a recognised social responsibility program in place (Cradle to Cradle Products Innovation Institute, 2019).

LEASING JEANS
A whole other approach to circularity came when MUD jeans first introduced their lease a jeans model in 2013. After seeing other industries moving towards product service-systems (PSS), Bert van Son, CEO of MUD Jeans, realised that the most efficient way of closing the loop is to avoid selling jeans in the first place. By remaining owner of the raw

materials, the process of recycling is at the base of MUD jeans' business (MUD jeans, 2019).

Any jeans from the MUD jeans webshop can be bought or leased. After paying a one-time membership fee, a jeans can be leased for €7,50 a month. After one year, MUD jeans contacts their customers to see if they want to keep their jeans or if they want to switch and recycle. If they choose to keep wearing their jeans, the monthly leasing fee stops, if chosen for a switch a new leasing program will start automatically. Even when customers choose to wear their jeans a little while longer, almost all jeans find their way back to MUD to be recycled (Engelen, 2019). To handle the returns of their leased jeans, MUD jeans uses a reusable packaging service called Repack, decreasing even the environmental impact of their logistics (MUD jeans, 2019).

4.3 ADOPTION OF NEW SOLUTIONS

Although these developments are rather new, most solutions and innovations discussed in this chapter like **pre-reduced indigo, laser, ozone and enzymes**, are developed by well-known industry suppliers of machinery and chemicals and already widely available and used by brands and retailers to decrease the impact of their garments. These developments can be seen as *sustainable commodities* and expected to be used by all brands and retailers.

Other innovations such as the **NoStone** technique or **alternative materials** are still less used in the industry, because of their higher investments or material costs. Just like newer innovations such as **Cadira denim, Cradle-to-Cradle denim and indigo foam dyeing** (that was only introduced a few weeks before the end of this thesis) these techniques or innovations are developed by brands or partnerships and can be seen as *sustainable premiums*: only used by a few brands or retailers and mostly in smaller amounts.

- CHAPTER OVERVIEW -

SUMMARY

Since the 'Dirty Laundry' and Detox campaign of Greenpeace in 2011, the fashion industry has been working to reduce its impact on the environment. Many new technologies were introduced to decrease the use of water and hazardous chemicals in denim manufacturing.

This chapter explained some of the most important new developments into more details:
- Alternative or recycled fibres
- Pre-reduced indigo
- Laser abrasion
- Ozone wash
- No-stone wash
- Enzyme wash

Also, two transformers in denim development were featured in this chapter: **Candiani SpA and Saitex**. Candiani is an Italian denim mill that carries the title 'the greenest mill in the blue world' with pride. Operating from within a natural reserve, clean manufacturing is part of their DNA. Candiani is continually looking for ways to improve their production even further, challenging the entire denim industry.
Saitex International is one of the cleanest denim manufacturing facilities worldwide; the LEED-certified facility recycles 98% of its water, uses alternative energy sources and repurposes byproducts such as sludge into bricks so new houses can be built (Everlane, 2019).

The chapter further discusses other initiatives that take sustainability to a higher level - **cradle to cradle jeans and jeans as a service** - and concludes with an overview of the adoption of these cleaner technologies.

KEY INSIGHTS

To understand how these new technologies can help reduce impact, I attended a denim academy course by Maarten Wentholt (see Appendix A). My key insights from this course combined with other research:

When going through the process yourself, it becomes more tangible and understandable; **experience is key to relate to the subject** and could be used to engage consumers.

There is **not just one technology or process that is a sustainable choice**; there are many which can be combined: processes fall into certain categories, that can be clustered per level of impact.

When looking at the level of adoption of new technologies or innovations a division can be made: technologies developed by bigger industry suppliers become *sustainable commodities* (sustainable techniques that are easily scalable and therefore accessible to a bigger audience), *sustainable premiums* are innovations by brands or partnerships that are developed on a smaller scale and therefore become more niche.

Post-consumer recycled cotton fibres are spund into new yarns.

INDUSTRY DEVELOPMENTS

To organise towards cleaner and better production in the fashion industry, multiple initiatives were developed to get a better grip on the value chain and make production processes more transparent. This chapter presents several initiatives to see what is already happening, which developments could contribute to the impact index and how the index can differentiate from other initiatives. The chapter will present the most important findings concerning the development of the index: a complete analysis of initiatives and rating systems can be found in Appendix C.

5.1 INDUSTRY INITIATIVES

DETOX DENIM

In 2012 Greenpeace launched its Detox campaign to address the widespread use of hazardous chemicals in the fashion industry. In countries like China, Indonesia and Mexico, nasty chemicals were often released into public waterways, and this campaign was the first initiative that challenged big brands to take responsibility for their environmental impact. To improve the water quality in the above mentioned countries, the campaign urged brands to regulate the use of hazardous chemicals in their production facilities and commit to achieve zero discharges of hazardous chemicals by 2020 (Greenpeace, 2018).

A total of 80 brands accepted this challenge; a clear message that the industry understood something needed to change. With this success, the initiative was an important first step to clean up the industry and many initiatives and innovations followed in its footsteps (Greenpeace, 2018).

ZDHC

Following the detox commitment, the Zero Discharge of Hazardous Chemicals (ZDHC) Foundation was set up to help brands participate in the programme and achieve the goal of zero discharge in 2020. The foundation provides a so-called manufacturers' restricted substance list (MRSL) to limit chemical substances used in the entire supply chain. By preventing the use of hazardous chemicals in production processes, chemicals will not have to be filtered from the wastewater - drastically improving the quality of waterways. Besides the MRSL, the ZDHC also issues guidelines for wastewater, an audit programme to check the level of compliance with the MRSL and software modules to control substances in product development; all compliant with the Higg Index (Szmydke-Cacciapalle, 2018).

SUSTAINABLE APPAREL COALITION (SAC)

Another initiative, the Sustainable Apparel Coalition (SAC), was founded by Patagonia and Walmart as an industry-wide alliance between apparel, footwear and textile companies. Collaboration is key in this coalition: by becoming a member of the SAC, brands, retailers and manufacturers commit to transparency and share their best practices to make meaningful improvements happen. To facilitate this process and create more unity and transparency in the industry, the SAC developed the Higg Index, a standardised value chain measurement tool for all industry participants.

CONVENANT DUURZAME KLEDING EN TEXTIEL

Since many brands and retailers outsource their production to less developed countries (to profit from lower minimum wages), human rights, worker health, safety, environmental protection and animal rights are at risk. To avoid these risks, companies have to oblige to international guidelines and agreements for business and human rights. However, problems in developing countries are often so complex that companies can improve very little by themselves. To join forces, a broad coalition of partners, including industry associations, trade unions, NGOs, and the Dutch National Government, have signed the 'Convenant Duurzame Kleding en Textiel' (Dutch Agreement on Sustainable Garments and Textile) (SER, 2019).

Parties signing the agreement commit against discrimination, child and forced labour, and support living wages in safe and healthy working environments. Besides the focus on social impact, participants aim to reduce a negative impact on the environment, prevent animal abuse, reduce the use of precious resources like water and electricity and to produce less chemical waste and wastewater (SER, 2019). All participants share their supplier lists to increase transparency and issue a yearly strategy describing plans to improve their *due diligence* and reflect on their previous strategy.

5.2 CERTIFICATIONS

A different approach to distinguish better products is through the use of certifications. Certifications are mostly used as industry or marketing tool to communicate compliance of specific standards by using (on product) logos or certification marks. Certifications are considered a reliable source of information since most certification standards are checked by independent third-party audit agencies. However, certifications are often only focussed on a small part of the production process, resulting in a need for many certifications to cover the whole supply chain. One certification gives thus little insight into the impact of the entire production cycle. Besides this, certifications are often expensive to acquire, making them more easily accessible to bigger companies than smaller ones.

To answer to the growing demand for more transparency and information, a jungle of certifications has developed over the recent years. According to the Dutch Certification index of Milieu Centraal, nowadays 24 different certifications are active in the fashion industry alone. This not only confuses and fatigues industry stakeholders (that constantly need to adapt and invest in other standards), it does not contribute to transparency for consumers either. Apart from the number of certifications to take into account, most of these certifications marks are not even mentioned to consumers on offline product information, and if mentioned online, brands expect consumers to know what they stand for.

To investigate which certifications are most important for the impact of denim and could be used to quantify certain materials/ techniques/ processes in the impact index, the following pages will explain the 17 most important certificates for the denim industry in a certification overview. The overview and assessed variables are based on the 'Sustainable Fashion Guide' of ABN Amro (ABN Amro, 2018), supplemented with information of Goedewaar.nl and Modint.

- OVERVIEW CERTIFICATIONS -

BETTER COTTON (BCI)

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	▨	☐
MATERIALS PROCESSING	☐	☐
GARMENT FINISHING	☐	☐

The Better Cotton Initiative (BCI) aims to improve the sustainability of mainstream cotton production. Farmers must meet minimum environmental and social requirements for their cotton to qualify as Better Cotton. Continuous improvement through the education of farmers is a key element of their program (BCI, 2019).

OCS BLENDED

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	☐	▨
MATERIALS PROCESSING	☐	☐
GARMENT FINISHING	☐	☐

The Organic Content Standard (OCS) applies to any non-food product containing 5-100 per cent organic material. It verifies the presence and amount of organic material in a final product and tracks the flow of raw materials from its source to the final product. The verification process is controlled by an accredited third party (Control Union, 2019).

OCS 100

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	☐	▨
MATERIALS PROCESSING	☐	☐
GARMENT FINISHING	☐	☐

Just like OCS blended, OCS 100 verifies the presence and amount of organic material non-food products. OCS 100 covers the processing, manufacturing, packaging, labelling, trading and distribution of a product that contains at least 95 per cent certified 'organic' materials. (Control Union, 2019).

GOTS ORGANIC COTTON

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	☐	☐
MATERIALS PROCESSING	▨	☐
GARMENT FINISHING	▨	☐

The Global Organic Textile Standard (GOTS) is recognised as the world's leading certification for textiles made from organic fibres. To comply with this standard, high-level environmental criteria, as well as social criteria must be met along the entire supply chain of the product (Global Standard, 2019).

FAIRTRADE

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	☐	▨
MATERIALS PROCESSING	▨	☐
GARMENT FINISHING	▨	☐

Fairtrade changes the way trade works through better prices, decent working conditions and a fairer deal for farmers. The Fairtrade standard organises farmers in democratic producer organisations and environmentally sound agricultural practices. The certification ensures a Fairtrade Minimum and Fairtrade Premium price (Faitrade International, 2019).

COTTON MADE IN AFRICA

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	▨	▨
MATERIALS PROCESSING	☐	☐
GARMENT FINISHING	☐	☐

Cotton made in Africa is an initiative of the Aid by Trade Foundation (AbTF) that helps smaller African cotton farmers to improve their living conditions. Framers must meet minimum environmental and social requirements to qualify their cotton as CmiA (Textile Exchange, 2016)

| STRONGLY ACTIVE | ACTIVE | LIMITLY ACTIVE | INACTIVE |

- OVERVIEW CERTIFICATIONS -

EU ECOLABEL

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		▢ (filled)
GARMENT FINISHING		

The EU ecolabel is a European climate certification for non-food products and services produced with lower environmental impact regarding raw materials, energy, water, harmful substances, waste and packaging. The EU ecolabel aims to stimulate sustainable production and consumption (Europees Ecolabel 2019).

OEKO-TEX 100

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING		▨ (hatched)

The OEKO-TEX standard 100 is a testing- and certification-system for the textile industry, focused on reducing harmful substances and protecting consumer health. Although the primary focus is health, criteria for harmful substances overlap with criteria for sustainable products (OEKO-TEX, 2019).

BLUESIGN

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING	▨ (hatched)	▢ (filled)
GARMENT FINISHING	▨ (hatched)	▢ (filled)

Bluesign is a holistic system that provides solutions in sustainable processing and manufacturing. As an independent authority, Bluesign checks the progress made by companies itself, provides help in the further development of solutions and continuously optimises its criteria (Bluesign, 2019).

BSCI

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING	▨ (hatched)	▨ (hatched)

The Business Social Compliance Initiative (BSCI) aims to improve working conditions and eliminate forced or child labour. Members of the initiative have to design a plan to comply with the International Labour Organisation (ILO) standards. BSCI is not a 'real' certificate and members are encouraged to work towards an SA8000 certification (Goede waar, 2012).

WRAP

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING	▨ (hatched)	

Worldwide Responsible Accredited Production (WRAP) is an independent team of global social compliance experts that promote safe and ethical manufacturing around the world. WRAP is the largest independent facility certification program in the world and holds three levels of certification - platinum, gold and silver (WRAP compliance, 2019).

SA8000

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS	▨ (hatched)	
MATERIALS PROCESSING		
GARMENT FINISHING	▢ (filled)	

The SA8000 Standard is a leading social compliance certification standard for factories and organisations around the world. SA8000 measures social performance in eight areas important to social accountability in workplaces. (Social Accountability International, 2019).

STRONGLY ACTIVE	ACTIVE	LIMITLY ACTIVE	INACTIVE

- OVERVIEW CERTIFICATIONS -

ETHICAL TRADING

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING		

The Ethical Trading Initiative (ETI) aims to improve working conditions in the apparel and food industry. Members of ETI agree to adopt the ETI Base Code of labour practice, based on the standards of the International Labour Organisation (ILO). Projects of ETI develop and try out new ideas or approaches in practice (Goede waar, 2012).

FAIR LABOR ASSOCIATION

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING		

Members of the Fair Labour Association (FLA) sign the Workplace Code of Conduct and set up internal systems to monitor workplace conditions and maintain code standards throughout their supply chains. The FLA conducts independent and unannounced audits by FLA affiliates to evaluate internal & external compliance (FLA, 2019).

FAIRWEAR FOUNDATION

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING		

Fair Wear Foundation (FWF) works together with brands, factories, trade unions, NGOs and governments to improve working conditions in the apparel industry. Members of the FWF are aware of their liabilities and take responsibility for the labour conditions in the factories they work with. Members continuously improve working conditions by changing the way they do business (Fairwear, 2012).

CRADLE TO CRADLE

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING		

The Cradle to Cradle product standard guides designers and manufacturers through a continual improvement process that looks at a product through five quality categories — material health, material reutilisation, renewable energy and carbon management, water stewardship, and social fairness. Product assessments are categorised into bronze, silver, gold and platinum and performed by an independent testing organisation (c2ccertified, 2019).

NORDIC SWAN ECOLABEL

	SOCIAL	ENVIRONMENTAL
RAW MATERIALS		
MATERIALS PROCESSING		
GARMENT FINISHING		

The Nordic Swan Ecolabel aims to reduce the environmental impact of the production and consumption of products – and to make it easy for consumers and buyers to choose the environmentally best products and services. The ecolabel sets strict environmental requirements in all relevant phases of a product's life cycle and verifies that all requirements are met before a product is approved (Nordic ecolabel, 2019).

| STRONGLY ACTIVE | ACTIVE | LIMITLY ACTIVE | INACTIVE |

The certification overview on the previous pages proves there is not one certification operating in the jeans industry that covers all factors of impact; multiple certifications have to be combined to control the impact of a jeans, asking a lot of effort and resources from brands and retailers.

Therefore, it is important that the impact index will not just become another certification; the index will prove most valuable if current standards and certifications can be combined into this new assessment or rating. This will not only make it more accessible to industry stakeholders, it will also help consumers since a combined score means they do not have to research all these certifications themselves anymore.

5.3 INDUSTRY RATING SYSTEMS

Next to the agreements/coalitions and certifications, industry rating systems are used to improve the industry. These ratings, assess or score products and brands based on a set of criteria depending on the goal of the rating in question. Rating systems can be applied in two ways: the first approach is a rating used internally to decrease the impact of products in development, the second is a product rating by an external independent party to communicate the impact towards consumers and other stakeholders.

The first approach, the internal use of the product rating, is either driven by the intrinsic motivation of a company to produce more sustainably or by the demanded standards of a coalition, agreement or certification like mentioned in the previous paragraphs. These systems are designed to be used within the industry and are more technical and detailed compared to other ratings.

The second approach is driven by the increased demand for transparency; how is a product made and with what materials or processes? These systems are designed for

stakeholders outside of the industry, like consumers or external organisations focussed on improving the industry.

To identify where the different rating systems are positioned in the market and how the impact index can differentiate from existing ratings, the most important ratings were analysed (the extended analysis can be found in Appendix C) and will be discussed in the following paragraphs.

HIGG INDEX
The Higg index is developed by the SAC and consists of three online tools to increase supply chain transparency by communicating in one common language. Although 10.000 industry stakeholders have started using the tool, a complete adoption seems to be challenging: the proportion and level of detail cause the use of the tools to be rather complicated, and many other similar tools are available in the industry (SAC, 2019).

Besides the online tools, the SAC is working on a consumer side of the Higg index: a universal tool to communicate the impact of fashion items towards consumers. The development of this consumer tool is going on for several years now and is being tested with consumers, but some major brands involved in the development of the tool do not fully agree with the way the impact is communicated and are stalling its development (Bruinsma, 2019)

MADE BY MODETRACKER
Dutch non-profit organisation Made-By helps to support fashion brands in the development of cleaner production strategies. One of their instruments is the MODE tracker tool; a rating system that enables and engages fashion brands and retailers to develop a roadmap on a broad range of sustainability issues (Made-By, 2014).

The MODE Tracker integrates several tools and reporting frameworks into a new environment

and brands using the tool can choose to report on certain topics that vary from products, manufacturing processes, end-of-life, social impact and working conditions. MADE-BY communicates the progress of participating brands in a yearly report that brands can feature on their websites for marketing purposes (Made-By, 2014).

Made-By went bankrupt last fall due to unknown circumstances, causing their tool to be out of order: a huge loss for companies like G-star that heavily rely on industry feedback (Bruinsma, 2019).

JEANOLOGIA'S EIM SCORES

Jeanologia's Environmental Impact Measurement (EIM) software helps denim developers build more sustainable processes by assessing the environmental impact of laundry processes on four elements: water, energy, chemicals and impact on workers health. By measuring the current impact, areas of improvement are easily identified, and actions to become more sustainable can be defined and monitored (Jeanologia, 2019).

EIM is used internally by laundries and brands, to decrease their impact in garment finishing and is a great tool for Jeanologia to advertise its technologies. EIM is easy to use; enabling clean garment finishing for all industry stakeholders (Jeanologia, 2019).

FASHION TRANSPARENCY INDEX

The Fashion Transparency Index is an initiative by the Fashion Revolution to spread their belief to the masses. The transparency ranking of the 150 biggest global fashion companies (that are selected based on annual turnover and representation in various market segments) aims to compare what brands and retailers are disclosing, to stimulate brands and retailers to disclose credible and comparable information, and to help the industry develop an understanding of what to share and what consumers may ask

brands and retailers in the future (Fashion transparency index, 2018). Information used as input for the rating consists exclusively on publicly disclosed supply chain information, to keep the assessment transparent in itself (Fashion transparency index, 2018).

RANK A BRAND

Rank a Brand was the first independent brand-comparison website that reviews and ranks consumer brands based on environmental impact, labour conditions and transparency. Brands are given a label varying from A (best) to E (worst), based on an assessment of several criteria. Rank a brand's labels aim to provide consumers with clear purchase advice, figure 12.

Score	% correct	Advice
A	75-100	Shop away!
B	55-75	On track towards sustainabiliy
C	35-55	On its way, but can do better
D	15-35	Should do better
E	0-15	Better put your wallet away

Figure 12: Rank a Brand labels and advice (from Rank a Brand, 2019)

Rank a brand publishes the scores for each brand on their website, alongside with the list of criteria, an overview of a brands performance per criteria and where the rating was based upon. If possible, Rank a brand tries to update their rankings every year, or every two years at least (Rank a Brand, 2019).

GOOD ON YOU

Good On You is an ethical brand rating system that informs shoppers and provides them with the power to make better choices. Good on you believes that fashion brands have a responsibility and should be transparent about their impact and the production processes (Good on You, 2019).
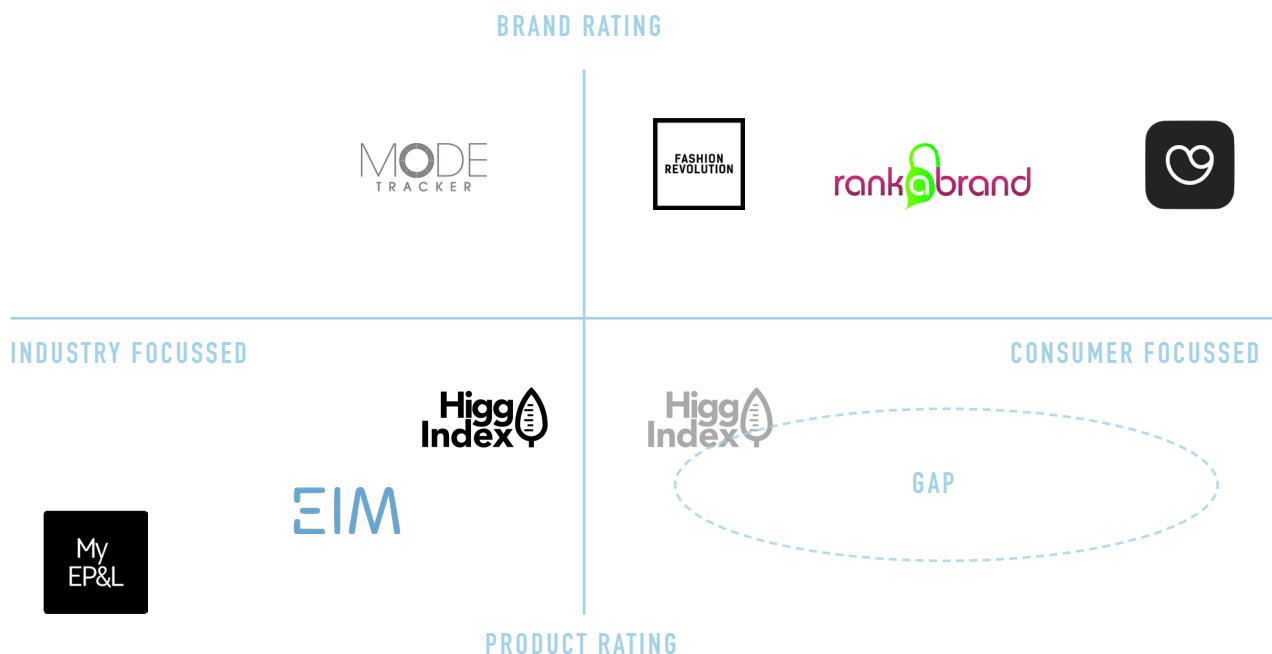
BRAND RATING

INDUSTRY FOCUSSED

CONSUMER FOCUSSED

GAP

PRODUCT RATING

Figure 13: Market positioning of the most used rating systems in the industry divided over industry/consumer focussed and product/brand oriented.

Good on you uses information from different certification schemes, like Fair Trade, OEKO-TEX and the Global Organic Textile Standard (GOTS), as well as other independent rating projects to put together their ratings. Since not all brands can afford certification fees, other standard systems (more than 50 in total) are taken into account as well (Good on You, 2019).

The good on you rating system is based on three topics, people, planet and animals, and the total score is accompanied by purchase advice and a series of smilies ranging from sad to happy (Good on You, 2019).

To advertise their ratings, Good on you offers brands that score either a 'good' or 'great' to publish a 'good on you rated' stamp on their websites. The stamp will indicate to consumers that the brand is making better choices, which could work as positive marketing.

POSITIONING THE IMPACT INDEX
To differentiate the impact index from other rating systems, the different rating systems were mapped on a grid shown in figure 13.

Like discussed in the previous paragraphs, general rating systems can be divided into two categories: industry or consumer focussed. Besides their focus, rating systems either rate brands or products. When looking at the positioning of the different rating systems, it becomes clear that in this industry there is currently a gap in the field of consumer-focussed product ratings. Currently, the only tools that could answer the need of consumers to evaluate products based on impact are certifications, but like concluded earlier there is not one certification that covers all aspects of impact: consumers therefore have to look into multiple certifications to make up their mind.

With the development of the consumer side of the Higg Index this gap could potentially be filled, but since this development is already going on for six years and is dependent on approval of brands and retailers (that do not want to lose their image) it could still take some time before it is launched to market. Besides this development time, the tool is quite complicated, so complete adoption of the tool stays questionable but is needed for the index to become a success.

So for now, positioning the impact index as a consumer focussed product rating seems a solid strategy, figure 14. But how could the impact index compete with a consumer-focussed brand rating that is already strongly

BRAND RATING

INDUSTRY FOCUSSED

CONSUMER FOCUSSED
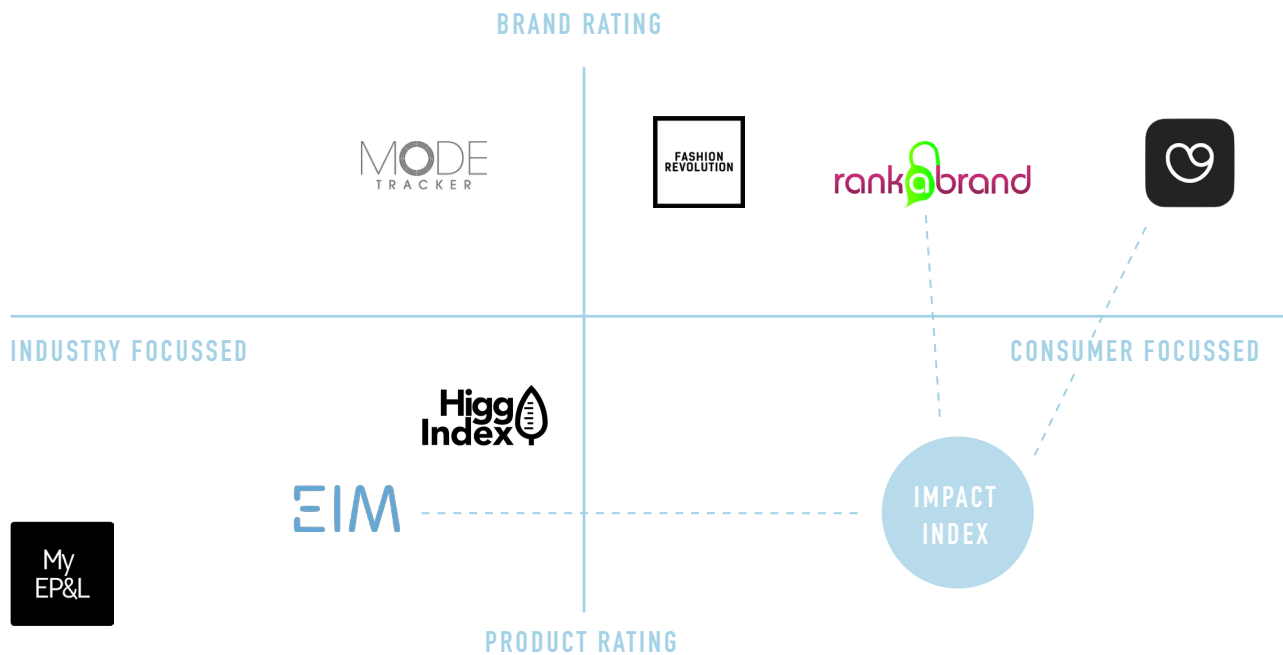
IMPACT
INDEX

PRODUCT RATING

Figure 14: Possible positioning of the impact index, to differentiate from other product ratings.

positioned in the minds of consumers like Good on You?
Even if we compare the purpose of the impact index (to help consumers buy better products and increase market transparency) to the purpose of on Good on You (informing shoppers and providing them with power to make better choices) the two rating systems would serve the same consumer need. So why should we add a product rating to the market?

First of all, the impact index is a denim specific rating: indicating that denim, even more than other garments, is an impactful product that calls for careful consideration. Being denim specific also makes the rating less complicated, since only denim specific materials and techniques need to be considered.

Second, the advantage of a product rating compared to a brand rating is that not all products or subbrands of a brand are generalised with the same verdict. Especially bigger brands can not produce all of their products sustainable overnight; a product rating presents consumers with the opportunity to switch to more sustainable products while staying with their favourite brands. H&M group, for example, consists of nine subbrands of which four (COS, Weekday, Arket and Afound) are more sustainably focussed. Good on You rates all nine subbrands

with the same rating '*It's a start*' while jeans from Arket are transparently produced using organic materials, less intensive finishing and better working conditions, proving that there can be a huge difference between subbrands or products compared to an overall brand rating. Good on You works well with consumers but does not give brands an opportunity to improve their products piece by piece.

Third, by focussing on denim alone, the rating of the impact index is more process-specific and provides consumers insights into the production of a jeans additional to a final rating. This will activate consumers to think about what they find important more than if we would just present a rating. Next to this, it will help consumers understand where the impact comes from and how they could decrease it themselves by making better choices: this makes the impact more transparent and allows a better comparison of jeans from different brands.

Therefore, a product rating would be a valuable market extension and since the intention of the impact index is to combine existing standards and certifications in its rating, suppliers do not have to comply to a new standard (increasing adoption potential) and it eliminates the need for consumers to check multiple certifications to evaluate the impact of a pair of jeans.

SUMMARY

This chapter discussed various initiatives, certifications and industry ratings that play an important part in the denim and apparel industry and that will be used as an inspiration or for implementation of the impact index.

Detox denim, Zero Discharge of Hazardous Chemicals (ZDHC), The Sustainable Apparel Coalition and the Convenant duurzame kleding and textiel are the most important initiatives by demanding better supply chain practices. Brands that are part of these initiatives promise to commit to better standards and work together to improve the industry.

A more concrete way to comply with industry standards is through the use of certifications. Certifications are used to verify product claims about quality or working conditions. Currently, 24 different certifications are active in the apparel industry, of which 17 are active in the denim industry and featured in this chapters certification overview on pages 43-45 to give a complete overview of their activities and approach.

Finally, some existing product ratings were discussed to provide an overview of the different intentions and applications of product ratings in the apparel industry. These ratings were plotted on a market positioning overview that helped determine where to position the impact index to offer the best added value.

KEY INSIGHTS

Many new initiatives, certifications and rating systems are already available and practiced in the apparel industry. Since all players seem to be creating their own systems to optimise production and decrease impact, there is a lack of unity to tackle the problem together.

Communicating in one common language can only be achieved if a majority of all brands, suppliers and retailers decide to use the same index. Getting these industry players all on the same page can be a very complex challenge.

Certifications only focus on a small part of the production process, resulting in a need for many certifications to cover the whole supply chain. One certification gives thus little insight into the impact of the entire production cycle.

A more holistic approach is needed, where different initiatives and certifications are combined into one simple rating indicating if a product is sustainable or not. Such a consumer focussed product rating is not yet present and would be a solid opportunity to develop.

PARALLEL PERSPECTIVE:

A CASE STUDY OF INDICES IN OTHER INDUSTRIES

To conclude the discover phase, the feasibility in terms of the design and the ability of an index to change behaviour was explored by means of a case study. Indices used in four other industries were reviewed: indices are useful tools to create clarity in complex markets or to compare products on a set of criteria more efficiently, by simplifying complex information into product scores or ratings.

This chapter will present a short overview of the different cases and main findings of the study, the complete case study with setup and approach can be found in Appendix D. The most important insights from this case study were translated into design directions for the impact index.

6.1 SET UP & APPROACH

The most well-known rating systems today, are peer to peer reviews of products or services used on online platforms like Booking, Amazon or Airbnb. However, peer to peer ratings are often superficial and lack proper judgement. Also, it is hard to evaluate if someone else's 4-star rating is comparable to your own standards. Therefore, my case study is focussed on rating systems that are still well known and successful, but a bit more controlled.

The following indices were selected because of their widespread success and awareness amongst consumers:
• European Energy label (electric appliances, cars & houses)
• Internet Movie Database (IMDb) (movies)
• Beterleven (animal welfare)
• De grote Hamersma (wines)

To retrieve insights into their setup (why was this index initiated?), design (what does the index measure and how does the index work?) and ability to change behaviour (is there evidence that the index helped change behaviour?), all four cases were reviewed on various levels by means of desk research.

6.2 CASES

EUROPEAN ENERGY LABEL FOR APPLIANCES
The European energy label measures the energy impact of household appliances - ranging from smaller appliances like lightbulbs and vacuum cleaners to bigger appliances like heaters and solar panels - using a scale from A - F (or sometimes A+++ - D). Fading from green (A or A+++ -60%) to red (F or D) the label communicates how much energy an appliance consumes, offering transparency in energy consumption to consumers, see figure 15 p. 54 (Milieu Centraal, 2019).

To allocate ratings for the energy label, appliances are tested (often on the eco-program setting) by their manufacturers on the use of energy and water or noise after production. Per type of appliance, there is a different scoring mechanism in place. Based on its test results, the appliance will receive a rating (for example A+) and retailers will attach a sticker featuring the label on the appliance to communicate the rating to consumers (Milieu Centraal, 2019).

EUROPEAN ENERGY LABEL FOR BUILDINGS
The European energy label for buildings is designed similar to the energy label of appliances. Since property owners can be divided into two categories (property owners and housing cooperatives), two different

methods are used to allocate the ratings for the energy label: the simplified energy label residence (VELW) and the Energy Index (EI) (RVO, 2019).

The first method VELW, uses a website to answer questions (on housing details, isolation and energy use) by submitting evidence like situational photos or invoices of investments. Based on the supplied information, a recognised expert reviews the file and submit a rating that is communicated back to the homeowner and saved in a database (Rijksoverheid, 2019). However, in practice, situational photos can be taken at neighbouring houses and the expert reviewing the case will only review the online file; a system that is not entirely waterproof (Trouw, 2018).

The second method, the Energy Index, is meant for property rented by housing cooperatives in the social sector. The Energy Index consists of around 150 questions and is executed by special experts, certified by Cito Netherlands. Since this method is way more profound and experts actually visit the apartments, costs are higher, but the ratings more reliable (RVO, 2019).

EUROPEAN ENERGY LABEL FOR VEHICLES
An Energy label for vehicles was introduced with the purpose of decreasing CO2 emissions by stimulating the purchase of less polluting cars: with the energy label, consumers can see directly how economical a car is compared to other cars of similar sizes (CLO, 2016). The average use and emission within a category is allocated with a C/D label; every step up means the vehicle is 10% more economical; every step down means 10% less economical.

In practice, this means that cars featuring an A label are at least 20% more efficient than the average car in the same category (Milieu Centraal, 2019).

Car manufacturers are responsible for testing the data used to allocate a label once a car is manufactured. Tests used by manufacturers are standardised procedures, but often these testings happen in lab settings that are rarely feasible on the road (Milieu Centraal, 2019).

BETERLEVEN
The Beter Leven certification mark was introduced in the Dutch market by the Animal welfare protection and indicates the quality of the living conditions of the animals before they are turned into meat or eggs. By using a three-star rating, the mark indicates, for example how long the animal lived, how much it weighed, how much space it had and in what conditions (inside or outside) it lived. By adding two categories between 'plofkip' and 'organic' consumers have a better choice of what fits their values and budget: with each added star the animals have a slightly better life but also a slightly higher price, up to three stars corresponding with organic farming (Beterleven, 2019).

To participate in the certification mark, farmers and manufacturers apply for certification at the Beter Leven foundation. All farmers, manufacturers and stores, are initially inspected by the Animal welfare protection on the living conditions of the animals. Based on these conditions, either 1, 2 or 3 stars are granted and communicated on products (Beterleven, 2019).
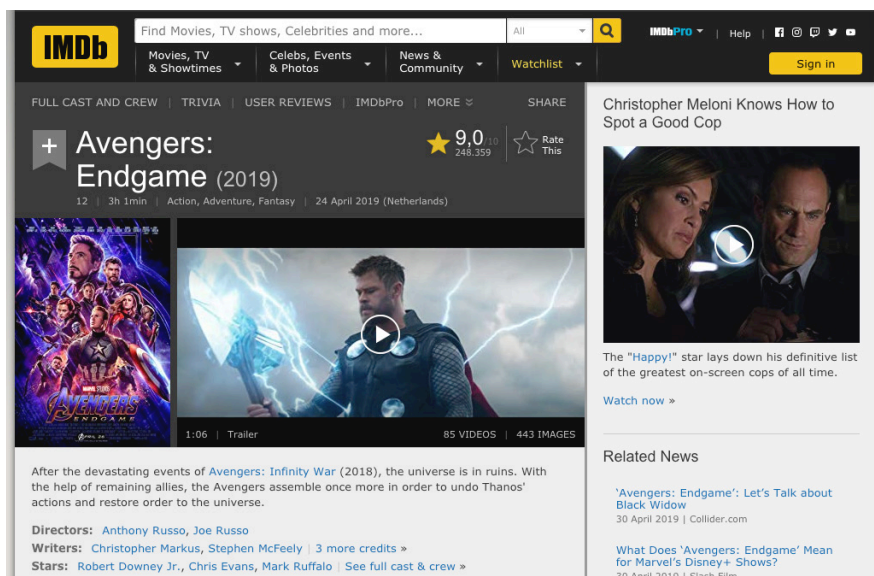
Figure 15: Photos showing how product ratings of the various indices are communicated.

Companies that apply for the mark are audited every year by an independent testing facility to see if they comply with all criteria; if not, their certification right is recalled immediately (Beterleven, 2019).

INTERNATIONAL MOVIE DATABASE

The Internet Movie Database (IMDb) is the most used movie rating for and by consumers. IMDb scores are used to indicate what 'normal' consumers think of a newly released movie. Before the existence of IMDb, movies would only be reviewed by experts that often appreciated more cinegraphic details than 'normal' people would. IMDb, therefore, offered a fresh perspective that was appreciated by many visitors.

An IMDb score is composed of one single variable: on a scale of 1 to 10 how would you rate this movie? By signing up on the platform, everyone can rate a movie based on their own opinion. However, IMDb is not a regular peer to peer rating: not every vote is weighted equally, the more ratings you give, the more they weight in the total score. This is done to avoid rating 'tankers' that just hand out bad ratings for fun. By rating many movies, visitors become a sort of 'expert' in the field and their opinion therefore matters more. Movie ratings are shown in a total score from 1 to 10 stars, but once you click on the score, ratings are subdivided into graphs showing the rating division and rating per demographic age or gender (IMDb, 2019).

HAMERSMA GIDS

The grote Hamersma is a rating system for supermarket wines by Harold Hamersma. Hamersma (a journalist in wines) informs 'normal' people how to pick a nice wine and to talk about wine in 'normal people language'. The Hamersma rating (a gold sticker showing grades above a 7) and description (featured in his books) offers a fresh perspective to most consumers, that do not understand a single word used in regular wine descriptions.

Since his ratings are present on the wines itself, they are easy to recognise on supermarket shelves. The index is based on a book published every year: the best supermarket wines. His guide helps regular consumers that do not have any knowledge on wines to pick a nice wine to impress friends during a dinner party (Wies, 2017).

Every year Hamersma tastes more than 4000 wines, and only the 150 best are selected for the guide and used as supermarket recommendations (VPRO, 2017). Supermarkets use the issued ratings in promotions on their products, in special shelving or their online shops.

6.3 FINDINGS

DESIGN INSIGHTS

Based on the analysis of the setup and design of the different cases, some important insights can be concluded to take into account when developing the impact index for jeans. Some are more on an organisational level; others go into more details of visual representation.

First, to make sure ratings are considered trustworthy by consumers, independent testing facilities or other plausible authorities should be used to issue or check information used as input for the rating to prevent corruption of the rating tool.

Second, to keep the rating future proof, new developments and variables susceptible to innovation have to be taken into account when setting up the rating system. This way, every year, the scoring can be reevaluated to prevent the rating from having to add new categories that could confuse consumers, like what happened with the additional A+++-40% rating for washing machines.

Third, to make sure the index is not too complicated and easily understood by everyone, the rating design should use

a recognisable scale to show what is the maximum score possible; 3 out of 5 stars/ 7 out of 10 points/ A till F scores.
At last, it is important to use some kind of layering (like clicking through on IMDb or an extended guide like Hamersma) in the communication towards consumers. That way, consumers can decide for themselves what information they need, without making it too complicated at first sight.

Different channels can be used for different levels of information:
• Rating marks on-product
• Short in-store explanations
• Background information on a website or guide

EVIDENCE OF CHANGED BEHAVIOUR

Besides insights into the design and setup, the ability of indices to change behaviour was researched too.

From the four reviewed cases, two were launched with the intention to change behaviour: the EU energy label and the Beterleven mark. The first label intents to change the purchase behaviour of consumers towards more energy or fuel-efficient goods and the second label intents to stimulate consumers to buy animal products that are produced in circumstances better than the bare minimum of industry standards.
But is there actually evidence that these indices changed the behaviour they intended?

Let us start with the EU energy label for appliances. Although the EU energy label for appliances was first introduced to simplify purchase decisions, the purpose of the label is nowadays more focussed on the reduction of energy use by household appliances. Research has shown that the EU energy label does indeed increase the amount of energy-efficient appliances bought by consumers (Consumentenbond, 2018; Stadelmann & Schubert, 2018). So there is evidence to conclude that the EU Energy label changed consumer behaviour on the short term.

However, most consumers do not realise energy labels are achieved by applying certain programs; for example washing machines are tested with half full loads using a 40 degrees eco-wash programme (Milieu Centraal, 2019). In practice, energy-efficient washing machines are often used in inefficient ways and give the consumer a false sense of efficiency (Milieu Centraal, 2017). So, to achieve a real reduction in energy use in the long term, the energy label in itself is not enough and consumers should be informed about the optimal use of the product as well.

Besides consumer behaviour, the EU energy label also influenced the development of energy-efficient appliances by industry stakeholders. Since the introduction of the label in 1995, energy-efficient appliances were developed at such a speed that it resulted in new categories that needed to be added to the existing label like A+, A++ and A+++ (Groenlinks, 2016). A very welcome side effect that resulted in increased uncertainty for consumers, that were still under the impression that A label appliances are energy-efficient. Nowadays, most labels still present categories A+++ - D while categories B, C &D are actually no longer allowed to be produced following more restricted EU legislation (Milieu Centraal, 2019). The current label

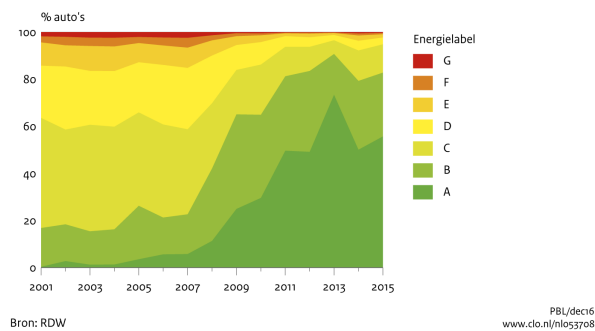Verdeling verkoop personenauto's naar energielabel

% auto's

Bron: RDW

PBL/dec16
www.clo.nl/nl053708

Figure 16: Total sales of new passenger cars divided per energy label. (RDW, 2016)

Verdeling aanbod personenauto's naar energielabel
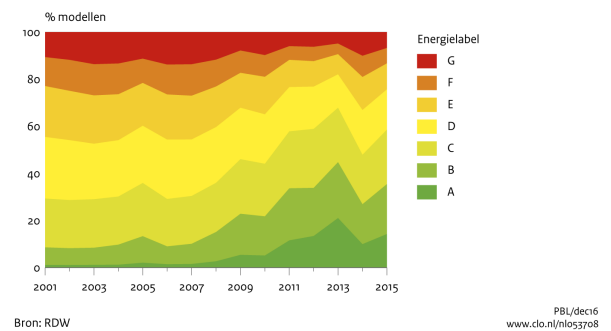
% modellen

Bron: RDW

PBL/dec16
www.clo.nl/nl053708

Figure 17: Total availability of new passenger cars per energy label. (RDW, 2016)

design is, therefore, not telling the whole story anymore, something that could jeopardise its effectiveness.

So, besides the ability to change purchase behaviour of consumers the index also changed industry behaviour and acted as a benchmark for stricter regulations. Therefore, it can be concluded that the EU energy label for appliances is able to change behaviour.

Next to the EU energy label for appliances, the energy labels for buildings and verhicles are reviewed.

Although the purpose of the EU energy label of buildings was to reduce CO_2 emissions and dependence on fossil fuels, as well as to stimulate property owners to invest in better energy efficiency, the only evidence of changed behaviour can be found for the second goal. However, this depends on how you review the situation. Research has shown that houses carrying green energy labels are sold more quickly and at higher prices than comparable houses with lower energy labels (Milieucentraal, 2016). So, during the purchase of a new property, buyers are willing to invest in better energy efficiency. Nevertheless, once a building is already in possession, the energy label does not have this desired effect: the energy label on itself is not enough to convince homeowners to invest in sustainable solutions (van Diggelen, 2009; energieoverheid, 2006). Research from a TU Delft doctoral thesis even shows that people living in houses with green energy labels feel they have less to worry about their energy costs and therefore often use more energy than people living in comparable houses with red energy labels: *A-labels make people careless* (Majcen, 2016).

Once again, this means that the energy label for buildings is able to change purchase behaviour (short term behaviour), yet it is not able to change behaviour in the long term. The purpose of the EU energy label for vehicles was to decrease CO_2 emissions by stimulating the purchase of less polluting cars. Between its introduction in 2001 and a few years ago in 2015, the purchase of passenger cars featuring a green (A/B) energy label increased from 20 to 80% of all newly sold cars, see figure 16 (CLO, 2016). If this is compared to the distribution of all available new cars per energylabel (figure 17), it can be concluded that the energy label does indeed favour the purchase of cars with greener energy labels. However, since the Dutch national government also uses green energy labels to offer financial benefits in the form of lowered taxes, it is hard to say if the label in itself would have the same effect. Yet again the label (combined with tax regulations) helps change purchase behaviour, although we do not know if greener energy labels would still be favoured in the long term if tax benefits would happen to disappear (CLO, 2016).

The Beter Leven mark was introduced to offer alternatives for animal products produced under minimal circumstances but with a lower price tag than organic products to consumers and stimulate more animal-friendly meat production. In the first year after its introduction already half a million less 'plofkippen' were sold to consumers, a major effect that contributed to the launch of the mark for other meat categories next to the one for chicken. Over the years, consumers started to favour animal products featuring at least one of the Beter Leven stars (without interfering with the sales of organic products)

and supermarkets even adjusted their buying behaviour accordingly: Albert Heijn deceided only to sell pork with at least one beterleven star and Plus did the same for chicken (de Jong, 2019). Meat products carrying the beterleven mark even increased their revenue by 50% (Beterleven, 2019).

This evidence suggests the Beterlevenmark is indeed changing the purchase behaviour of consumers towards animal products made in better circumstances. This changed purchase behaviour is helped a lot by the increased volume of products carrying the mark and therefore also stimulated change within the industry. The number of farmers complying with Beter Leven keep growing every year, and the Beter Leven mark is one of the fastest-growing certifications within the industry (IRI, 2017). So, apart from changing the short term purchase behaviour of consumers, the mark also succeeded in generating long term behaviour change within the industry.

CONCLUSION

As shown in the previous section, the several indices discussed in this study have the ability to change behaviour: consumer purchase behaviour that is. Although there is evidence that these indices were able to change consumer behaviour on the short term (i.e. when purchasing products), evidence that suggests more long term behavioural change appears to be lacking (except for the Beter Leven mark).
This teaches us that a label, mark or index often needs more than a scale or advice to convince consumers to change behaviour more permanently.

LIMITATIONS

Although the indices discussed in this study offer insights intoto the ability to change behaviour, only two types of indices were reviewed. For the sake of my research I made a generalising conclusion to use in further development of the index tool for jeans; however, additional research is necessary to found this claim in the future.
Additionally, for both cases evidence of changed behaviour was presented; however, since purchase behaviour is susceptible to other factors as well (as will be discussed in chapter 8) it is sometimes hard to say if the index itself is responsible for this change or that other factors influenced this behaviour.

- CHAPTER OVERVIEW -

SUMMARY

In this chapter, **a case study of indices from four other industries** was presented to **investigate what is feasible in terms of the design of an index and its ability to change behaviour.** The indices were selected because of their wide spread success and awareness amongst consumers:
- European Energy label
- Internet Movie Database (IMDb)
- Beterleven
- De grote Hamersma

To retrieve insights into both the setup, design and ability to change behaviour, all cases were reviewed on various levels:
- **Why** was this index initiated?
- **What** does the index measure?
- **How** does the index work?
- **Who** is the authority behind the index?
- Is there **evidence** that the index helped **change behaviour**?

The most important design insights are presented below under 'key insights'. Within this study there is evidence to suggest that indices have the ability to change consumer purchase behaviour. However, although evidence was presented that these indices were **able to change consumer behaviour on the short term** (i.e. when purchasing products), evidence that suggests more **long term behavioural change appeared to be lacking** (except for the Beter Leven mark).

This teaches us that a label, mark or index often needs more than a rating or advice alone to convince consumers to change behaviour more permanently.

KEY INSIGHTS

To make sure the index is not too complicated and easily understood by everyone, the rating design should **use a recognisable scheme** and show the maximum possible score; 3 out of 5 stars/ 7 out of 10 points/ A till F scores.

There should also be **layering in communication** towards consumers. Different channels can be used for different levels of information:
- Rating mark
- Short in store explanation
- Background information on website or guide.

Independent testing facilities or other plausible authorities should be used to issue or check information used as input for the rating **to prevent corruption** of the rating tool.

To keep the rating future-proof, new developments and variables susceptible to innovation should be taken into account when setting up the rating system. This way, for example, every year the scoring can be reevaluated to prevent the rating from having to add new categories like what happened with A+++-40% for washing machines.

DEFINE

Maarten Wentholt during an interview by Thomas Stege Bojer of Denimhunters (photo property of Denimhunters).

STAKEHOLDER CHALLENGES

To elaborate on the insights from the desk research presented in the discover part of this thesis, get a better understanding of the challenges faced by the different stakeholders in the denim industry, and to ask for advice on the development of the index, eight industry experts were interviewed using qualitative in-depth interviews with a semistructured approach (Patton, 2002). The setup, approach and used interview guides can be found in Appendix E.

This chapter will shortly introduce the interviewed experts, illustrate their biggest challenges and conclude with their advice for further development.

7.1 INDUSTRY EXPERTS

Together with James Veenhoff and Mariette Hoitink of House of Denim, industry experts were selected and recruited based on their experience and relevance to the project. The interviewed experts are a mixture of brand representatives, corporate social responsibility (CSR) managers, marketing managers, developers, suppliers, retailers and consultants to give a complete overview of what is happening in the industry. Each of the experts will be shortly introduced below, to create a better understanding of who they are and where their expertise comes from.

Frouke Bruinsma
For the last three years, Frouke has been the CSR & Communications director of G-Star. Before becoming director, Frouke worked on sustainability for G-star for over twelve years and knows everything there is to know about sustainability in the industry.

Alberto de Conti
With his education and background in biochemistry, Alberto worked on the development and innovation of garment finishing for Levi's for over fifteen years. Not so long ago, he started a new initiative: Hub 1922, an R&D centre where innovative garment finishings are developed based on sustainable chemistry together with brands and retailers.

Franck Belochi
Franck is president of Calvin Klein Product at PVH Europe and has been president of the PVH denim centre and Tommy Hilfiger for eleven years. Franck connects the expertise of various experts and stakeholders in their vision towards not only sustainability but even circularity.

Maarten Wentholt
After several other jobs, Maarten was denim developer at G-star for over fifteen years. In these years he travelled to suppliers twice a month to create the best styles and washes for the G-star men collection. Since a few years, he teaches how to be a developer to Jean School students, consults various industry players on sustainability in denim and sits at diverse panels on conferences and trade fairs.

Tony Tonnaer
Eight years ago Tony founded his own label Kings of Indigo (K.O.I.) after being director of Kuyichi for about seven years, to further develop sustainability in denim and really put it on the map. The goal of K.O.I. was to start using more recycled products and materials and to stimulate the triple R: Repair, Reuse, Recycle.

Simon Giuliani
Simon is the global marketing director at Candiani S.p.A. and answered my questions over email. Simon has a lot of knowledge on how to communicate industry practices to consumers and explained me their communication model.

Eva Engelen
After an education in business and fashion in Antwerp, Eva started as an intern at MUD jeans. Over the years she grew into her sustainability role at MUD and has been their CSR manager for over two years.

Menno van Meurs
Menno founded his first Tenue de Nimes shop ten years ago, since then his shop became a real destination for denim lovers and a second shop opened soon. Menno believes in quality, craftsmanship and responsible production. When he could not find this any longer at his regular suppliers, he started his own Tenue de Nimes label, that produces at local suppliers and uses high-quality resources. Next to his two stores and his own label, Tenue de Nimes is also an online store.

7.2 BIGGEST CHALLENGES

During the first part of the interviews, the experts were asked about the biggest pains or challenges in the denim industry regarding sustainability.

OVERPRODUCTION & BEHAVIOUR

One of the first challenges mentioned was that the biggest impact is not always in the production techniques or materials itself. According to Maarten (MW) and Menno (MvM) the biggest problem of the industry is **overproduction**:

"On a world population of 7 billion people, 150 billion garments are produced every year. Every year. From these 150 billion garments (more than 20 times the world population), 75% does not even make it to the consumers

closet: because it is off-season, wrongly produced, out of trend or rejected - ending as landfill. Each and every year" - MvM

Along with a waste of resources, overproduction results in a lower appreciation for garments. Because of the cheap fashion that fast fashion brands offer (to get rid of their overproduction), the mindset of consumers is completely messed up: *"Why do we pay 4 euros for a latte and 3 euros for a t-shirt, that is insane. People need to realise that a t-shirt for 3 euros can never be produced fair or sustainable."- MvM*

Maarten even adds that most fashion ordered online is not even ordered to be really worn anymore, young consumers only try items on for Instagram photos and then return the products: *"We need to educate the new generation that fashion is not a throw-away product". - MW*

But how do we explain to consumers that jeans should be more expensive? Recently Dutch bank ABN Amro accepted this challenge together with the Impact Institute. Their research publication 'True pricing in the denim supplychain' concluded that the average cost of a pair of jeans is 33 euros too cheap (ABN, 2019). After analysing their calculations, I must conclude so many assumptions were made (and laundry was even kept entirely out of it) that it is hard to make a claim like this on an average jeans, since there is not really an average jeans to begin with. However, their message is clear, and they received a lot of media attention, which only increased consumer awareness.

Besides overproduction, there are more miscommunications about impact. According to Alberto (AdC) *"water is a treasurous resource, and we are all trying to reduce the amount of water - which is great - but I do not hear anybody talking about the amount of water that is being used at home to wash the jeans, and the rest of clothes. Which is by far more than the water that has been used during the production of a jeans." - AdC*
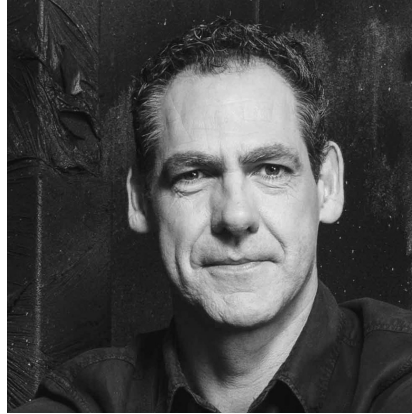
INDUSTRY
EXPERTS

Figure 18: Interviewed industry experts (fltr); Frouke Bruinsma (G-Star), Alberto de Conti (Victedo, Levi's), Franck Belochi (Calvin Klein), Maarten Wentholt (Jean School, denim consultant), Tony Tonnaer (Kings of Indigo), Simon Giuliani (Candiani), Eva Engelen (MUD Jeans) and Menno van Meurs (Tenue de Nimes).

After hearing these expert opinions, it becomes even more clear that the public awareness of the climate impact of fashion is far behind:

Do you notice a bigger demand for sustainable products? No. I know that is a very disappointing answer but to be honest, I notice very little change" - MvM

For the second most polluting industry in the world, it is weird that there are not any (public) discussions on overproduction or resource management. Tony (TT) shares this opinion: *"If you walk into a supermarket nowadays, you have certifications, shelves filled with organic products. If you walk into the average fashion retailer, there is nothing, no information at all. Much remains to be done". - TT*

MISSING BENCHMARK
The lack of public awareness or discussions is not the only reason there is not much information available on the topic: brands have a hard time figuring out what and how to communicate to consumers without being subject to greenwashing.

Frouke: "It is really hard to explain what all of it (production terms) means because there is no standard. There is no benchmark that says what is good or what is not" - FB

Rank a Brand and Made-by are the closest to a standard, but since Made-by went bankrupt last fall the industry is missing its benchmark:

"There used to be a benchmark of Made-by that the whole industry was using, but since the foundation went bankrupt, there is no real benchmark anymore." - FB

Their authenticity made it easier to explain consumers and other industry partners what was right and wrong: now that it is missing it is getting harder to separate the wheat from the chaff.

RADICAL TRANSPARENCY
As a reaction to a missing benchmark, brands are trying to be as transparent as they can be.
According to Tony, radical transparency is the strongest tool there is to communicate purpose and motivate for the better: *"I really believe in transparency. I think that's the strongest thing we have. And we want to motivate other people too. My goal is not only to set up a sustainable brand, but to show the industry that this can be very cool and fun, and qualitative and affordable."*
-TT

However, deciding how to communicate and what information should be disclosed is not always that easy:

"I think transparency in principle is a good thing, I think it is important that consumers are as informed as they can possibly be about where the products are coming from, how they are made, what kind of processes, what kind of conditions during manufacturing; this is all good. But I think somehow we need to draw a line because otherwise, it becomes unreasonable in terms of intellectual property rights." -AdC

In order to be transparent some brands ask their suppliers to disclose their processes and materials fully. Processes and techniques that often took a lot of time and investments to develop. *"To come up with innovations is an expensive process, especially if you are talking about a chemical company. I hope nobody is expecting that once the innovation has been identified that we tell everybody how we do it." -AdC*

Of course, brands should know how their products are manufactured so they can tell their customers, but there is no reason why for example a chemical company should disclose the chemical formula of their dyes for the sake of transparency; with that information, brands could easily transfer this knowledge to other (competing) companies.

To refrain from detailed specifics and help explain and assure the quality of these processes, many certifications and standards are used. These certifications are expensive to acquire for brands, and at the moment, there are so many certificates that it is becoming more confusing than clarifying and assuring.

The balance between disclosing details and hiding behind certifications is hard to find, and therefore, we should focus on what consumers really need to know.

In the short time available in our busy lives, we need to inspire instead of confuse by showing consumers and the industry that sustainability can be cool, fun, qualitative and affordable.

POWER OF CONSUMERS
The experts confirm what my desk research already showed: *"the industry has all the knowledge and techniques it needs to produce sustainably, they just make a very deliberate decision that has to do with price." - MvM*

As long as consumers do not have the knowledge and/or do not feel the necessity for sustainable products the industry will not change: *"I am convinced the consumer is the only one with the power to change the industry". -MvM*

The real challenge is to make the *"unconscious consumer unconsciously*

conscious" as Tony said so beautifully. We need to offer consumers tools to make better choices and let them think about it properly through communication: *"The mindset of consumers is completely messed up because of cheap fast-fashion chains, that is why I am so fanatical to get started on consumers. We have to give consumers very simple tools to make better choices, especially 'Jip and Janneke' tools that everyone will understand."- MvM*

The food industry is doing this for years now and with succes; supermarket shelves have never been more responsible.

SUSTAINABILITY TOO COMPLEX TO EXPLAIN
Although consumers are not directly asking for sustainable products yet, consumers are starting to ask for more transparency and understanding of how products are made. However, sustainability in denim requires a pretty high level of technical knowledge in order to understand what makes one product better than another:

"The problem is that sustainability in Denim is a strictly technical matter. It requires a pretty high level of knowledge in order to understand and to communicate the sustainability of the production process and sustainability of the final garment. It is therefore very hard to get brands first and then consumers to understand what makes one product better than another." -SG

According to Giuliani, brands and retailers use many terms (like organic, recycled, circularity)to get the attention, but those are just the tip of the iceberg:

"The real challenge is to find a way to explain the whole iceberg. That leads us to the real question of today: does a consumer have to study to make his purchase?" -SG

Communication to consumers should be easy to understand and only provide more depth and details when they really ask for it.

7.3 HOW TO MAKE THE INDEX A SUCCES

After we discussed the biggest challenges of the denim industry, I introduced my research topic and asked for their advice and opinion. This paragraph will discuss the most important insights for development.

FOCUS ON CONSUMERS
One of the most important insights from the interviews was to really focus on what consumers need instead of what stakeholders would be willing to participate in:

"Do not try to go through brands and retailers - you will be lost". - AdC

Currently, there is no product level rating that is talking directly to consumers or educates them about product impact. Consumers want to know what they should or should not buy and are open to tools that simplify this decision.

Moreover, there is more momentum now than ever on the topic of sustainability. "*If you can make the young generation realise what power they have and activate them in the right way, it could be possible to start a movement as Greta Thunberg did*" -AdC.

KEEP IT SIMPLE
Know whom you are talking to. When talking to consumers really *keep it easy, simple and visual (TT)*; do not make it too vague, complicated or technical. Not only in the use of copy but also in terms of design.

Therefore, the index should be focussed on layering information in the best possible way: "*very simple at first sight, explaining just enough to come across as trustworthy and offering enough depth and information when consumers really look for it*" -SG

Further research is needed into what consumers understand about the process and how it should be communicated to avoid the rating being too technical.

KNOW YOUR ADDED VALUE
It will be important to distinguish the rating from already existing labels and certification to really offer an added value.

"To regain some overview, it would be nice to have a system where raw materials, make and washes would be rated in a way that its globally applicable" - TT

The index could be based on choices made during production; these steps will also educate consumers on how a jeans is made.

INDEPENDENT FROM BRANDS
Independence from brands and retailers will be vital to achieving a trustworthy rating image. The index should talk directly to consumers, and its rating should be supported by an assessment of a known or trusted authority like the covenant, NGO's or the EU.

Although it should be independent, brands should not be totally excluded from the platform. There should be a possibility for brands to react to their assessment and improve their communication.

GUIDE FOR THE INDUSTRY
Since there is currently no benchmark, the rating tool could double as an industry benchmark. This way the impact can be reduced through consumers as well as through the industry.

- CHAPTER OVERVIEW -

SUMMARY

To deepen insights, get a better understanding of the challenges faced by the different stakeholders in the denim industry, and to ask for advice on the development of the index, **eight industry experts were interviewed** using a semistructured qualitative approach.

The interviewed experts are a **mixture of brand representatives, corporate social responsibility (CSR) managers, marketing managers, developers, suppliers, retailers and consultants** to give a complete overview of what is happening in the industry.

According to the experts the **biggest challenges** in the denim industry at the moment are the industries' **overproduction, impact of use, a messed up consumer mindset, the absence of an industry benchmark**, the application of **radical transparency**, (a missing) **consumer power** and that **sustainability** is a **very hard thing to understand** and therefore explain.

To develop a potential succesful index, the design and communication should be **focussed directly towards consumers and really speak their language**. To distinguish the new rating, it should have a clear added value and stay independent from brands to establish a trustworthy image. When executed right, the index could potentially become an industry benchmark to guide sustainable production.

KEY INSIGHTS

Overproduction and impact during the use phase of a jeans are just as impactful as the production of a new jeans. Although overproduction and use are not directly in my project scope, **they should be kept in mind while developing the index**.

Communication on the impact of a pair of jeans is hard since **there is little consumer awareness**. Also, the industry is missing a benchmark: **authority makes it easier to explain what is right and wrong.**

Transparency should be managed correctly and used to inspire instead of confuse by showing consumers and the industry that sustainability can be cool, fun, qualitative and affordable.

Consumers have the power to change this industry. As long as consumers do not have the knowledge or do not feel the necessity for sustainable products the industry will not be pressured to change. We **need to offer consumers tools to make better choice**s and let them think about it properly through communication.

Sustainability in denim gets pretty technical: communication should be easy to understand and only provide more depth and details when really asked for it.

GREEN CONSUMER BEHAVIOUR

During the interviews with industry experts, it became clear that one of the biggest challenges to minimise impact is consumer behaviour. To better understand this behaviour towards sustainable products or services, a literature study of trend reports and journal papers was executed on this topic. As a result, this chapter will define important trends and barriers that occur in green consumer behaviour and will conclude with some key factors to influence this in the future.

8.1 GREEN CONSUMER TRENDS

Many (if not all) trend reports over the last few years that featured sustainability as one of the most important macro trends. But not only trend reports write about the topic, it is becoming harder every day to open a paper or news app that is *not* talking about sustainability. After the launch of several shocking documentaries like 'Before the flood', 'Cowspiracy', 'The blue planet' and 'River Blue', many consumers became aware of the upcoming threats that climate change brings in the coming years if we do not start changing things now.

However, when it comes to change *"people see the sustainability effort as a collective issue: 91% believe that companies, countries and individuals should all work together to tackle the problem. Half of these people expect governments to play a decisive role" (JWT Innovation Group, 2018).* Until government actions force people to change, most people will do what is most convenient for them - regardless of their green intentions (I&O, 2019).

"Convenience is absolute key, if it is not convenient it is very difficult to get people to do something" - Hege Sæbjørnsen, Ikea

According to a global survey of 30.000 respondents from market researcher Nielsen (2015), three in four respondents said they would pay more for sustainable products. But when it comes to purchasing decisions, only 35% of the respondents ranked sustainability as most important attribute (Nielsen, 2015).

A more recent study '*Duurzaam denken is nog niet duurzaam doen'* of Dutch institute I&O (2019) and in a circular retail report of ABN Amro (2017) found similar results: on average consumers are willing to pay a 12% price premium on top of new product prices (18-29 years-olds even 14%) for sustainable products. However, if a sustainable product is more expensive than a 'regular' product, 68% will buy the 'regular' product instead. Amongst the younger generation of 18-29 year-olds, this number is even higher (78%) (ABN Amro, 2017).

Of course, young people have less to spend, but they are also most open to more sustainable products (ABN Amro, 2017). According to the respondents of the study, 89% of this younger generation is aware of climate change and their impact, although 29% is not willing to do something about it compared to 21% of 30-44 year-olds and 16% of 45-59 year-olds (ABN Amro, 2017). Interesting to see is that precisely this younger generation is participating in the school strikes for climate that were started by Greta Thunberg earlier this year, indicating that their concerns do not immediately change their own (purchase) behaviour.

When analysing reports and online articles it is clear that these are turbulent times and it seems that although many consumers care a lot about the climate, a lot of them face difficulties converting their attitudes into pro-environmental behaviour.
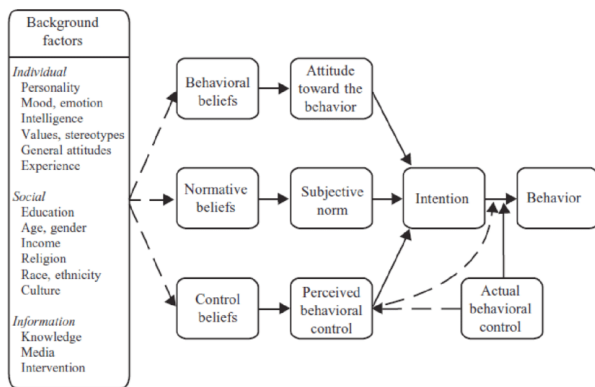
Figure 19: Theory of reasoned action and planned behaviour (Ajzen & Fishbein, 2010).

Figure 20: Behaviour model of Blake (1999).

8.2 THE GREEN GAP

Awareness on the impact of fashion has thus never been higher, but actual green purchase behaviour leaves much to be desired. One in three UK consumers concerned about the environment reports being struggling to translate their intentions into actual purchases (Young et al., 2010). But what is standing in the way of consuming more sustainably?

Social and environmental psychologists have been researching this 'value-action gap' or 'attitude- behaviour gap' for many years now, and most research builds on the theory of 'reasoned action' and 'planned behaviour' of Ajzen and Fishbein (Ajzen & Fishbein, 1975; Ajzen & Fishbein, 1980; Ajzen, 1985; Ajzen & Fishbein, 2010). In their theory, Ajzen & Fishbein assume that human beings are usually quite rational and make systematic use of available information in their decision making (figure 19). However, different people will interpret and respond to the same environmental information in very different and unpredictable ways (Myers & Macnaghten, 1998). Therefore, it is interesting to see what *consumers themselves perceive to be barriers in green consumption*. The behaviour model of Blake (1999), figure 20, is based on such research where respondents were asked to identify their reasons or barriers that prevented them from executing pro-environmental behaviour to see what types of barriers are generally standing in between concern and behaviour.

As can be seen in figure 19 and 20 the models show quite some overlap, but although the model of Ajzen and Fishbein shows a more complete overview of how behaviour is planned, the model of Blake shows concrete barriers that are experienced in green consumption behaviour. Given that this thesis researches how to overcome the gap in sustainable jeans consumption, the last model will be better applicable.

According to the behaviour model of Blake, three types of barriers need to be overcome to turn environmental concern into pro-environmental behaviour: individuality, responsibility and practicality.
The first type of barrier, individuality, is a very personal barrier: *is environmental concern really my concern? Do people like me care about this?*

The second type of barrier, responsibility, is becoming more of a social barrier additional to a personal one: *Is the environment really something I can change by myself? Why should I do this if others are not doing much either?*

The third and last type, practicality, is mainly social or institutional: *Do I have the means (budget, time, resources) to do something about it?* Even consumers that have a deep environmental concern are sometimes unable to perform environmental behaviour because of impracticalities caused by this last barrier.

At the start of this thesis, I discussed Steven Covey's (2004) circles of concern, influence and control to understand how people deal with issues that they feel are hard to control. When comparing Covey's circles to the model of Blake, I see a lot of similarities: the first barrier, individuality, is the threshold for *a* concern becoming *your* concern. The second barrier, responsibility, prevents a concern from becoming something you can influence. At last the third barrier, practicality, are things
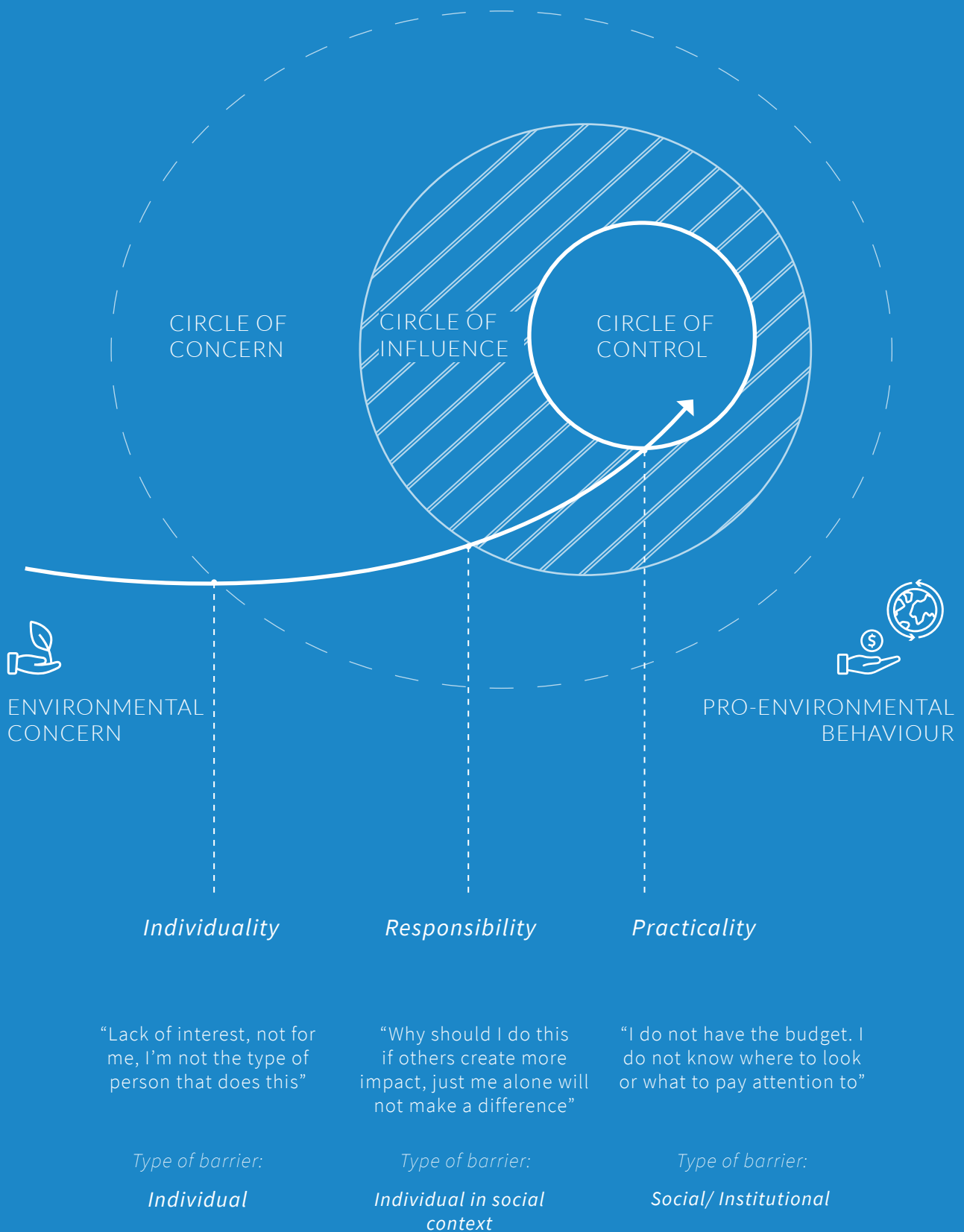
CIRCLE OF
CONCERN

CIRCLE OF
INFLUENCE

CIRCLE OF
CONTROL

ENVIRONMENTAL
CONCERN

PRO-ENVIRONMENTAL
BEHAVIOUR

Individuality

Responsibility

Practicality

"Lack of interest, not for
me, I'm not the type of
person that does this"

"Why should I do this
if others create more
impact, just me alone will
not make a difference"

"I do not have the budget. I
do not know where to look
or what to pay attention to"

Type of barrier:

Individual

Type of barrier:

*Individual in social
context*

Type of barrier:

Social/ Institutional

Figure 21: Stephen Covey's (2004) circle of control, influence and concern combined with the behaviour model of Blake (1999)

standing in between what you can influence and what you can control yourself. These parallels drawn between the two models are visualised in figure 21.

The parallels between the two models indicate there are three types of barriers that need to be overcome by the index to influence consumer behaviour in general and in specific towards buying better jeans.

8.3 BARRIERS FOR GREEN PURCHASE

Now that it is clear what types of barriers need to be overcome to influence the 'attitude-behaviour gap' of denim consumption, it is time to explore these barriers a little bit more in-depth.

First of all, barriers to greener purchasing behaviour are mostly based on customer perceptions: different consumers will interpret and respond to the same message in different ways.

There are several factors that influence the first type of barrier (individuality). These could be personal values like goodwill, safety, health and a drive for responsibility (Joshi & Rahman, 2015; Joshi & Rahman, 2019). But also habits (mindless or not), knowledge of environmental problems or emotions about these problems - like not finding it a pressing matter (Tan et al., 2016).

Factors that influence the second kind of barrier (responsibility) are: emotions about this responsibility (feeling like others should act), knowledge of what can be influenced, the perceived effectiveness of an individual action, perceived control over one's own behaviour, and a lack of trust or even scepticism towards certain authorities (Joshi & Rahman, 2015; Joshi & Rahman, 2019; Tan et al., 2016; Paço et al., 2019)

The most important factors that influence the third (practicality) barrier are perceived higher product prices and the importance of other non-green criteria - like convenience and style. Green consumption seems to be expensive and hard work: research, decision making and purchasing take time. Because of a lack of information online and in-store, consumers do not see a significant difference between green and non-green products (Young et al., 2010; Joshi & Rahman, 2015; Tan et al., 2016)

A last and not least important factor that acts as a practicality barrier is the perceived image of sustainable products: sustainability just is not that sexy yet. Although sustainable products are becoming more fashionable and luxurious, many consumers still think of sustainable products as being too hippy and not very exciting (JWT Innovation Group, 2018).

8.4 KEY FACTORS TO INFLUENCE

Addressing what causes the green attitude behaviour gap will be key to solving the problem. Some key factors to influence sustainable behaviour are:

- Playing into emotions like concern and responsibility
- Interrupting mindless consuming habits
- Showing consumers the direct effect of their purchase
- Diverting cynicism by offering a trustworthy source of information
- Using store-related attributes to increase mental availability
- Highlighting other product attributes like the higher quality and that it is better for health.
- Using eco-labels to foster positive attitudes

- CHAPTER OVERVIEW -

SUMMARY

This chapter presents the findings of a literature study used to unravel consumer trends and barriers in the consumption of green/ sustainable products.

After the launch of several shocking documentaries, many consumers became aware of the upcoming threats of climate change. However, when it comes to change, most consumers wait for bigger companies or even governments to take action instead of changing their own behaviour.

Many consumers indicate they would be willing to pay more for sustainable products, but most of them do not put their money where their mouth is. Interesting to see is that the younger generation is most aware, but a third of them is not willing to change their habits. So what is standing in their way to consume more sustainably?

Social and environmental psychologists have been researching this 'attitude- behaviour gap' for years, and according to the behaviour model of Blake (1999), three types of barriers need to be overcome to turn environmental concern into pro-environmental behaviour: individuality, responsibility and practicality.
These barriers were compared with the circles of concern, influence and control of Covey (2004), and their parallels are shown in figure 21.

The chapter concludes with a more detailed analysis of the three barriers and some key factors to influence behaviour.

KEY INSIGHTS

Barriers for greener purchasing are mostly based on customer perceptions. Green consumption seems to be hard work: research, decision making and purchasing take time. Because of a lack of information online and in-store, consumers do not see a significant difference between green and non green products. The most important barriers to tackle are perceived higher product prices and the importance of other non-green criteria - like convenience and style.

The rating tool should make it more convenient and accessible for consumers to buy better products. Being where the customers are (in-store and online) and speaking their language will be vital for adoption.

Showing the direct effect of purchase will help influence the buying behaviour of green products. This does not have to be an environmental effect; other product attributes like better for health or better quality is often easier understood.

DESIGN GUIDELINES

To translate the findings presented in both the discover and define phase of this thesis into a first draft of the impact index, key insights were used to define important guidelines for the development and design. This chapter will present these guidelines starting from a more systematic level - *How should the rating system work?* Towards a more detailed design level - *How should the rating system communicate?*

9.1 SYSTEM GUIDELINES

FOCUS ON CONSUMERS
One of the first key insights was to really focus on what consumers need instead of what stakeholders would be willing to participate in:

"Do not try to go through brands and retailers - you will be lost". - Alberto de Conti

Currently, there is no product level rating that is talking directly to consumers or educates them about product impact. Consumers want to know what they should or should not buy and are open to tools that simplify this decision.

BE AN INDEPENDENT AUTHORITY
Independence from brands and retailers will be vital to achieving a trustworthy rating image. The index should talk directly to consumers, and its rating should be supported by an assessment of a known or trusted authority like the covenant, NGO's or the EU.

Independent testing facilities or other plausible authorities should be used to check information used as input for the rating to prevent corruption of the rating tool.

ACT AS GUIDE FOR THE INDUSTRY
Since there is currently no benchmark, the rating tool could double as an industry benchmark: showing both industry stakeholders and consumers what is to be expected in terms of sustainability. This way, the impact can be reduced through consumers as well as through the industry.

THINK GLOBAL
Since the success of a rating system is often not limited by its design, but by its adoption, global (online & offline) scalability will be vital for the success of the index.

KEEP IT FUTURE PROOF
To keep the rating future proof, room for new developments and innovations should be taken into account when setting up the rating system. To prevent the rating from having to add new categories, the rating should be reevaluated regularly.

CONNECT ENVIRONMENTAL, SOCIAL AND CULTURAL IMPACT
The impact of a jeans is not only environmental, but also social and cultural. Social and environmental elements will be important to incorporate in the product rating; the cultural impact should be taken into account for the development of the market introduction strategy.

9.2 INTERACTION GUIDELINES

EMPOWER BETTER CHOICES
Consumers have the power to change this industry. But as long as consumers do not have the knowledge and/or do not feel the necessity for sustainable products the industry, will not be pressured to change.

Tools should be offered to make better choices and stimulate thinking through communication, so consumers will feel more in control and realise they have a choice to make.

SIMPLE BUT EDUCATIONAL (NOT TOO SIMPLE)

Communication should be easy to understand but still tell a message: the index could be based on choices made during production, these steps will also educate consumers on how a jeans is made.

FACILITATE DIFFERENT CONSUMERS

Not all consumers care or look for the same information. Therefore, the index should layer information in the best possible way: very simple at first sight, explaining just enough to come across as trustworthy and offering enough depth and information to service consumers that really look for it.

Different channels can be used for different levels of information:
- Rating mark
- Short in-store explanation
- Background information on website or guide

Since sustainability in denim can be very technical, seeing or experiencing the impact in different ways is key to relate to the subject and could be used to engage consumers.

INDEPENDENT BUT OPEN FOR FEEDBACK

Although the rating itself should be independent, brands should not be completely excluded from the process. Brands should get an opportunity to react to their assessment and improve their communication to prevent them from boycotting the system.

9.3 DESIGN GUIDELINES

KEEP IT SIMPLE

Know whom you are talking to. When talking to consumers really talk in 'Jip & Janneke' language; do not make it too vague, overcomplicated or technical. Speak their language in copy and design. Keep it easy, simple and visual.

To make sure the index is easily understood by everyone, the rating design should use a recognizable scale and show the maximum possible score; 3 out of 5 stars/ 7 out of 10 points/ A till F scores.

LEVELS OF IMPACT

Choices made in design and production influence the total impact. But there is not just one technology or process that is the most sustainable choice, and many technologies can be combined: cluster processes into levels of impact to allow for easier comparison.

COMMUNICATE YOUR ADDED VALUE

It is important to distinguish the rating from already existing labels and certification to really offer an added value. Otherwise, the rating will just be another rating in the jungle of certifications and standards that already exist.

MORE THAN JUST A RATING

According to the case and literature study, more than just a rating or advice will be needed to overcome all barriers towards pro-environmental behaviour and change this behaviour more permanently.
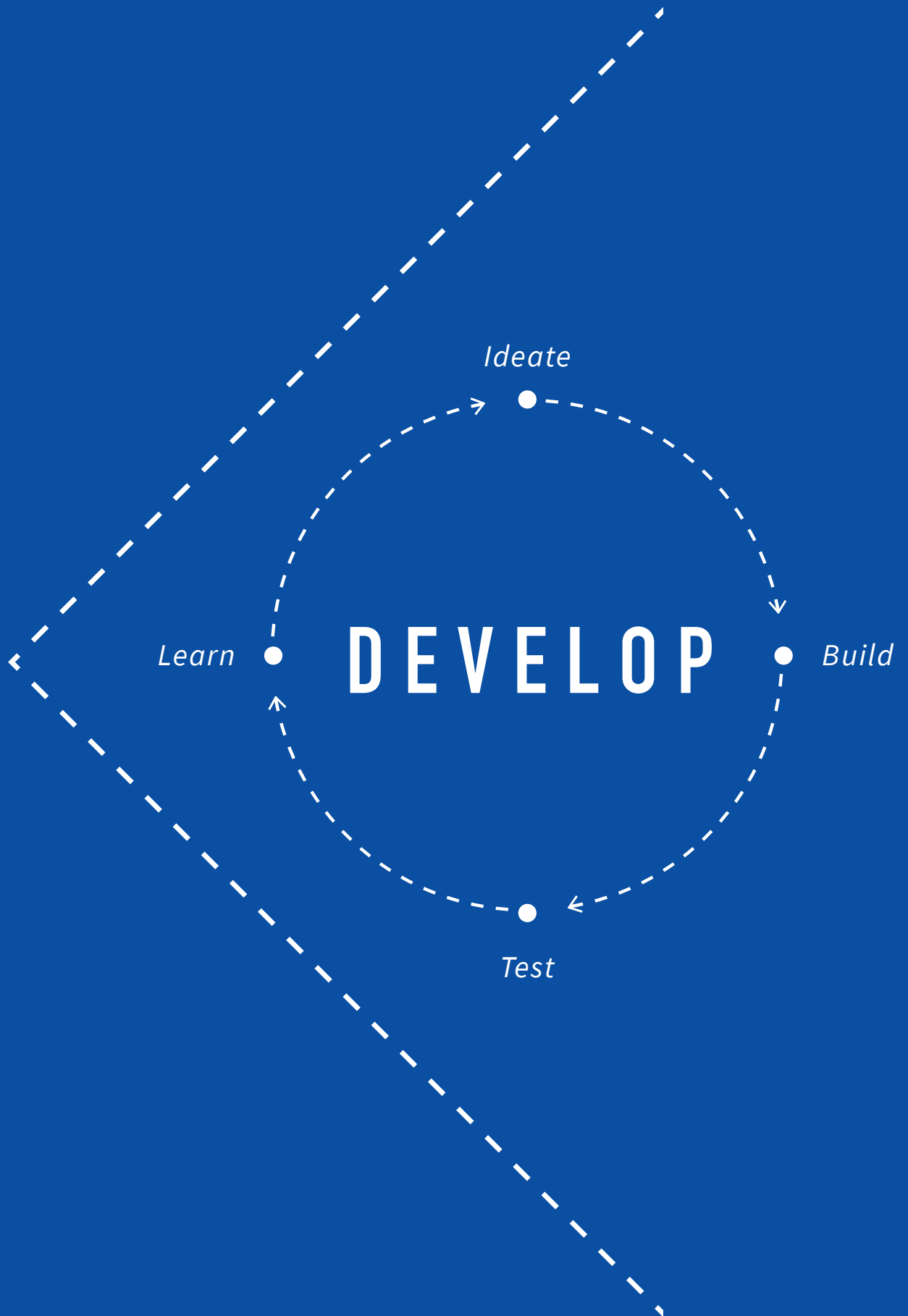
TRANSPARENCY IS KEY

Transparency is important to win consumer trust. The rating methodology, process and criteria should be openly available for consumers.

DESIGN INSPIRATION

" *To regain some overview it would be nice to have a system where raw materials, make and washes would be rated in a way that it is globally relevant* "

Tony Tonnaer

Founder Kings of Indigo

CONCEPT DEVELOPMENT
PRELIMINARY STRATEGY & DESIGN

After defining the design guidelines, all insights from the desk research, case study, interviews and literature review were translated into a first testable concept to present for the international advisory board of House of Denim: a minimum lovable product. This minimum lovable product had to be a concept that was not only viable (which is normally the case in lean development) but also desired. Therefore not only the rating methodology but also the system (who is going to rate it) and a possible consumer translation had to be developed.

Therefore, the design guidelines were evolved into a first version of the product rating tool, consisting of five questions to indicate the impact, a benchmark rating for each of the questions and a hangtag to communicate the rating towards consumers.

10.1 FIRST STRATEGIC DIRECTION

To achieve the true goal of this project - to increase the demand for more sustainable jeans - a solid strategy is needed that goes beyond the product rating itself. To increase the demand, several barriers need to be overcome to change current consumer behaviour: individuality, responsibility and practicality. Since the product rating will mostly overcome the last barrier - practicality - other strategic steps have to be taken first.

We hypothesize that consumers do not know how to buy more sustainable jeans, because they do not see jeans as a very impactful product. There is a starting awareness that fashion is not good for the planet, but consumers do not realise what the current impact actually is. The fact that most fashion is produced far away from western consumers makes this impact even harder to grasp: they do not see or feel or smell the direct dangers. They are not confronted with the pollution of the fashion industry in their daily lives.

As a first step, we need to start awaking consumers; to raise their attention by showing what is really happening and explaining what they can do to consume or choose better. We need to educate the consumer and give insights into more sustainable alternatives that are currently available. Because what is transparency really if we do not understand the story?

AWAKE & INSPIRE
Much consumption today is done on autopilot: these mindless consuming habits first have to be interrupted before consumers will pay attention to a new rating or advice. So, we have to awake before we facilitate and educate.

The first step to achieve our goal is to make the unconscious consumer unconsciously conscious, by interrupting mindless consumer behaviour and inspiring them with best practice examples. Through advertisement campaigns on different sorts of media, offline, online and in stores, we will advocate the good.

EDUCATE
Not one of the current rating platforms is focussed on educating or engaging consumers about the impact of fashion. If we want to change behaviour, consumers

first need to know what needs to change. A platform connected to the rating hangtags will offer more in-depth information on the benchmark, production and certifications. To prove the validity of the claims, Jean School students will educate and explain practices to consumers.

FACILITATE
As a last step - to initiate internal action - tools need to be available to help consumers choose better. The impact index will provide a product rating present on hangtags and a Google extension to offer a better overview of the impact of jeans. In-store displays will highlight sustainable season favourites and different flavours of better denim.

10.2 FIRST INDEX DESIGN

IMPACT INDEX
To develop a product rating that sincerely represents the impact of a jeans we should look at these variables that contribute most to its impact: cotton, water, chemicals and energy. However, these variables are dependent on multiple processes during production and therefore, hard to assess independently in terms of impact. When looking more closely at the production process, it becomes clear that during every step of production a choice can be made to use cleaner and more sustainable materials or technologies. These are independent choices. Thus, in terms of impact assessment, it makes more sense to look at processes instead of variables.

The production processes that influence the total impact most are 1) the choice of raw materials, 2) the dyeing of the fabric, 3) how the jeans are laundered to its desired style and 4) the working conditions of all suppliers involved (see chapter 3). To stimulate that brands and retailers are open about their processes (no matter how impactful) transparency is an important last factor to take into account.

But how do we translate these processes into a rating? To get a better overview of the different production processes and their impact, all processes were mapped on the value chain according to their impact (see Appendix B). This map allowed to see which processes were available per production step and how they compared to each other in terms of impact. This way the processes could be categorised from most impactful to least impactful and a benchmark could be created per impact indicator, see figure 22 and 23.

In the impact index, these benchmarks are used to assess the different production processes into one final rating: a new benchmark rating based on five simple questions related to choices made during production and development.

5 Questions

🌱 What material is it made of?

💧 How is it dyed?

🧺 How is it washed?

🔍 How transparent is it?

🤝 How fair are the working conditions?

🍃 Materials.

		1 point	2 points
🔴	🟠	🟡	🟢
No full declaration of materials (not 100%)	Conventional Cotton Elastane	BCI Cotton CmiA Cotton REEL Cotton In conversion Cotton Recycled Polyester	PCR Cotton. Organic Cotton. Organic Fairtrade Cotton. Fairtrade Cotton. Linen, Hemp, Tencel

💧 Dyeing.

		1 point	2 points
🔴	🟠	🟡	🟢
No information	Natural Indigo	Pre-reduced indigo	Indigo free dyes Natriumhydroxide free dyes
		N-Denim Indigo Juice	GStar Dystar Crystal clear Archroma advanced denim

Wash.

		1 point	2 points
🔴	🟠	🟡	🟢
No information	PP Spray Chlorine bleach	Stone wash Natural (peroxide) bleach	Raw - no wash Laser Ozone Abrasive drums Enzymes

Figure 22: Material, Dye and Wash benchmarks used to configure the jeans rating.

🔍 Transparency.

		1 point	2 points
🔴	🟠	🟡	🟢
No information	Only materials declared and CSR report available	Some information on materials, production & suppliers. Not detailed per product	All materials, production techniques & suppliers mentioned CSR or sustainability reports available

💚 Fair work.

		1 point	2 points
🔴	🟠	🟡	🟢
No Certification No information	BSCI / GLOBAL ORGANIC TEXTILE STANDARD	Ethical Trading Initiative / FAIR LABOR ASSOCIATION / ETHICALLY CORRECT CERTIFIED COMPANY SA 8000	FAIR WEAR FOUNDATION / FAIRTRADE

Figure 23: Transparency and Fair work benchmarks used to configure the jeans rating.
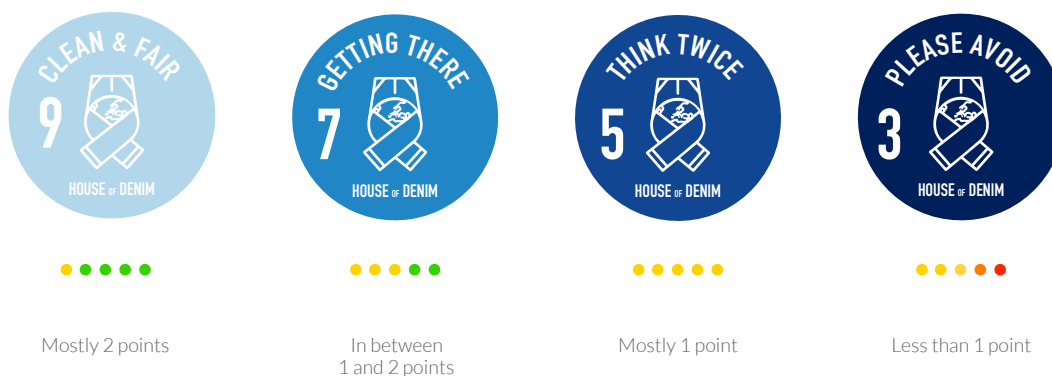
Figure 24: Total product scores and advice based on the benchmark rating.

These questions will not only provide insights on the impact of a jeans, they will also stimulate consumers to think about the choices they want to make, what is important for them. For example: if I care a lot about labour conditions but not that much about the materials used, I could use the rating to find a jeans that fits my priorities and that scores really well on fair work but maybe not that great on materials.

RATING METHODOLOGY

As discussed, the impact index will use a benchmark rating methodology to assess the impact of a product based on five key choices. In the benchmark rating, production methods are divided over four levels per indicator:

- ● : no information present
- ● : current unsustainable technologies
- ● : better & cleaner technologies
- ● : best sustainable techniques available

To rate a jeans, production details are compared to the techniques defined in the different benchmark levels of the five indicators. Scoring works as follows:

- ● : 0 points
- ● : 0 points
- ● : 1 point
- ● : 2 points

The total amount of points collected by the five questions defines the rating on a scale of 1-10. If a jeans scores less than one point per category (so below a 5), the advice will be to 'please avoid'. If a jeans scores between 5-7 the advice will be to 'think twice', between a 7 and 9 'getting there' and jeans that score a 9 or even a 10 will be proven 'clean & fair' (see figure 24).

To assess the jeans but keep it accessible to consumers, only information and data that is publicly disclosed by brands and retailers on products or websites will be taken into account. This way, consumers could execute the rating methodology by themselves if they wanted to and at the same time, it will stimulate brands and retailers to disclose more detailed information about their products.

When products score zero points on an individual indicator, it does not necessarily mean they are impactful. It just means the brand is not disclosing their efforts publicly. Hopefully, this will be a gamechanger for brands to become more transparent.

HOW IT WORKS

Now that the rating methodology and benchmarks are discussed, it is time to explain how the rating will be executed. Jean School students will examine and rate the jeans based on the before mentioned five questions. These ratings will be checked by an independent entity, who will issue the rating scores on a hangtag.

These hangtags will be sent to the retailers so they can attach them to the rated jeans. Consumers can use the hangtags in-store to help their orientation and decision making or once at home, it will provide them with more information and potentially influence future purchase behaviour.

Figure 25: First hangtag design featuring the five rating indicators and final advice to the consumer.

HANGTAG DESIGN

After an analysis of current communication strategies in sustainable innovations (as can be found in Appendix F), a hangtag was chosen to be the most efficient way to communicate the product rating to the consumer. It is closest to the price tag (where most consumers look at during purchase), and if consumers do not read it in store, they have to take it off their jeans before wearing, presenting the opportunity to read it at home.

The first hangtag design is made from FSC certified recycled material, and shows the final rating and advice as well as the answers to the five questions asked during the rating, as can be seen in figure 25. The symbols on the hangtag indicate the different production steps and behind the symbol, the used process of the rated jeans is explained together with a colour indication of its impact.

Since more and more purchases are made online nowadays, a digital solution was thought of as well. The rating could be featured in a google extension, allowing consumers to rate every jeans available online. The software of the Google extension will be based on a smart algorithm that scans all product information present in the Html code of the product page. Based on this information, a live rating is possible based on the rating benchmarks just explained. Instead of consumers having to look for the information themselves, the algorithm would do it for them, providing a digital product rating and accompanying purchase advise.

To create an alignment between the two services, the design will be kept similar to the rating featured on the hangtag.

DESIGN INTERVENTION 1:

ADVISORY BOARD REACTION ON RATING SYSTEM

After the development of the first concept, three design interventions were used to learn and iterate on the preliminary strategy and design. The first one of these three design interventions was a presentation to the international advisory board of House of Denim that was used to get a first industry reaction on the rating system and hangtag design.

11.1 BUILD

To demonstrate the first concept, a keynote presentation was used to share initial insights from the research and build-up towards the strategy and design of the rating system. The slide deck that was used during the meeting can be found in Appendix G.

11.2 MEASURE

SETUP
The advisory board meeting took place in denim city and lasted for about three hours. Both the House of Denim board and advisory board (figure 26) were present, and during the meeting, this research, as well as the research from fellow graduation student Lieke about recycled cotton and other agenda points, were discussed.

The presentation of my research and first concept took about 30 minutes, followed by a 30-minute discussion of the findings and design. Afterwards some advisory board members elaborated on their statements in person. The presentation and discussion were audiotaped, so the reactions and input could be analysed after the meeting.
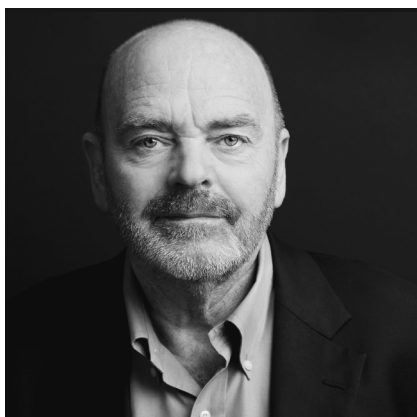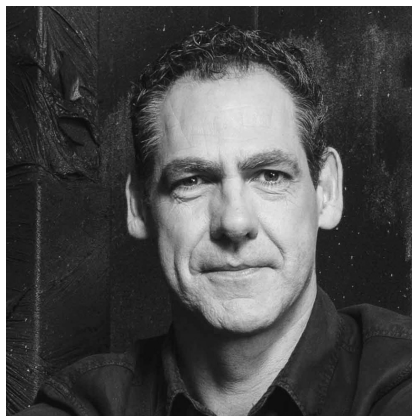
INTERNATIONAL ADVISORY BOARD
The international advisory board of House of Denim was established in April 2018 to support and advice House of Denim in their strategy and projects. The advisory board is a hand-picked group of seven global industry visionaries with a substantial variety of perspectives and experience, covering the entire value chain from the cotton fields to retail (House of Denim, 2019) and consists of:

- Andrew Olah: CEO of Olah Inc. and founder of the Kingpins Show
- Adriana Galijasevic: Denim & sustainability expert G-Star
- Adriano Goldschmied: 'Godfather of denim'
- Alberto Candiani: Head of Candiani SpA
- Alberto de Conti: Head of Rudolf group
- Menno van Meurs: Founder of Tenue de Nimes
- Sedef Uncu Aki: Sales, Marketing & Operations director at Orta anadolu mills

FIRST REACTIONS & DISCUSSION
The first reactions during the discussion were mainly about elements or certifications that were not included in the five benchmarks yet: for example smaller artisan factories in Japan that do not have the capacity for certifications or products made in Europe that do not require certification for labour conditions since the EU has very strict regulations on this already:

Alberto Candiani: "Are Fair Wear and Fairtrade the only 2 pointers? I am asking you this because I find myself stuck with

INTERNATIONAL ADVISORY BOARD

Figure 26: Members of the House of Denim international advisory board: Adriana Galijasevic (G-Star), Alberto de Conti (Rudolf group), Alberto Candiani (Candiani SpA), Adriano Goldschmied ('Godfather of denim', Genious group), Sedef Uncu Aki (Orta), Adrew Olah (Kingpins owner) and Menno van Meurs (Tenue de Nimes).

the Higg Index, for instance. Because I get discriminated because I produce in Italy, where those things (certifications) do not make sense, because within the EU fairwear or fairtrade is not required. Even if you do not have it".

Afterwards, there were questions about the authority of the rating system. If Jean School students are going to rate the jeans, then there should be at least a trusted authority that will issue the rating to make the rating credible to consumers.

But the most significant discussion was about the negativity of the first rating scores. By pointing fingers at brands or products that do not score very well, the product rating could jeopardise the current relationships that House of Denim has build with brands and retailers. Besides this Menno pointed out that no brand or retailer is going to put a score lower than a 7 on their garments:

Menno van Meurs: "It is super negative for something that should be positive. All these benchmarks are super valuable, but I do not think we should tag the products. I think we should get to the point where consumers feel comfortable to ask him/herself those questions without making it too complicated or hard to buy".

Alberto Candiani then argued that maybe the rating is not really a consumer tool but more a tool for retailers:

"If I look at the simplicity, it is a good effort. But I think it is more towards the retailers than the consumer. A retailer should be able to answer those questions, and then the retailer can use this information to tell the consumer."

Adriana concluded the discussion with a suggestion to adjust the mission from 'how can consumers buy a better product' into 'how can consumers make a more conscious decision'. With this alteration, potential arguments on the authority of claims on what a better product is would be eliminated.

11.3 LEARN

Although the discussion sometimes came across as negative, the benchmarks were considered valuable and a good effort in terms of simplicity. The five indicators cover enough on the impact of a jeans to generate a rating, but some additional research is needed on how all benchmarks could be quantified and which certifications are still missing.

The absolute key learning of this first design intervention was that the rating was too negative for an effort that is meant to be positive. The rating scores will, therefore, be adjusted into a rating that will award better products instead of judging the bad.

Some board members mentioned the opportunity to have consumers ask the questions themselves, instead of answering it for them on a hangtag. Something that could work in terms of awareness, but considering that most consumers only buy a jeans once or twice a year it would be a lot to ask from consumers to remember these questions during their purchase.

Asking questions to consumers would be a practical approach to create a better understanding of the impact and awareness of their choices and will, therefore, be used as part of the first two strategic steps.

DESIGN DECISIONS

The benchmarks will be further developed to quantify as many indicators as possible. Cradle to cradle certifications and EU regulations will be added to the benchmark.

If Jean School students are going to rate it, who will take the authority? During further development, we will have to think about who is going to be the issuing authority.

Pointing fingers does not help, and retailers will never label products that do not score great: award the good, do not punish the bad. The rating will be developed into a positive rating without scores below seven. Lower scores will still be accessible through a database, but will not be issued on the hangtags that will be used to award better products.

Producing hangtags that all have a unique score per jeans is not a viable option. To make it viable, a simple hangtag featuring the rating mechanism will be used; retailers will be the ones to fill in the ratings.

To avoid discussions on who has the authority to say that some products are better than others, better choices will be used in copy instead of better products.

Asking simple questions to provoke consumers might not be enough for them to make better purchase decisions, but will be useful to let them think about the impact themselves. Therefore provoking questions will be used as part of the first two strategic steps: awake & inspire and educate.

Fronteer participants filling out their elevator booklets during validation (photo taken during session)

DESIGN INTERVENTION 2:

EXPERT CONSUMER INSIGHTS ON THE STRATEGY & DESIGN

After the first design intervention with the advisory board, a second design intervention with expert consumers was used to gather insights on the strategy and design from a consumer point of view. In this case, the expert consumers are called 'experts' because they are not only consumers that are interested in using the rating, but also because they work at creative strategy firm Fronteer in Amsterdam and work a lot on design and strategy themselves.

12.1 BUILD

Just like during the first design intervention, a keynote presentation was used to present the research insights that were translated into the first strategy and design, followed by an updated design that was developed after the advisory board meeting.

DESIGN ADJUSTMENTS
Before the second design intervention, the first concept was adapted based on the learnings from the first design intervention. Cradle to cradle and EU regulations were added to the benchmarks, and a new simplified hangtag design was developed where the rating would be inserted by the retailer, see figure 27.

Apart from this development in the design, there has been an evolution in the working mechanism of the rating. During the Kingpins show (an important denim trade show) right after the advisory board meeting, the United Nations showed an interest in the rating system, that could lead to a possible

endorsement if we would be able to link the rating system to the UN sustainable development goals. This development would not only mean a lot in terms of funding but could also help in solving the authority issue that was brought up during the first design intervention.

12.2 MEASURE

SETUP
The second design intervention took place during Fronteer cafe: an afternoon where inspiring projects are presented to the Fronteer team to learn from. The presentation of this project took about 30 minutes and was followed by a small 30-minute elevator validation with 11 participants.

An elevator is one of the techniques used at Fronteer to validate new products or services, starting with a short presentation of the new concept followed by some questions to be filled in individually in a special booklet and a discussion on the given answers. This design intervention followed the elevator format and the booklet used to test the concept and receive individual feedback can be found in Appendix H.

ELEVATOR INSIGHTS

First reaction to the strategy

★★★★⯪ *4.3/5.0*   *SD= 0.53*

The first question asked in the booklet was to indicate how much the strategy, presented during the presentation, appealed to the expert consumers. The strategy appealed a

Figure 27: The top two images show the hangtag design where retailers can insert the product rating themselves. The bottom two images show a possible hangtag design if endorsed by the United Nations.

lot because it approaches the problem from a positive angle and consumers are really taken through the process step by step. The strategy is clear and clarifying to the participants; however, Awake and Educate could use some polishing; '*is awake still really necessary?*' and education must be kept *short & snappy*, not too didactic.

First reaction to the hangtag

★★★★⯪ *4.2/5.0*   *SD= 0.78*

A similar question was asked to indicate how much the hangtag appealed to expert consumers. Although they liked the initiative and design, the participants mentioned the hangtag felt less clear than the strategy. This was mostly due to some confusion about the rating scale (*is 2 points good?*) and the title saying 'buy a better product' that was understood as 'Oh so *not* this one?'. Another comment made was the amount of effort for the retailer - '*what is in it for them?*'- and that it does not really feel reliable if retailers insert the ratings themselves. These comments aside, the design was perceived to be appealing and reminded them of the Beterleven mark but then for jeans.

Subsequently, some statements were made about the concept and participants were asked to what extent they agreed with the following statements:

'The rating clarifies the purchase process'

★★★⯪☆ *3.6/5.0*   *SD= 0.77*

Most participants acknowledged that the design of the hangtag was clear and that the five-point system was easy to understand, but could use some additional context. Since there are already many choices to be made (price, fit, style, size) and information present on the product, the hangtag was not considered to be more clarifying, but it was considered more insightful.

'The hangtag provides me enough information'

★★★⯪☆ *3.3/5.0*   *SD= 0.75*

This second statement was presented on a different scale ranging from too little to too much information. According to the reactions, the current hangtags shows enough information to make a purchase decision. However, some participants felt the information could be more concrete (*what do I save?*) or provide more context. One of the participants mentioned it would be nice if the hangtag could link to more information by scanning a QR code; that way, the design could stay clear but also provide some additional context.

'I would use the hangtag during my purchase '

★★★★⯪ *4.3/5.0*   *SD= 0.74*

Almost all participants answered that they would use the hangtag during their purchase. It would be a great way to get a better impression of the jeans, and the hangtag is easy to use. In some cases, it would convince the respondents to buy a better jeans, and in some cases, it would serve as a base for comparison between different options: but if a jeans truly fits amazing, a lower score will not be a reason not to buy it.

'The rating would influence me to buy a better jeans '

★★★★⯪ *4.5/5.0*   *SD= 0.5*

Although it is hard to get an honest opinion on this type of statement (since many people do not really know if something influences them and tend to be biased on their own behaviour), we were wondering what the expert consumers would answer. Most reacted positive on the statement and said it would ('definitely/ absolutely') influence their behaviour. Some were a little more cautious and answered that they would consider the rating but did not know if it would actually influence their final purchase. The real answer we will have to measure in a more controlled setting, but for now, it is a useful insight that consumers think it would influence their behaviour because it only would if they would take the rating seriously.

12.3 LEARN

During the second design intervention, we gathered insights on the strategy and design from a consumer point of view and learned things on various levels:

First of all, the strategy is clear and guides the consumer easily through the various steps towards greener consumption. Furthermore, the strategy approaches the problem from a positive angle: exactly as is intended and a great improvement from the first concept. However, some of the strategic steps could use some polishing to see if they are really needed to complete the story.

Second, consumers are not convinced by ratings that are filled in by the retailers themselves: it feels niche, much work and not really reliable since retailers are in business to sell as many products as possible. Additionally, we have to think about the role that the shop assistants can or will fulfil in this system; the rating could be a great opportunity to educate them on how to talk to consumers about sustainability.

At last, on a more organisational note, we have to think about how the rating hangtags will be attached to the jeans. It seems too much work for retailers to do this themselves and allows for error: *how does a consumer know that the hangtag rating really belongs to the jeans the tag is attached to?*

DESIGN DECISIONS

In general, the design of the hangtag is clear and understood. However, to avoid any confusion "buy a better product" wil be adjusted to "a better choice" .

Since the filled in rating scores do not have much added value and retailers inserting the rating feels niche and not really reliable, the hangtag will present the outcomes of the rating and not the scorecard itself. This will create room to make the outcomes more concrete as well.

Although the hangtag was not considered especially clarifying (because many choices already have to be made), it still creates more insights into the impact and production of a pair of jeans. Since there is not really a viable or feasible alternative to communicate ratings on the product, the hangtag will be maintained.

A QR code will be added to the hangtag to provide a bit more context on the rating and product. By scanning the code, it will link the consumer to a database app. An additional benefit of the QR code is that by scanning, consumers can check if the presented rating actually belongs to the jeans it is attached to.

To strengthen the strategy, we have to think about the whole story: what happens next to the ratings? How will the different strategic steps follow up on each other? If we want to keep education, it has to be short & snappy: not too didactic

Shop assistants can add value by informing consumers in their choice: the rating could be a great opportunity to educate them on how to talk to consumers about sustainability.

DESIGN INTERVENTION 3:

INSIGHTS FROM THE CUSTOMER JOURNEY

After the first two design interventions, a third design intervention was used to retrieve consumer insights that were still missing, like what information consumers use during their purchase and why they make certain purchase decisions. To answer these questions in the best possible way, consumers were asked about the process and decisions of the purchase journey of their last pair of jeans. A survey of 35 questions was used to compose a customer journey and to get insights intoto the emotional benefits of the rating system.

13.1 BUILD

To retrieve these insights an online survey was chosen over qualitative interviews to reach a bigger sample of consumers and be able to get a more generalised image of their journey and decisions. However, to keep the richness and details like you would in a qualitative interview, the survey was both quantitative and qualitative: the questions were asked in a qualitative and open manner with a lot of clarifying follow-up questions and the sample size was big enough to generate quantitative results and statistics. The setup of the survey and questions can be found in Appendix I.

ONLINE SURVEY
The choice for an online survey was made to get the best possible response rate, since it could be spread easily over different channels like Whatsapp and LinkedIn. Google forms was chosen as the platform to host the survey, because it works very intuitively, allows to use images and gives an immediate insight in the analysed results through graphs and presentation of the data in Google spreadsheets.

SAMPLING
Both Whatsapp and LinkedIn were used to spread the survey over the personal network of the author. This sample was chosen both for convenience and since this sample represents an important potential target group, according to the research of ABN Amro (ABN Amro, 2017).

13.2 MEASURE

RESPONDENTS
A total number of 53 respondents (students, colleagues and LinkedIn network) completed the survey. Half of these respondents were aged between 18 and 24, the other half between 25 and 34. Two-thirds of the respondents were female, one-third male and 60% of the respondents reported to try to make conscious purchase decisions. Most of the respondents own five pairs of jeans, and their favourite brand was Levi's.

CUSTOMER JOURNEY OF JEANS
Although the questions were set up with a qualitative approach, the answers of the respondents were very similar and could be quantified into an average customer journey of a pair of jeans, as illustrated in figure 28 on page 102 & 103. What immediately became clear is that most respondents already know what kind or what brand of jeans they want before the need for a purchase was even triggered, which will be interesting to influence.

About half of the respondents buy a new jeans because the old ones are that much worn down that they need replacement, the other half because they want to add a new style or model to their wardrobe to have more choice in what to wear.
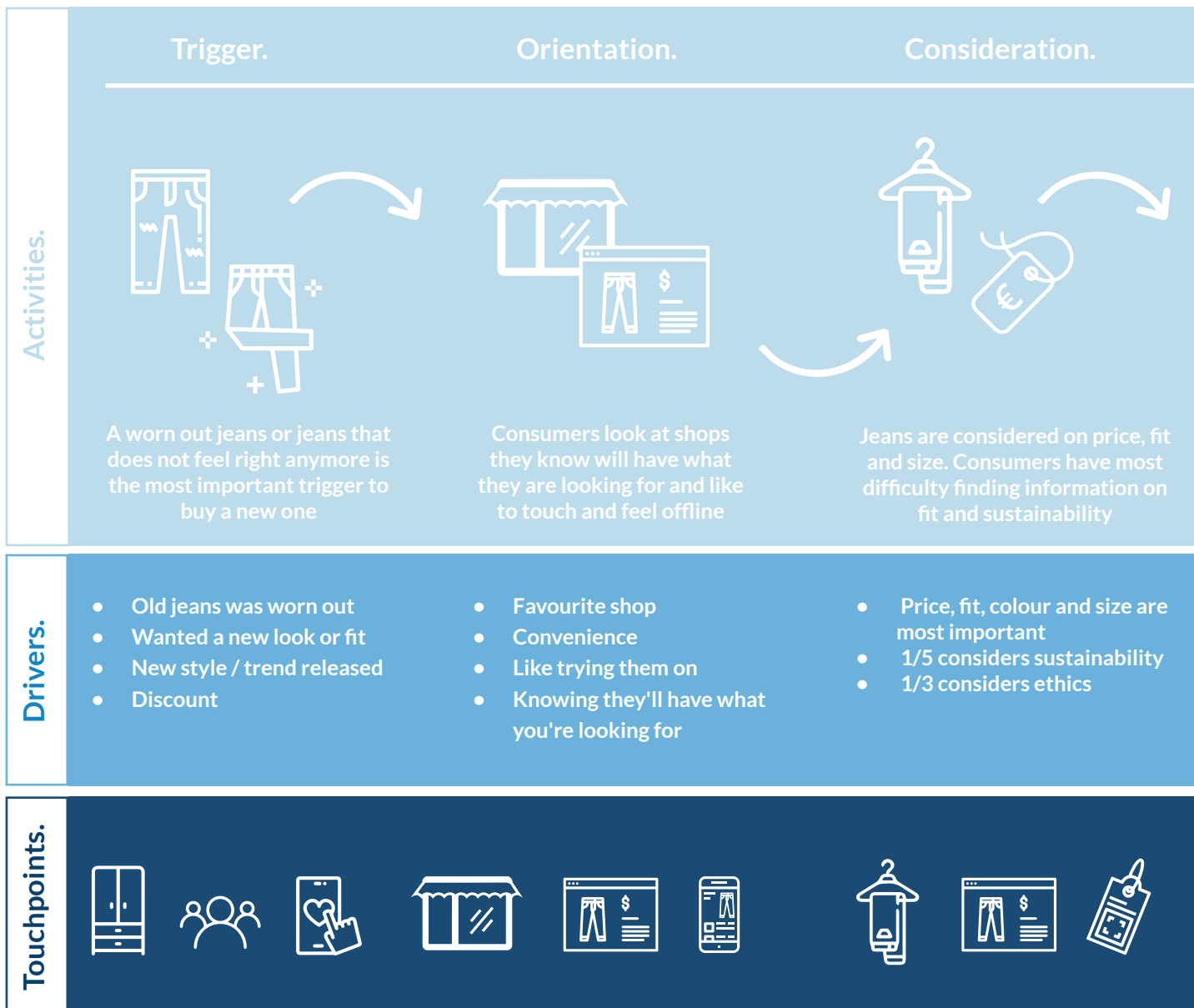
Trigger.

Orientation.

Consideration.

Activities.

A worn out jeans or jeans that does not feel right anymore is the most important trigger to buy a new one

Consumers look at shops they know will have what they are looking for and like to touch and feel offline

Jeans are considered on price, fit and size. Consumers have most difficulty finding information on fit and sustainability

Drivers.

- Old jeans was worn out
- Wanted a new look or fit
- New style / trend released
- Discount

- Favourite shop
- Convenience
- Like trying them on
- Knowing they'll have what you're looking for

- Price, fit, colour and size are most important
- 1/5 considers sustainability
- 1/3 considers ethics

Touchpoints.

Figure 28: The average customer journey of purchasing a pair of jeans

Research or orientation for a new jeans still happens a lot in offline retail environments, to see the colour, feel the fabric and try on different jeans to see how they fit in real life. Online, most respondents either shop at bigger platforms like Zalando, Wehkamp and Google to compare different models and prices or they visit an online brand store. Both online and offline retail environments are chosen out of convenience, because they sell their favourite jeans or because they have a lot of different options.

During their orientation, respondents mostly look for information on price, fit, look and size, as could be expected. However, durability and sustainability are becoming more important in the search for information and come in fifth and sixth place. Most respondents do not experience much difficulty in finding the information that they are looking for. Though respondents that were experiencing some difficulty had most trouble finding information online about how the jeans would fit or if it was produced sustainably.

A third of the respondents take ethics into account during the consideration of their purchase. Some of the respondents simply do not buy that much because of ethical reasons, and others do online research through blogs and brand websites. Interesting to see is that 25% of the respondents that consider ethics, buy a more expensive brand to ease their mind - without knowing for sure that this brand is indeed more ethical.
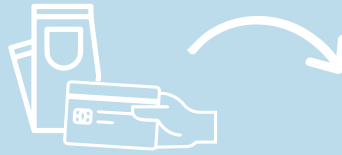
Decision.	Purchase.	Wear & Disposal.
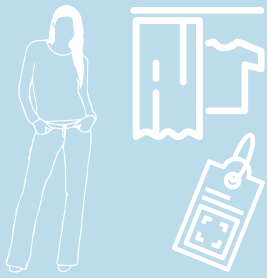
Jeans are fitted to see if they look good and friends, family and shop assistants are asked for advice.

Jeans are bought directly after trying them on in physical stores. Purchase decision is hard to influence by additional information

Very few consumers use repair services, most jeans that do not fit right anymore or are worn out end up in collection/ recycling bins.

- Fitting jeans to see if it matches bodytype
- Advice on looks and quality
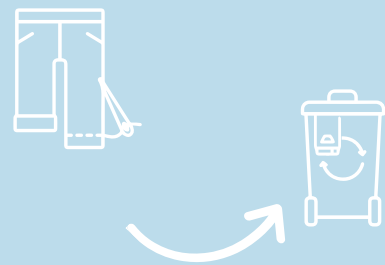- Consumers look at hangtags for price & fit information as well as curiosity of how a product is made

- A good fit
- Quality or sustainability aspects can influence decision

- Jeans are rarely repaired because 90% does not know about free repair services
- Brought to a collection bin to be recycled
- Old jeans are kept in the

Except for jeans bought online, all respondents tried on their jeans before purchase. How it fits and suits their body type is most important when trying it on and half of the respondent ask friends, family or shop assistants for advice. The most frequently asked question? *If their butt looked nice*. Shop assistants are mostly asked about the quality of the jeans and how the fit could potentially change over a longer period of time.

When considering their purchase, 80% of the respondents look at the price tag and 60% at the hangtag or other tags present on the jeans. The most important reasons to look at this information were the price, size & fit and out of curiosity for more product information. Respondents are interested to see what materials the jeans are made of, how they

should care for the garment and if sustainable production information is available. Although more than half of the respondents ask for advice or looks at on-product information, 80% says their purchase was not influenced by a certification mark, product information or information from shop assistants. For the 20% that was influenced, information on quality, durability and sustainability was most important. In the end, almost all the respondents bought their jeans directly after trying it on in a physical store.

During the use of their jeans 40% of the respondents noticed something unexpected: not having bought the right size after all, more stiff or stretchy fabric than expected or a disappointing quality that caused the jeans to lose its fit quite soon.

Despite that 40% is not completely happy with their purchase, only 10% of the respondents know if their jeans are part of a warranty or free repair service. When asked if they would use it when known about it, more than 60% would definitely use it, and 20% would think about it. Reasons to think about it are if the service is convenient and if it is possible to repair the default in their jeans.

At the end of the life cycle of their last jeans (not necessarily their latest purchase) more than half of the old jeans were brought to a local collection point for charity or recycling or kept in the back of their closets (20%). Only 10% of the jeans were thrown in the trash because they were completely worn out.

To check if the customer journey just described, was representative for the 'normal' purchase behaviour of the respondents, a control question was added: *Do you consider this a representable journey?*
90% of the respondents answered their journey was representative; the other 10% answered that they normally shopped online or at bigger retailers and now bought a more premium brand because of quality/ sustainability reasons; *a positive change of events.*

Although many steps are taken during the purchase of a jeans, respondents answered their purchase took only 30 minutes to a couple of hours to complete from orientation to actual purchase; so it will be quite a challenge to change behaviour in such a short period of time!

DIFFERENCES IN JOURNEYS
The journey, as presented in figure 28, is what the average customer journey of a jeans looks like if we generalise the data. Since there were multiple possible target groups within the sample, a comparison was made to see if there were differences between the journeys of various groups based on age (Gen Z vs Millenial), behaviour (Conscious vs not Conscious) and gender (Male vs Female).

GEN Z VS MILLENIALS
The biggest difference between the customer journey of Generation Z (18-24) and Millenials (25-34) is that the journey of Generation Z is executed more digitally and advised through friends and influencers compared to Millenials that prefer to visit a physical store . Another big difference is that 50% of generation Z considers ethics compared to only 15% of the Millenials and that the younger generation cares more for durability and sustainability, although both respondent groups have an equal division, self declared conscious consumers. Both groups spend a similar amount of time to complete their journey.

CONSCIOUS VS NOT CONSCIOUS
Changes between the journey of a self declared conscious consumer and not conscious consumer, already become apparent in the first step of the journey: while half of the conscious consumers buy a new jeans because the old one is worn out, this percentage amongst not conscious consumers is only 25%. The other 25% buys a jeans because of a sale or out of impulse. When looking for information, a third of the conscious consumers find sustainability most important

(still after price and fit) and 50% considers ethics during their purchase compared to only 10% of the not conscious consumers. Next to this, conscious consumers look for quality and how a product is made: they are critical when the jeans they bought does not live up to its expectation, and more than 2/3 brings their jeans to a collection bin at theend of life.

Every step of the journey there is a clear difference between self declared conscious and not consious consumers and the journey of a conscious consumer can last from a day up to a month compared to 2 hours of not conscious consumers. Although respondents self declared their behaviour conscious, there is a significant difference in behaviour between the two groups and self declared conscious consumers actually show more conscious behaviour.

MEN VS WOMEN

Unlike the conscious and not conscious consumers, the difference between the journeys of men and woman is much less obvious. The biggest difference is that the customer journey of men is much more goal-oriented (price and fit) and functional and the journey of women more based on feelings (size & materials), ethics, sustainability and opinions of others. There is no significant difference in the total time spent on both journeys, and both men and woman have the same feelings on the impact of the fashion industry. Although the women in this survey find sustainability more important than men, men appear to show more sustainable behaviour.

SUSTAINABILITY INSIGHTS

Additional to the questions about the purchase process of their last jeans, respondents were asked about their knowledge on the impact of the fashion industry, how they felt about it and what they know about the impact of a pair of jeans to collect insights on the potential emotional benefit of the rating system.

Most respondents know quite a lot of the impact of the fashion industry and describe feeling sad, powerless, helpless, and some even depressed. Even though many of them would like to change something about this impact, most respondents do not feel supported by the current systems and feel guilty because they do not know how to do better. Others feel like it is not up to them to change this and feel that brands or even the government should take action.

Almost all respondents know the impact of jeans involves water, and some of them are even aware of the washing, dyeing and working conditions. Funny is it that transport is thought to be one of the most impactful factors and despite that it is part of the impact, it is only a very small part. While most respondents know something about the impact of a jeans, it is interesting to see that very few of the respondents actually know how jeans are produced: an opportunity to improve!

To get some additional input on the design, the respondents were asked what they would like to know about their jeans. According to the respondents, consumers would like to know about the direct impact, working conditions, materials and amount of water used during production.

13.3 LEARN

JOURNEY INSIGHTS

After the analysis of the data and comparison between journeys, a couple of important insights were found:

First, the average time spent to buy a new jeans is just a couple of hours, and many purchases take even less time. So there is a very limited timeframe to influence behaviour and seeding will be needed before a new purchase is triggered.

Second, the purchase of a jeans is mostly made out of habit: the respondents already know what they want and where they should look for a new purchase. It is hard to influence a purchase in store: only when looking for something new or specific more research is done online.

Third, consumers face the most difficulty in finding information about sustainability or the fit. Providing this information through a hangtag and platform will be an opportunity to improve the current journey.

According to this survey, sustainability is valued most by 18-24 year-olds, and more than 50% of this group considers ethics in their purchase. These conscious youngsters look for information online and are influenced through social media and friends: a major opportunity for the product rating to target.

As could be expected: conscious journeys take longer, consider ethics in their purchase and look for product information that tells

something about how it is made and from which materials. As opposed to the short time frame available unconscious consumers, conscious consumers take their time and will be influenced by the product rating.

EMOTIONAL BENEFITS

The goal of this third design intervention was to collect missing information on the customer journey and insights intoto the potential emotional benefits of the rating system.

According to the survey, most consumers feel sad, powerless or guilty about the impact of the fashion industry. They would like to know about the direct impact of their jeans as well as the working conditions, water use and materials used during production.

So the emotional benefit of the rating system will be to empower consumers to feel more in control and proud of their behaviour. The functional benefit of the hangtag and rating system to create insights into impact will answer their need for more information.

DESIGN DECISIONS

Because of a very limited time frame to influence behaviour, educate will be taken out of the strategy. Awake and Inspire will be extra important in seeding information about the rating before a new purchase journey begins.

Most respondents already know what kind or what brand of jeans they want before the need for a purchase was even triggered, by advertising or asking questions on social media we can create a desire for their next jeans to be more sustainable.

Expensive brands are considered more ethical or sustainable because of their price premium. The platform will help consumers in creating more transparency of what jeans are a better choice without having to buy more expensive brands.

Conscious youngsters are the most promising target group since they care more for sustainability (Fridays for future), look actively for information online, and are influenced through social media and friends. Since their journey is mostly online, digital platforms will be used to spread our message.

Most respondents feel sad, powerless or guilty about the impact of the fashion industry. The emotional benefit of the rating system is to empower consumers to feel more in control and proud of their behaviour.
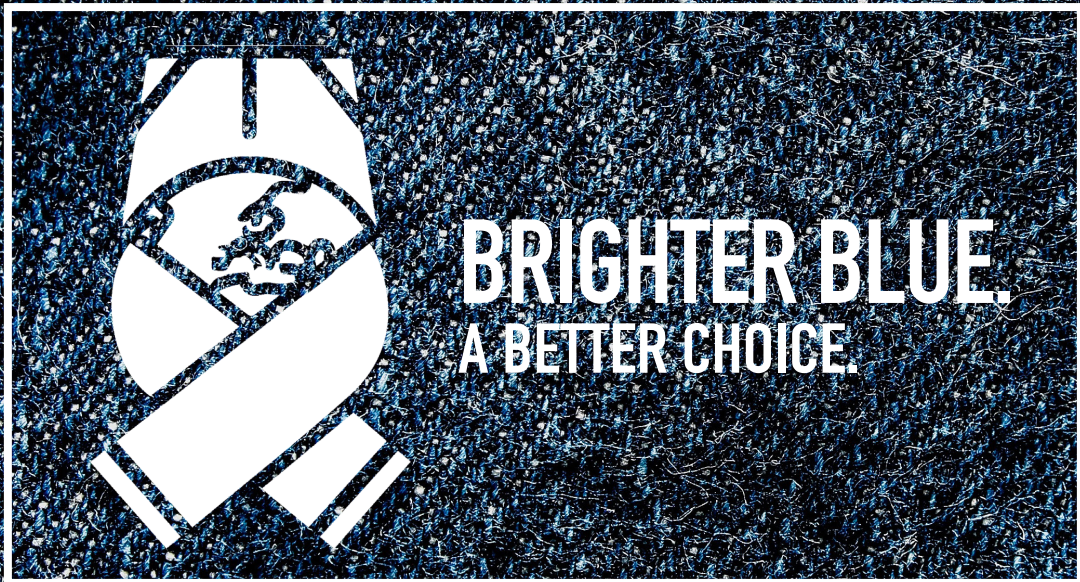
Respondents want to know more about how their garments are made and what impact they have on the world. The functional benefit of the hangtag and rating system is to create easy to understand insights into impact.

DELIVER

BRIGHTER BLUE.
A BETTER CHOICE.

14

FINAL CONCEPT

During the development phase of this project, three design interventions were used to iterate on and enrich the initial concept. Learnings and design decision from these interventions were shared in the previous chapters. This chapter will present the final outcome of this thesis: the design of the impact index.

14.1 BRIGHTER BLUE

Inspired by the mission statement of House of Denim to bring the industry towards a brighter blue, Brighter Blue was chosen as the final name for the product rating. Brighter Blue not only links directly to this statement, it also refers to jeans that are made using 'brighter' production techniques and therefore symbolises cleaner and smarter produced jeans.

As a mantra of the rating, *'A better choice'* was chosen to communicate that Brighter Blue stands for better choices made during production and that by choosing a Brighter Blue jeans you will make a better choice yourself. This mantra is in line with House of Denims educational strategy: since their courses in sustainable development are called 'Making better choices'.

During the development of the final concept, the article '*People like us do things like this'* by Seth Godin (Godin, 2017) inspired our way of thinking. In his article, Godin describes that in order to make change happen (what we are trying to achieve) we have to appeal to the internal narrative of people. Because people do not make decisions in a vacuum: they make decisions based on the perception of who they are and who they (want to) belong to. With

every decision made, we go through a concise process: we categorise the offer, we decide if it is something that we like or dislike and then we think about *do people like me do something like this?*

This last thought is an integral part of our culture and is most of the time even more important than price or availability. So, to make change happen, we have to change the culture of buying jeans. According to Godin, to change a culture, you have to **change the right people in the right way**.

In his article, Godin writes about an initiative in New York where blue ribbons were hung into a tree to convince a school board to stop budget cuts of an elementary school. In this initiative, blue ribbons were a sign of educational excellence, but blue ribbons are used all over the world as a sign of excellence in a specific field. In the example of the elementary school, the ribbons reminded the school board of their achievements, and they decided against the budget cuts. This illustrates, that enlightening the positive inspires people to make better decisions themselves, instead of telling them they should. Behavioural psychologists confirm this theory: other people unintentionally copy exemplary behaviour because they like to follow the herd (Smit, 2019). Propagating a positive norm works better than a cautionary finger: "Fear causes people to close themselves for the message," says Swankhuisen of Tabula Rasa (Smit, 2019).

Since setting an example is exactly what Brighter Blue intends to do, a blue ribbon will symbolise this as part of the Brighter Blue

How it works.

Jeans are rated by Jean
School students as part
of sustainability course

Ratings checked by
Jean School teachers
for assessment

Expert panel will oversee
rating and twice a year
randomly check jeans

After first check ratings
will be published in an
online database

Brands of rewarded jeans
will be supplied with the
Brighterblue hangtags

A retailer guide will promote
rewarded jeans to retailers and
advice them how to buy better jeans

Consumers see advertisement on
social media and click the link or see
the hangtag in store and scan QR

By clicking the link or scanning the
code the consumer will be linked
to an online platform or app

The platform or app will provide the rated database, more in-
depth information about the rating & production techniques
and offer more tools to facilitate better choices.

Consumers are now fully
equipped to start making a better
choice now and in the future.

Figure 29: Illustration of how Brighter Blue works in practice.

logo. Currently, House of Denim already uses a logo where jeans are folded into a ribbon: to emphasise the context of sustainability, the Brighter Blue logo will be folded around a globe (page 110). To resemble a blue ribbon, the Brighter Blue logo will be issued in blue on light coloured backgrounds, and for contrast reasons, in white on dark coloured backgrounds.

14.2 RATING MECHANISM

So, Brighter Blue is not just a product rating for jeans; Brighter Blue's role is to inspire and guide stakeholders towards better choices. Contrary to other standards and certifications, Brighter Blue awards industry changemakers for their efforts and connects them to consumers that have the power to make this change happen. To be able to award these efforts, the following paragraphs will explain the process.

HOW IT WORKS

To award better choices, jeans are rated by Jean School students as part of their sustainability course so they can learn how to make clean and good looking jeans by examples. Jean School teachers will check these ratings as part of the assessment of the course. Approved ratings are then published in an online database that is connected to an app and platform, from where the ratings will be accessible to brands, retailers and consumers.

An expert panel consisting of sustainability and industry experts that are not tied to a jeans brand will oversee the rating process and execute random checks to assure reliability twice a year. Once a year, the expert panel will review the benchmarks and update the scoring mechanism with new innovations and agreements to make sure the rating will stay up to date.

Once the ratings are published in the database, the ratings will be communicated to the brands to allow them to react or improve their product communication. Brands of rewarded jeans will be supplied with the Brighter Blue gold or platinum hangtags so that they can attach the ratings onto the jeans during the last stage of production.

Next to the hangtag, every season Brighter Blue will issue a retailer guide to promote rewarded jeans and advice retailers on how to buy better jeans. A similar guide for consumers will be published on the Brighter Blue platform.

Advertisements, social media and the hangtag, will expose consumers to Brighter Blue. By clicking the link or scanning the QR code on the hangtag, consumers will be linked to the online platform or app. The platform or app will provide the rated database, more in-depth information about the rating & production techniques and offer more tools to facilitate better choices. Afterwards, consumers are fully equipped to start making a better choice and keep making them in the future.

RATING METHODOLOGY

Brighter Blue uses a benchmark rating methodology to assess a product's impact based on five key choices, including used materials, dyes, laundry processes, transparency and fair working conditions. In the benchmark rating (figure 30& 31), production methods are divided over three levels:

- ● : no information available or current unsustainable technologies
- ● : better & cleaner technologies
- ● : best sustainable techniques available

Five questions define the rating:

🌱 What material is it made of?

💧 How is it dyed?

🔘 How is it washed?

🔍 How transparent is it?

🕊 How fair are the working conditions?

To rate a jeans, production details are compared to the techniques defined in the different benchmark levels of the five indicators. Scoring works as follows:

- ● : 0 points
- ● : 1 point
- ● : 2 points

When a product scores zero points on an individual indicator, it does not necessarily mean it is an impactful product. It just means the brand is not disclosing their efforts publicly.

Since Brighter Blue awards products, the well-known colours of medals of honour are used to describe the final rating. This final rating is defined by the total amount of points collected by the five questions:

- 1 or 2 points: **Basic**
- 3 or 4 points: **Bronze**
- 5 or 6 points: **Silver**
- **7 or 8 points**: Gold
- **9 or even 10 points**: Platinum

To keep the rating positive, only Gold and Platinum ratings will be awarded with the Brighter Blue hangtag; the other ratings will be accessible through an online database. In this database, all product information, including the rating, will be communicated to consumers.

To assess the jeans but keep the rating accessible to consumers, only information and data that is publicly disclosed by brands and retailers (on products or websites) will be taken into account. This way, consumers could execute the rating methodology by themselves if they wanted to and at the same time, it will stimulate brands and retailers to disclose more detailed information about their products on- and off-line.

RATING PROCEDURE

As explained, Jean School students will rate the jeans according to the rating methodology. An online tool will be used to guide them through this process: the jeans passport. This passport, constructed as an online form, needs to be completed with information about the rated jeans like the model name, brand name, who is doing the rating, where the jeans was made, by whom it was made, care

Materials.

Materials with a smaller water and chemical footprint.

Materials with the smallest water and chemical footprint.

● (red)

Conventional Cotton
Elastane

No full declaration of materials (not 100%)

● (yellow)

BCI Cotton
CmiA Cotton
REEL Cotton
In conversion Cotton
Recycled Polyester

● (green)

PCR Cotton.
Organic Cotton.
Organic Fairtrade Cotton.
Fairtrade Cotton.
Linen, Hemp, Tencel

Dyeing.

Dyes with a smaller water and chemical footprint.

Dyes with almost no water and smallest chemical footprint.

● (red)

Natural Indigo

No information

● (yellow)

Pre-reduced indigo

C2C Gold

● (green)

Indigo free dyes
Natriumhydroxide free dyes
Indigo foam dyes

C2C Platinum

Wash.

Washes with a smaller water and chemical footprint.

Washes with almost no water and smallest chemical footprint.

● (red)

PP Spray
Chlorine bleach

No information

● (yellow)

Stone wash
Natural
(peroxide) bleach

C2C Gold

● (green)

Raw - no wash
Laser
Ozone
Abrasive drums
Enzymes

C2C Platinum

Figure 30: The average customer journey of purchasing a pair of jeans

Transparency.

Transparency on production level

Complete transparency on product level

● (red)

● (yellow)

● (green)

No information or only materials declared and CSR report available

Some information on materials, production & suppliers. Not detailed per product

All materials, production techniques & suppliers mentioned CSR or sustainability reports available

Fair work.

Better working conditions.

Fair and equal working conditions.

● (red)

● (yellow)

● (green)

No Certification No information

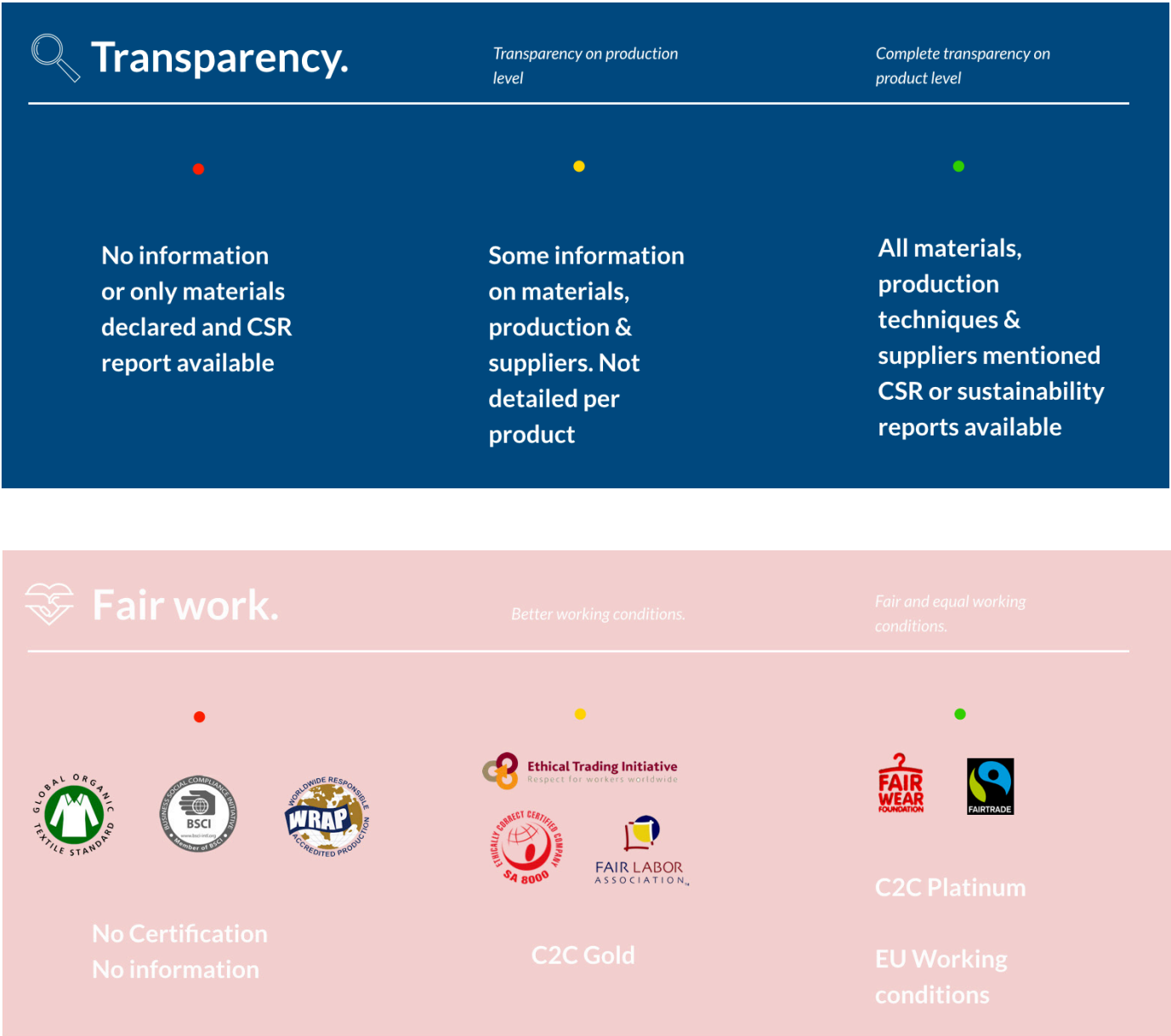**C2C Gold**

C2C Platinum

EU Working conditions

Figure 31: The average customer journey of purchasing a pair of jeans

Figure 32: Mockup of Brighter Blue app, showing the database search option, QR scanner and digital product passport

instructions and what production techniques were used during manufacturing (figure 34). Additional to the information, photos of the jeans and information used to rate are uploaded to serve as proof and support of their findings. When the student completes the passport, it will be sent automatically to the instructors for assessment.

JEANS PASSPORT

The jeans passport serves not just as rating guide for the Jean School students. Once the completed passports are assessed and checked, they will be uploaded to the online database from where consumers can access them through the Brighter Blue website or app (see figure 32).

The passport for consumers works as follows:

Imagine you (as a consumer) are looking for a new pair of jeans, and while browsing through some displays, you come across a poster that explains the Brighter Blue initiative. You did not see a hangtag attached to the jeans, but you are interested and decide to use to app to check its rating. You type in the brand an model name and are presented with a jeans passport: all information you would like to know in a very simple overview with a rating on the bottom of the page. Now you have all the information you need and decide to search for jeans that do have a Brighter Blue hangtag.

Of course, this is just one of the possible user scenarios, but the digital jeans passport will not only allow students to rate the jeans, it is also very informative for consumers that would like to know more about the product. Since the same format will be used for rating and informing, little translation is needed before it can be published on the platform.

HANGTAG & GOOGLE EXTENSION

During the three design interventions, the hangtag design developed most since the first concept, and insights from every session were used to iterate further on the design. The design, as presented in this final concept, can be seen in figure 33 on page 118.

Similar to the first concept, the hangtag is made from FSC certified recycled cardboard. On the front of the hangtag, the Brighter Blue ribbon is clearly visible and accompanied by the Brighter Blue name and mantra. Right below the logo, the endorsement of the United Nations (UN) is presented as a form of authority. *Since this endorsement is still under consideration, the text mentioning the endorsement is a possible draft. In case the rating will not be endorsed by the UN, another disclaimer of authority should take its place to clarify the reliability of the rating.*

The backside of the hangtag comes in two different designs: one for the gold and one for the platinum rating. Since the rating will
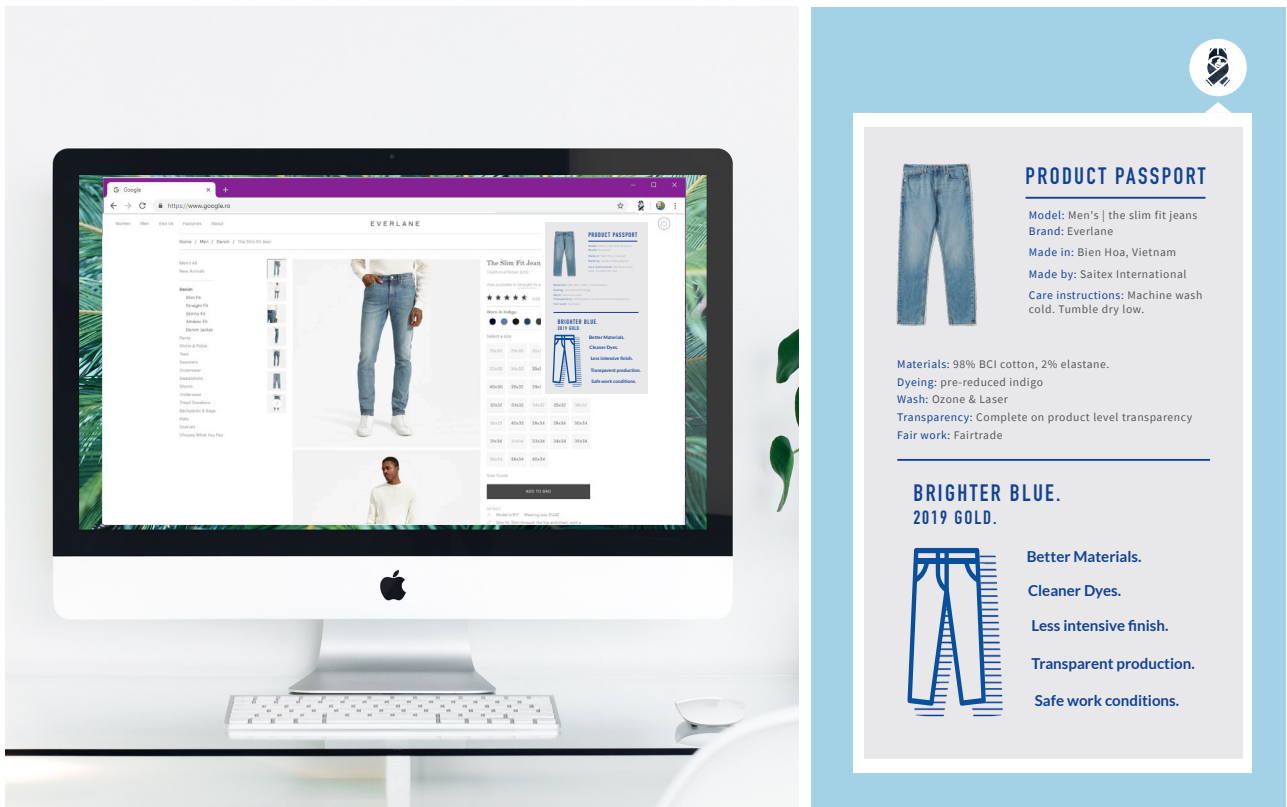
Figure 34: The Brighter Blue google extension allows to rate all available jeans online.

be updated once a year to keep awarding the most sustainable jeans, the rating is accompanied by the year it was issued, to let consumers know if the rating is still up to date.

Since the scorecard on the hangtag was sometimes considered to be confusing (design intervention 2), the final hangtags do not mention the rating per category to consumers. Instead, a more concrete description per final rating is used. When looking at the benchmarks, gold-rated jeans are produced with better materials, cleaner dyes, less intensive washes, transparent production and better working conditions. Platinum-rated jeans are made using the best materials, cleanest dyes, waterless finish techniques, transparent production and fair working conditions. By communicating in this way, we can ensure consumers that they are making a better choice without making it too complicated.

According to the survey of the third design intervention, consumers want to know a lot about the product. To keep the design clean and simple, a QR code is added to link the consumer to the product passport for more information. This way, interested consumers can search for more info and consumers that are not, only see the rating. A comparison of the water that is saved when buying a gold/platinum-rated jeans compared to a regular jeans is added to provide a little more context on the impact. Water was chosen for this

comparison since it is the best-known impact of a jeans by consumers and most relatable in terms of use.

Since more purchases are made online, a digital solution was thought of as well. Brighter Blue will be available as a google extension, allowing consumers to rate every jeans available online automatically. The software of the Google extension will be based on a smart algorithm that scans all product information present in the Html code of the product page. Based on this information, a live rating is possible based on the rating benchmarks. Instead of consumers having to look for the information themselves, the algorithm would do it for them, providing a digital product rating and accompanying purchase advise.

The design of the extension is similar to the rating featured on the hangtag, and the product passport in the database, to create an alignment between the two services. By presenting additional information like the model and brand name, consumers can check if the extension uses the right information. The design of the extension can be seen in figure 34 and will present itself as a browser popup.

This chapter described the design and setup of the developed Brighter Blue rating. The next chapter will discuss how the rating should be implemented and launched to make it successful.

IMPLEMENTATION & LAUNCH

To successfully introduce Brighter Blue to other stakeholders and the market, an implementation and launch plan were developed. This chapter describes the next steps then have to be taken to make the rating a success, to introduce Brighter Blue to the different stakeholders, and launch the new rating into the market.

15.1 IMPLEMENTATION

Before Brighter Blue can be introduced to the market, several steps have to be taken to implement the design and to introduce the concept to other project stakeholders.

Now that the general rating methodology and system are in place, the next step is to develop the rating tool for Jean School students: the jeans passport. This tool will provide the students with a step-by-step process to rate the jeans and ask for all information necessary to complete a rating. The first version of this tool could be developed using Google forms to test it during a pilot. Afterwards, it is recommended to develop the tool on a different platform, since the filled in passports will be linked to the Brighter Blue database.

Once a first version of the passport tool is developed, the concept has to be evaluated with the different stakeholders connected to this project: brands, retailers, consumers, Jean School students and staff. The most efficient way to do this would be through an evaluation sprint. During this sprint, inspired by the Google sprint, all elements of the concept will be evaluated and further developed in just one week to keep the momentum of the project going. The evaluation sprint could look like this (figure 35, p. 122);

On Monday the concept and hangtag design are presented to retailers (various types of retailers like Tenue de Nimes, Denim City, G-star- Hutspot and the Bijenkorf) and Amsterdam based denim brands (i.e. K.O.I, Denham, G-star, Scotch & Soda, Calvin Klein, Tommy Hilfiger) to evaluate the setup of the concept and to see if they are interested in joining a pilot rating of their jeans. On Tuesday, the rating benchmarks are evaluated with suppliers, brands and impact experts to discuss the quantification of the rating, on Wednesday the rating tool and methodology are evaluated with Jean School students and staff, and on Thursday all input will be further processed and prototyped for consumer testing. On Friday, to complete the evaluation, the concept as a whole is tested with consumers in a retail setting, using 'Wizard of Oz' style prototypes, so their behaviour can be observed before the consumers are asked for feedback.

After the evaluation sprint, several parties need to be approached for endorsements or partnerships to make the concept viable. The best and most efficient way to approach these parties is through a coalition fast track. In this type of fast track, designed by Fronteer, all possible future partners or other parties needed to complete the system are invited for a 3-day sprint to think about what role they would like to play in the system and if they want to participate in future partnerships. By inviting these parties for three consecutive days, you will have their undivided attention, causing the process to be sped up tremendously. Possible parties to invite for Brighter Blue partnerships or endorsements are the UN, the SAC, Fashion for Good, the C&A Foundation, Modint, ASN, Triodos and for

EVALUATION SPRINT SET UP

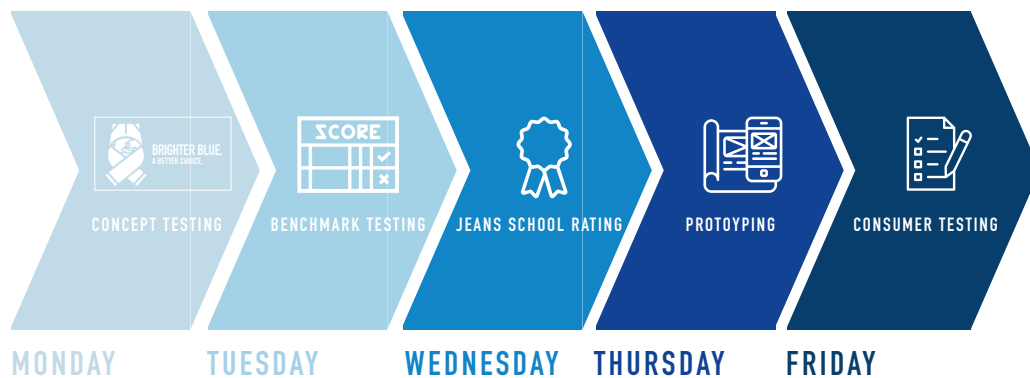| CONCEPT TESTING	BENCHMARK TESTING	JEANS SCHOOL RATING	PROTOYPING	CONSUMER TESTING
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY

Figure 35: Setup of evaluation sprint

D66 minister Jessica van Eijs, who showed an interest to develop a European certification mark for fashion.

When the concept is evaluated and endorsed, the next step will be to implement the rating in the sustainability course of the Jean School. This development will be done in cooperation with curriculum coordinator, tutor and coach, Mira Copini and sustainability consultant Maarten Wentholt, who is responsible for the Jean School sustainability course. Once the course is established, a pilot version will be tested with (former) students.

To assure the reliability of the rating, the rating will be overseen by an expert panel. Therefore, House of Denim needs to approach experts to participate in this panel. Ideally, the panel would consist of one of the House of Denim board members (James or Mariette), a sustainability expert in denim (for example Maarten Wentholt), a sustainability expert in fashion (for example Marieke Eyskoot) a member of the party endorsing the rating and a real denim industry transformer like Sanjeev Bahl (Owner of Saitex International). Such a mix would ensure enough knowledge and reliability to oversee the rating and reevaluate the benchmarks to keep them up to date.

Once the expert panel is formed, the first jeans need to be rated to start building the Brighter Blue database, so, preferably it would consist of 501 (the most symbolic number in the denim world) rated jeans once it will be introduced.

In the meantime, both the database and platform content should be developed before the beta version will be introduced during Kingpins in October this fall.

The release of Brighter Blue as a rating system will just be the start of it all. If we really want to create industry change in the long term, Brighter Blue should be developed beyond a rating. If the benchmarks prove to influence brands and suppliers towards cleaner development (like the benchmarks of Made-By used to do), these benchmarks could form a base for 'Brighter Blue lines' - denim collections licensed by House of Denim as a sign that they were developed following the Brighter Blue benchmarks. This would be the ultimate goal for Brighter Blue to really challenge the industry and leave a lasting impact. Besides a more long term impact, it would also reinforce its market position in case the Higg Index would launch their consumer tool as well.

15.2 COMMUNICATION

To make Brighter Blue a success, it should be properly introduced to the different stakeholders. Hereby, communication will be key, and brands, retailers, students and consumers will be introduced to Brighter Blue in different ways.

First, brands and different types of retailers (G-star, Tenue de Nimes, Denim City, Hutspot and Bijenkorf) located in Amsterdam will be contacted by House of Denim, to see if they

Figure 36: Introduction of Brighter Blue during the leadership breakfast in October 2019

would like to participate in a pilot: brands would send part of their collection to be rated, and retailers would participate in in-store consumer testing. Other brands and retailers will be informed through the use of a brand and retailer guide. This guide will tell them how Brighter Blue works, what the purpose is, how it can help them become a brighter brand or retailer (by buying and promoting better jeans), what will be expected of brands or retailers (nothing if they do not like to), and how they could communicate their efforts to consumers.

Second, Jean School students will be introduced to Brighter Blue as part of their education. This introduction will be done by Mira and Maarten, who will explain the mechanism to the students.

Third, Brighter Blue will be formally introduced to the industry during the next leadership breakfast in October 2019. During the breakfast, a beta version of the rating (including landing page) will be introduced by James or Mariette to show the industry what is coming (Figure 36). The official release is dependent on further development, but will hopefully be ready to be launched during Kingpins spring 2020. In the meantime, the landing page will communicate the concept to the industry and allow them to get in touch.

At last, after the release of the beta version, consumers will be introduced to Brighter Blue through social media, Instagram in particular, which will host the first version of the platform. Through the account, a consumer guide and add campaign will start awaking consumers.

BRIGHTER BLUE.
A BETTER CHOICE.

Jeans are, without doubt, the coolest garment on earth. They are also, probably, one of the most polluting things we own.

Some brands try harder but still compete with cheap & dirty. Consumers want to make a 'better choice' but are confused by complexity.

Brighter Blue awakes, inspires and empowers with five dimensions to translate complex impact into a simple score from 1 to 10: *Materials - Dyes - Laundry - Transparency - Fair Work & Wages.*

Extra merit for the brands that try harder;
A 'Brighter Blue' clarity for all of us.

Your Brighter Blue purchase is a step towards a cleaner industry!

15.3 BRAND IDENTITY

As part of this communication, a unique brand identity is needed to conquer a place in the minds of consumers and compete with other (yet existing) product rating systems and initiatives like Good on You and the Fashion Revolution.

BRAND DNA

Many models and theories are available to construct a brand identity like Keller's brand equity model (Keller, 1993) and Kapferers brand identity prism (Kapferer, 2006). Both models were used as an inspiration to the brand DNA model of van der Vorst (2017) that simplifies the brand DNA into three pillars: Purpose (why), Personality (how) and Positioning (what). The brand DNA model of van der Vorst was chosen to set up Brighter Blues first brand identity.
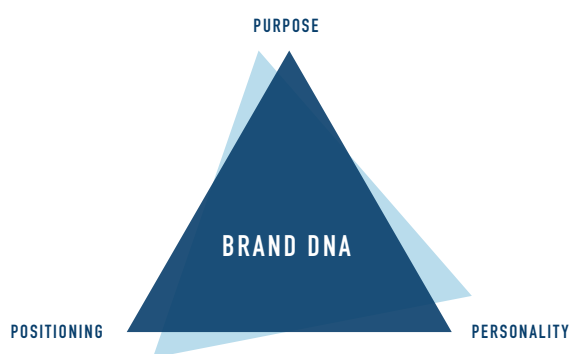

Figure 37: Brand DNA model (van der Vorst, 2017)

PURPOSE *[Its core belief]*

The purpose of a brand is defined by a brands core belief, a short statement representing its reason to exist. In co-creation with James, the purpose of Brighter Blue is defined as follows:

There is a dark side to denim that makes it hard to tell what is right and what is wrong.

Brighter Blue empowers consumers to identify a better choice, and by channelling their demand towards 'cleaner' denims, Brighter Blue will support the transition to a cleaner industry.

POSITIONING *[What does the brand offer to whom]*

The positioning of a brand frames what service the brand delivers to its target group and clearly defines their positioning related to the market. The positioning of a brand consist of (product) features, functional, emotional and self-expressive benefits. Brighter Blue will be positioned as follows:

" *For consumers who want to make a conscious choice, Brighter Blue is a simple indicator of the best jeans out there. By 'voting with your money', you can look good and feel confident that you have made the right choice.* "

PERSONALITY *[How does the brand behave]*

Each brand has its own personality. This personality is the underlying factor of all communication used between the brand and consumer and provides a trusting relationship. The most well-known brand personalities are defined by Aaker (1995) and are often combined, so different people can relate to the personality of the brand.

As opposed to other product ratings that have a more competent and reliable personality, *Brighter Blues personality is Independent, Cool, Clear and Conscious. Uncompromising and aware that consumer choices can change the world.*

AMBITION

Brighter Blues ambition is not only to change consumer behaviour but to inspire the industry to make better choices:

Brighter Blue will favour consumer demand to be a force for good.

MANIFESTATION

Brand manifestations are used to communicate the brand identity elements towards consumers and give a call to action. Brighter Blues manifesto will be used on the online platform to explain its mission and activate consumers to join. Brighter Blues manifesto is presented on page 124.

15.4 LAUNCH

How Brighter Blue will be received and embraced by the industry and consumers, will be an important part of its success.

To *change the right people in the right way* and increase the demand for more sustainable jeans, a solid strategy is needed that goes beyond the product rating itself. To increase the demand, several barriers need to be overcome to change current consumer behaviour: individuality, responsibility and practicality. Since the product rating will mostly overcome the last barrier - practicality - other strategic steps have to be taken first:

AWAKE

Most consumers know about the impact of the fashion industry, but do not directly see it as their own choice. If we want to change behaviour, consumers first need to see that this impact is actually their impact. With advertisement campaigns on different sort of (social) media and in stores, we will create ownership of the problem.

INSPIRED

Consumers have a hard time believing that their choice of purchase can make a difference. By showing what difference they can make and inspiring them with best practice examples and testimonials of other conscious consumers, we will advocate the good and convince them their purchase matters.

This step will not just focus on better purchases but will stimulate consumers to repair, reuse and recycle to enable behaviour change for a longer period of time.

EMPOWERED

To initiate internal action, tools should be available to help consumers choose better and overcome practical barriers. Brighter Blue will provide hangtags and a Google extension to make the purchase process more transparent and within reach.
Other tools on the platform, like a consumer and retailer guide and best buy overview, will be available to help to make these decisions.

TARGET GROUP

Brighter Blue targets young conscious denim shoppers, who want to make their purchase count.

Therefore, advertisements will be aimed at *consumers that feel concerned but do not know they can make a difference.* According to research done by ABN AMRO, this could be 77% of the Dutch consumers (ABM Amro, 2017).

LAUNCH STRATEGY & ACTIVITIES

AWAKE *[awareness campaign]*

To spread the message that consumers have the power to choose what they want, an awareness campaign (in cooperation with other fashion initiatives) will be launched through different social media and in-store advertisements.

This will be a two-step campaign: First, a commercial will tell consumers about their choice and how Brighter Blue can help them make better choices. This commercial should inspire and call to action like Eneco's 'Nieuwe Wereld' campaign did. Second, advertisements on social media (for example, through Instagram stories, or youtube ads) will ask
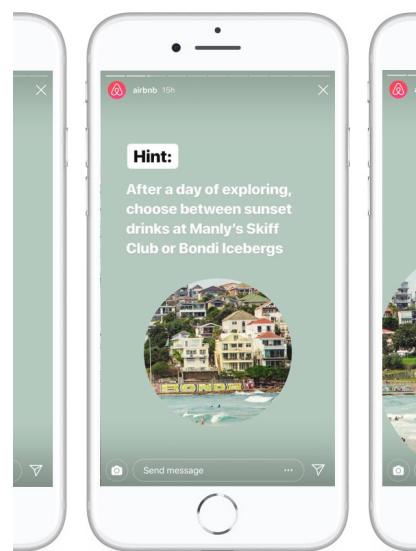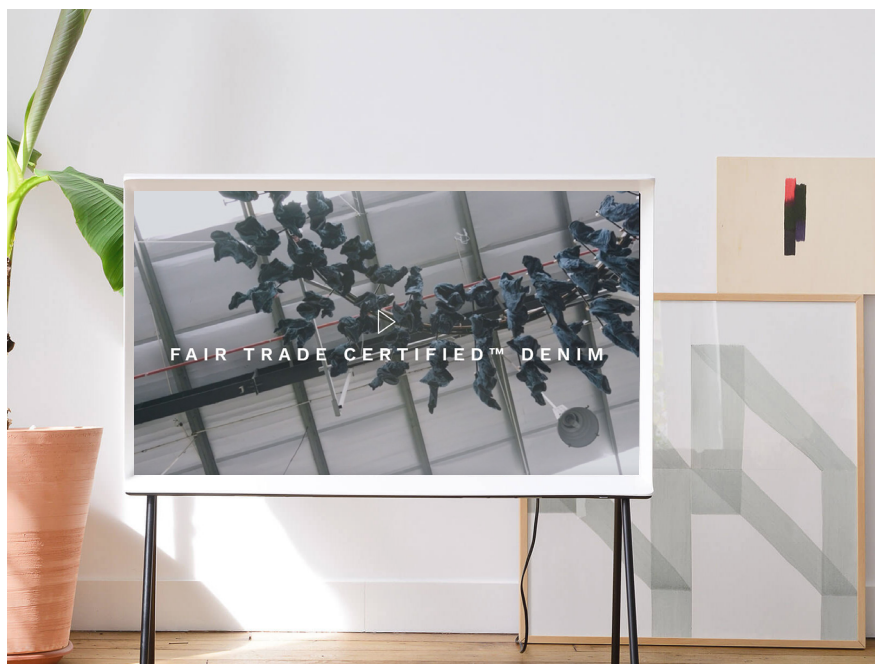
Figure 38: Instagram influencer and advocate of cleaner fashion Romy Boomsma, possible TV commercial to increase awareness of the rating, Amsterdam Denim Days, a consumer festival for denim lovers, example of brands that ask questions through Instagram stories
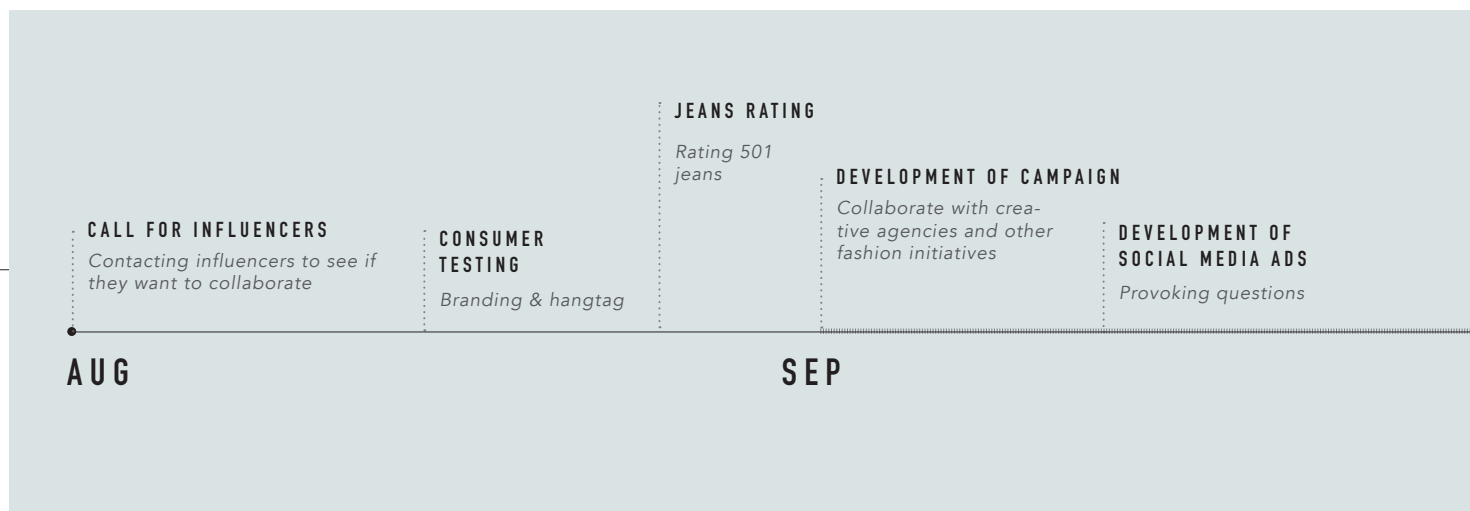
JEANS RATING

Rating 501 jeans

DEVELOPMENT OF CAMPAIGN

Collaborate with creative agencies and other fashion initiatives

CALL FOR INFLUENCERS

Contacting influencers to see if they want to collaborate

CONSUMER TESTING

Branding & hangtag

DEVELOPMENT OF SOCIAL MEDIA ADS

Provoking questions

AUG

SEP

Figure 39: Illustration of the timing of the various launch activities.

provoking questions about current consumer behaviour to let consumers think about their choice. For example: *Do you like to wear jeans produced with heavy chemicals?*

INSPIRED *[activation]*

To inspire consumers, the realised impact and innovative stories of denim suppliers or developers will be shared on the platform (website/app). Instagram will be used to reach consumers through influencers that care a lot about this topic.

Sara Dubbeldam (whensarasmiles), Marieke Eyskoot (This is a good guide) and Romy Boomsma are examples of influencers that advocate conscious fashion and only share new initiatives when they genuinely believe in it (unpaid). Romy Boomsma, for example, has over 100.000 followers and will be a great way to reach our openminded, young and conscious target group.

EMPOWERED *[touchpoints]*

To facilitate internal action, tools will be provided to overcome the last barrier of green consumption. The platform & app will provide the rated database, more in-depth information about the rating & production techniques and offer more tools to facilitate better choices, like a consumer guide, a 'to buy or not to buy' feature, and a listing of best jeans under a €100. To make it easier for consumers to choose better during a purchase, the rating hangtag will help create an overview of better products in store.

RATING HANGTAGS
PRODUCED

START CAMPAIGN
Week of sustainability

LAUNCH EVENTS
Beta version live

INFLUENCERS
Testimonials

MAGAZINES
Articles

OCT

*Kingpins Show &
Denim Days festival*

LAUNCH EVENT

Like explained, a beta version of Brighter
Blue will be introduced to the denim
industry during the Kingpinsshow of October
2019; this also presents the opportunity to
introduce the concept to consumers during
the accompanying Denim Days festival for
consumers. By combining these two events
(of which the organisers are part of the board
and advisory board of House of Denim), the
concept of Brighter Blue can be introduced to
consumers and the industry at the same time.
Since the denim days festival organises denim
themed activities throughout Amsterdam,
many consumers would be exposed to the new
initiative.

TIMING

Starting from September, various launch
activities, channels and messages will need
to be developed and finetuned. To awake
consumers on their choices and interrupt
mindless consuming behaviour, the awareness
campaign will launch during the week of
sustainability at the beginning of October.
This will allow the awareness on the topic to
grow before Brighter Blue is introduced during
Kingpins.

To reach a bigger audience, fashion magazines
like Vogue, Elle, Harpers Bazaar will be asked
to write an article about Brighter Blue. A
complete overview of activities and timings is
illustrated in figure 35.

BRIGHTER BLUE.
A BETTER CHOICE.

Initiative endorsed by the UN
sustainable development goals

EVALUATION OF FINAL CONCEPT

To evaluate the final concept, multiple stakeholders were approached for validation interviews. Unfortunately, due to the current summer holidays, none of the stakeholders replied to this invitation. Therefore, the final concept will be evaluated based on the input received during the project (from over 80 participants) and final evaluation with James and Mariette.
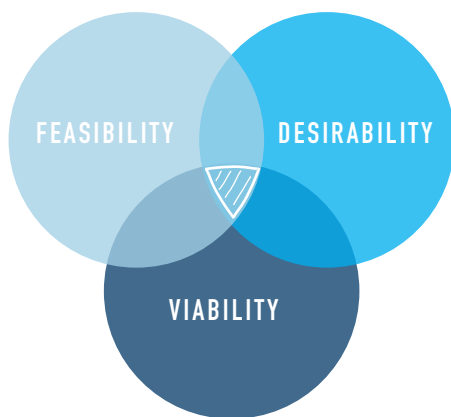

Figure 40: At IDE students are taught to integrate the needs of people with the possibilities of technologies and requirements for business success.

During my bachelor and master studies at the Faculty of Industrial Design Engineering (IDE), I was taught to design integrating knowledge about people, technology and business into solutions that are desirable, feasible and viable (figure 40). Therefore, it seems only logical to evaluate the final concept of my graduation project on these three pillars.

FEASIBILITY

To evaluate the feasibility of the design I looked at multiple factors, like *is it feasible to define the complete impact of a jeans by five variables?, is it feasible to find the information necessary to complete the rating?, and is it feasible to influence consumer behaviour with a product rating?*

Is it feasible to define the complete impact of a jeans by five variables?

When looking at the impact of a jeans there are more than five variables that influence the total impact. However, some of these variables (like transport, waste management and energy use) are not possible to assess on an individual product level, because a lot of other products share these variables during production. Besides that they are not assessable on product-level, they make up just a small part of the total impact; the variables that are chosen to use for the rating have much more effect. So, is it feasible to evaluate the complete product impact based on five variables? Not entirely, but we have to start somewhere, and these variables combined come really close. By starting with these variables, we can start making a lot of change already.

Is it feasible to find the information necessary to complete the rating?

The different benchmarks used for the rating were designed keeping the accessibility of the information in mind. However, many brands and retailers do not share all this information yet, meaning it will not always be easy to complete a rating. That is why 'no information present' is included in the rating benchmarks and will hopefully stimulate brands and

Figure 41: An Instagram post of Saitex International posting a mock up of a new sewin label showing the production impact of a pair of jeans received almost a 1000 likes and many positive reactions (Saitexdenim, 2019).

retailers to share more product information in the future, which will contribute to a more transparent industry.

Is it feasible to influence consumer behaviour with a product rating?

This still has to be validated by proper consumer testing, but based on the feedback received during the second design intervention, the hangtag might not be enough to change a purchase decision (since so many other determining factors are involved as well), but it will influence the way consumers go through the process. By presenting the information, consumers have to think about it and take it into consideration (just like the energy label and Beter Leven mark). There will always be consumers that do not care about it, and there might still be practical barriers left that will 'win' over sustainability in their choice, like size, budget & fit, but it is definitely a step in the right direction. To measure the real impact of the rating, it has to be tested in a controlled setting with a bigger sample group.

DESIRABILITY

To evaluate the desirability of the design, I looked at the desirability for the different project stakeholders, like House of Denim, denim brands, retailers and consumers.

The desirability for House of Denim

At the start of this project, House of Denim asked to develop a jeans rating to answer the question 'how might we help consumers buy better jeans?'. The reason for this research was the need for more transparency and to create a sort of podium for brands that put

in much effort to produce more sustainable. The design of the final Brighter Blue rating answers to these needs: Brighter Blue creates industry transparency by drawing a line with its benchmarks, and consumer transparency by enabling them to interpret to available information, thereby empowering them to make better choices. Additional to transparency, the rating distinguishes products that are made more sustainable and awards developers that put in the extra effort. Since House of Denim wants to start implementing the design, this shows that the project outcome is indeed desirable.

The desirability for brands

Why would brands want to participate in these ratings? Well, first of all, we do not really need permission of brands; the rating will stay independent. That said, it is always better to involve brands in the process. Brighter Blue will mostly be desirable for brands that make an effort to produce more sustainably, since it provides them a podium and it does not cost them extra effort or resources to participate in the ratings. Brands are always looking into ways to communicate their efforts; Brighter Blue will help them to tell their message better (and less costly) than a certification would.

The desirability for retailers

In the final design of the system, retailers have a voluntary role: if they want to spotlight their better products, Brighter Blue will help them achieve this. Otherwise, they will not have to actively participate since the hangtags will be attached to the products by the brands. For the retailer, it will mostly be another form of POS material attached to the products. Retailers

can decide for themselves what role they would like to play. However, since consumers are starting to ask more questions, Brighter Blue could be a valuable tool for them to help answer these questions.

The desirability for consumers

Brighter Blue makes it easier for consumers to make a better choice since it collects all the information needed to assess the impact of a jeans and turns is into one simple rating. This will save consumers a lot of time, and at the same time, it will teach them what factors of a jeans are most impactful.

When talking to friends, fellow students, colleagues or consumers during the project, they would react in a very positive way and almost always link the initiative to other like the Energy label or Beter Leven mark. During this research, it became clear that such a rating is indeed desired, but still has to be confirmed by further consumer testing.

VIABILITY

To evaluate the viability of the design, I looked at the requirements of Brighter Blue to become successful, such as the implementation of the rating in the Jean School curriculum, the development of the platform and the need for partnerships.

Will it be viable to implement the rating in the Jean School? (will there be enough students to rate?)

During one of the first interviews, Maarten Wentholt reacted very positively on the idea to have Jean School students rate the jeans. Maarten saw it as an opportunity for the students to be inspired to produce in more sustainable ways if they would see that very cool jeans could also be developed with less impactful technologies. Since James already has a lot of experience with setting up new forms of education in cooperation with the ROC of Amsterdam (of which the Jean School itself was one), implementing the rating in the current curriculum should not be a problem. However, since the number of students of the Jean School is not that high, we will have to see if Jean School students alone are enough resources to rate the jeans or if there need to be additional raters.

Will it be viable to set up a platform, database extension and production of the hangtags?

Since House of Denim is a non-profit organisation their budget is limited, it will be key to collaborate with other parties to make the project viable. During the implementation, they will have to work with beta versions first, like an Instagram page instead of a platform, to see if the concept will work. The concept created during this thesis sketches the prefered circumstances and resources to help the adoption of sustainable jeans, but step by step, they have to see what will be viable to develop.

Will it be viable for House of Denim to find partners to endorse the project?

If there is one thing that I have learned during this thesis, is that the network and energy of James and Mariette are unbelievably big. So I think it should definitely be viable to find partners to endorse the project. It might take a while and need some further development, but House of Denim would not have decided to implement the project if they thought it would not be viable.

CONCLUSION

At the beginning of this thesis, a couple of research questions were formulated to guide the development of the rating system. During the different phases of the project, these questions were answered to develop the final concept. This chapter will look back on these questions and answer them concretely.

In order to answer the main research question, the three subquestions will be answered first. Afterwards, the main research question will be answered, and the contribution of this thesis will be discussed

How do we create an index that sincerely represents the impact of jeans?
To sincerely represent the impact of jeans, the production process was examined to determine the most impactful factors of production. This impact was translated into five indicators of choices made during development that influence the impact most. These indicators combined represent the most significant production impact of this moment and are the best chance to decrease the impact of production. To keep a sincere representation of the impact, the index has to be developed continuously: every year, the different benchmarks need to be re-evaluated, and new innovations or indicators will be added.

However, the total impact of a jeans is not just dependent on the impact of production; use and disposal play a big part in this too. Since use and disposal differ a lot per consumer, this impact is hard to be quantified. Therefore, additional to the impact of production, the complete impact of jeans will be presented to consumers with help of the awareness campaign and inspiration through various channels. These channels will be used to teach consumers how they should take care of their jeans and (if needed) discard in the best possible way to minimise the impact.

How could an impact index influence the purchase of jeans?
Brighter Blue was developed to answer a need for more transparent and clear information during purchase. This need is just one of the barriers that commonly exist in the purchase of more sustainable products. Brighter Blue influences the purchase of jeans by removing three crucial barriers standing in the way of green consumption behaviour: individuality, responsibility and practicality. By helping consumers tackle these barriers, the chances that consumers will purchase a better product become higher. On the short term Brighter Blue will, therefore, facilitate better purchase decisions, so, when consumers start asking for better products, retailers are stimulated to procure better products on the middle term and in the long term a higher demand will ensure cleaner production processes.

How do we brand the impact index to get consumers actively involved?
People unintentionally copy exemplary behaviour because they like to follow the herd (Smit, 2019). To get consumers actively involved, they have to be open for the message to make better choices: propagating a positive norm works better than a cautionary finger, since "Fear causes people to close themselves for the message" (Smit, 2019). Therefore, Brighter Blue will be a positive and easy indicator of a better choice: accessible on various levels to serve as many consumers as possible. Brighter Blue conveys the message that sustainable choices do not have to be that hard or complicated: everyone can vote with their money. Brighter Blue will help consumers regain their power to decide and give a little push to young conscious consumers that want to make better choices but not always know how.

Pitching my project to the top of the denim industry during the leadership breakfast last April.

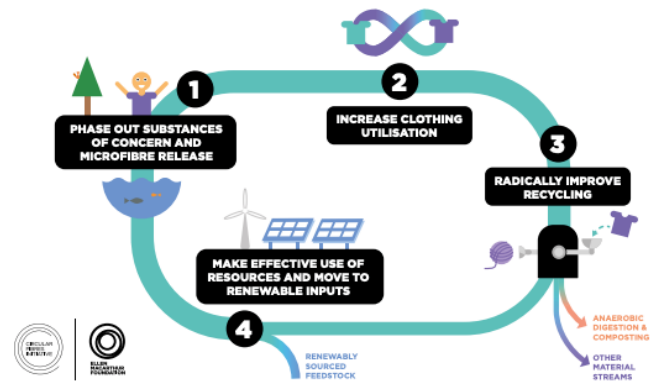Figure 42: SDG 12 responsible consumption and production. (United Nations, 2015).

Figure 43: ambitions for a new textiles economy (Ellen McArthur Foundation, 2017).

How do we create an impact index that contributes to the choice for more sustainable jeans?

By simplifying the impact of a jeans into five understandable and easy indicators, materials, dyes, laundry, transparency and fair work, it becomes easier for consumers to make a better choice and vote with their wallet. Brighter Blue strategically builds awareness, awakes and inspires consumers before they are triggered to buy (their favourite) new jeans and empowers them to make better decisions. This way, the most critical barriers - individuality, responsibility and practicality- that consumers encounter in their behaviour towards more conscious consumption are overcome.

By influencing the purchase behaviour of consumers in the short term, it will stimulate retailers to sell better products on the middle term and demand suppliers to produce better products on the longterm: changing the industry step by step.

CONTRIBUTION OF THE MASTER THESIS

The research and final results of this thesis contribute to the industry, the field of design and society in various ways. First, the result of this thesis contributes to the denim industry by introducing new benchmarks for cleaner production and by showing that impact calculations do not have to be that complicated to answer the consumer need for information. Current existing rating systems tend to approach the environmental impact in very scientific ways and are therefore hard to work with for many supply chain stakeholders. Of course, these systems are needed to improve and optimise sustainable production techniques, but if we want to inform consumers effectively, there is a need for more accessible tools and communication.

Second, this master thesis contributes to the field of design by researching green consumer behaviour and presenting a way to use strategy to tackle barriers towards green consumption. Although this thesis did not specifically add to the knowledge of green consumer behaviour in general, this behaviour science was applied in the field of strategic design, which was new to me and could inspire other students and researchers when solving strategic challenges in the future. Since climate change is becoming a more severe problem (that is desperately in need of strategic design) behaviour science is becoming of more importance to strategic designers.

At last, this thesis contributes to society in general by introducing a new system to help consumers buy better products and decrease their impact on the environment: Brighter Blue contributes to the sustainable development goals of the United Nations (goal 12, responsible consumption an production, figure 42) and to the first two ambitions for a new textiles economy of the Ellen McArthur Foundation (figure 43).

During the project, the fashion and jeans industry have received a lot of media attention on the topic of environmental impact: a report was issued by ABN Amro that concluded jeans are sold too cheaply to cover their impact and the NOS published an article on the need for an eco index for fashion items. This master thesis contributes to both these publications by illustrating the impact of a jeans and how it could be decreased and by the concept of a rating system for jeans, that could be translated into a rating system for fashion items in general.

Voorpagina | Economie | NUsport | Tech | Entertainment | Uit | Overig | Wonen

Voorpagina
Net binnen
Algemeen
Verkiezingen
Economie
Geld
Werk
Zakelijk
Brexit
Auto
Vacatures
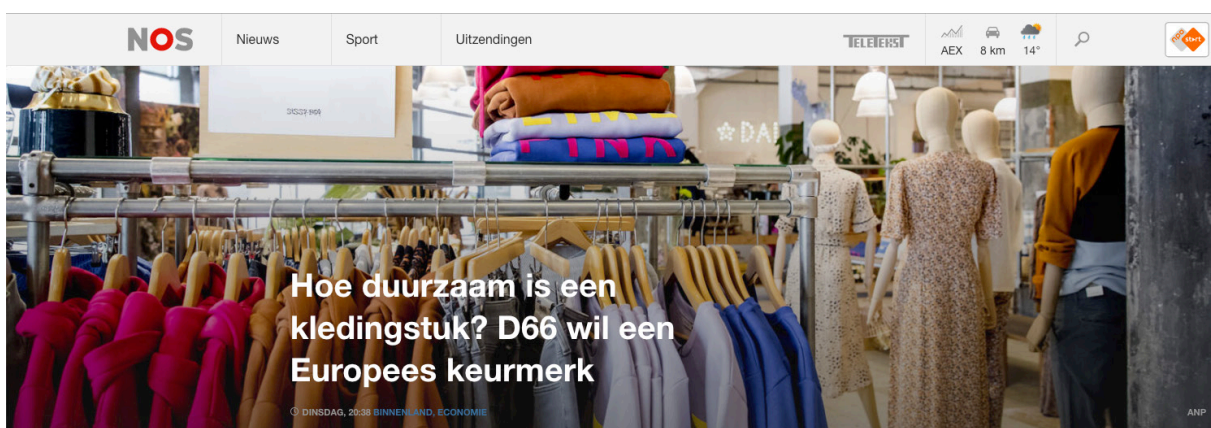
Sport
Tech
Entertainment
Uit

Donderdag 30 mei 2019 | Het laatste nieuws het eerst op NU.nl

'Spijkerbroek zou met milieu- en sociale kosten 33 euro duurder zijn'

23 mei 2019 06:01
Laatste update: 23 mei 2019 08:53

320 · f · y · in · ✉

NOS   Nieuws   Sport   Uitzendingen   TELETEKST   AEX   8 km   14°

Hoe duurzaam is een kledingstuk? D66 wil een Europees keurmerk

DINSDAG, 20:38 BINNENLAND, ECONOMIE   ANP

Er bestaan al energielabels voor huizen, auto's en elektronica. Waarom dan geen label om aan te geven hoe duurzaam kledingstukken zijn? D66 wil dat op Europees niveau voor elkaar krijgen.

Tweede Kamerlid Jessica van Eijs heeft een motie ingediend om te onderzoeken hoeveel steun er in de Kamer is voor zo'n keurmerk. Van Eijs hekelt het gebrek aan transparantie in de kledingindustrie. "Als je in een elektronicazaak loopt, kun je direct zien hoe duurzaam een koelkast is aan de groene, oranje of rode kleur op het label. Maar in een kledingwinkel weet je als

GESCHREVEN DOOR
Susan Sjouwerman
redacteur Online
y ✉

RECOMMENDATIONS

After evaluating the final concept and answering the research questions, some discussion points, limitations of the research and final recommendations are presented in this chapter.

DISCUSSION

Another rating system
No matter how we position Brighter Blue in the market, it will still be another rating system in a jungle of already existing ratings and certifications. So, how will Brighter Blue differ from these other initiatives? Certifications are necessary to 'track and trace' product claims but are expensive and hard to understand for consumers. By uniting existing certifications in the Brighter Blue rating, buying better products will become easier for consumers and retailers, while suppliers do not have to comply to yet another standard, increasing the adoption potential of the rating. Brighter Blue will thus act as a unifying factor.

Visibility of the rating
Currently, the rating system and benchmarks are designed in such a way that not many jeans comply with the gold an platinum standards. This was a deliberate decision to challenge brands in cleaner production. However, by only awarding gold and platinum jeans with a hangtag, this has one big downside: visibility to consumers. Since not many jeans will be awarded a hangtag, the chance that the hangtags attract the attention of the average consumer is slim. So, apart from the hangtags, social media will have to play a big part in informing consumers and convincing them to start using the app.

LIMITATIONS
The first limitation to this research is that although many people were involved in the process and development of the rating, they were all gathered from our personal networks and therefore a very distinct part of society. Both the denim experts and consumers involved in the project are highly educated and are, therefore, not the average consumer. This could have caused certain biases in the qualitative analysis of this project.

Another limitation of the study is that the final results could not be adequately validated since crucial project stakeholders were on holiday during the final part of this research. Besides this validation, the study misses consumer testing, which will only be possible if all parts are prototyped so their behaviour can be observed in a controlled setting.

RECOMMENDATIONS
To tackle these limitations, I would recommend House of Denim to execute additional consumer testing and evaluation of the project, as explained in the implementation plan of the final concept.

Two other projects, related to this project, were executed during this research: Lieke's graduation thesis to stimulate the use of post-consumer recycled cotton in denim production and the development of Blue School, an education for specialised denim retailers, by Fronteer. To get the most out of these projects the results could be combined during the implementation: The Bright Blue Loop label for recycled cotton could be integrated in the material benchmark to quantify PCR cotton and in a partnership with Blue School, retailers to be could be taught how to buy better jeans and how to talk to their customers about impact and sustainability.
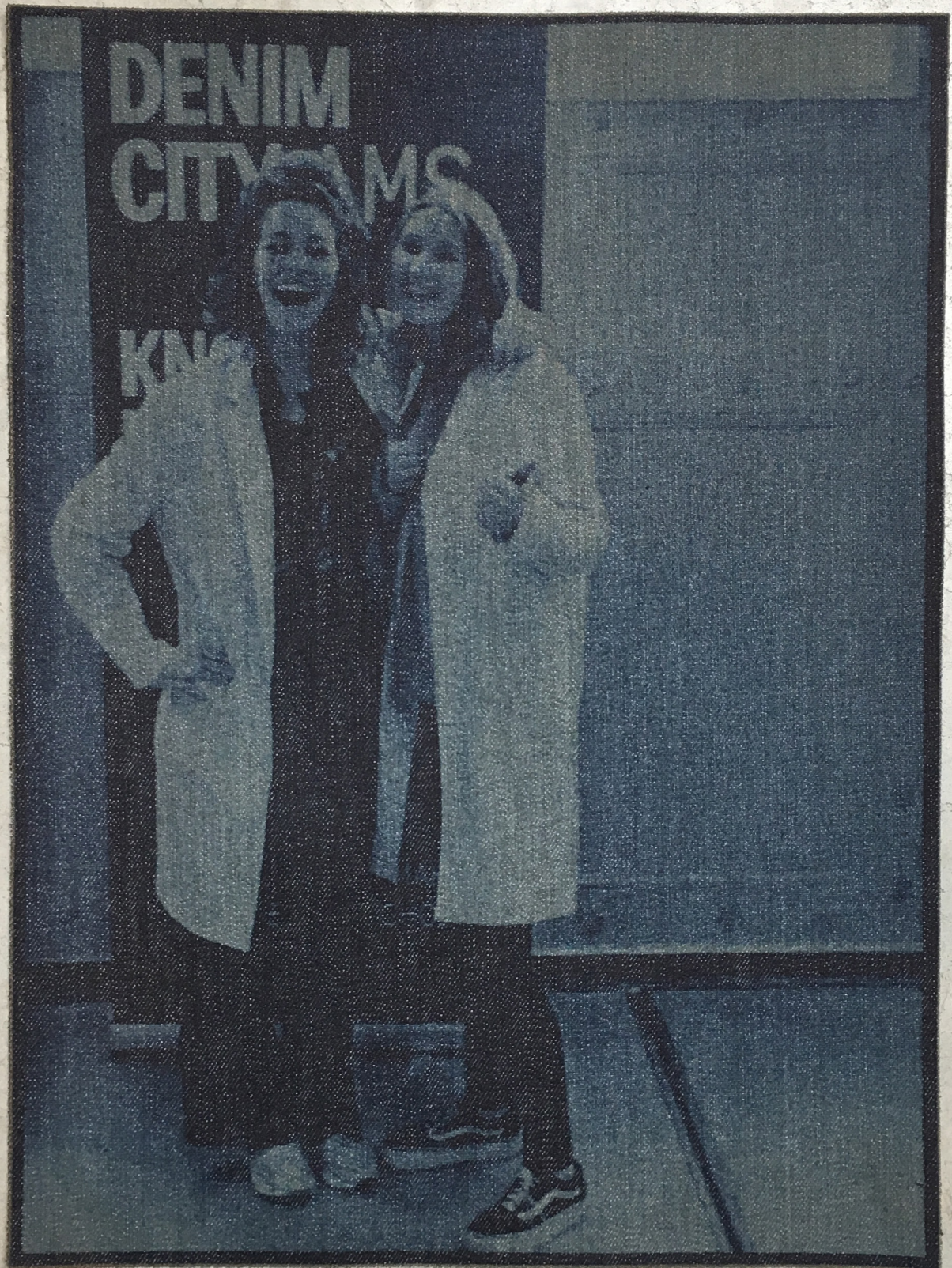
Lieke and me lasered in denim fabric during the denim academy course at Denim City (photo taken during workshop)

PERSONAL REFLECTION

When reflecting on the project, I must say it has been a very exciting and challenging journey. After (almost) eight years of studying (and a lot of other things in between) I was very eager to start graduation and prove my value as a strategic designer. Now that I am writing down the last words of this thesis, I have to say it was a bigger challenge than I expected it to be.

Not due to the nature of the project (which was very exciting to work on!) but to the fact that graduation is a solo project. I normally like to work on myself for a while, but for a project of this length and impact, I really missed to work with a team. Graduation made me realise how much I value interaction with others and to listen and learn from their ideas and point of view.

That said I learned a great number of things and I loved to work on a project with so much momentum; I think I never worked on a project before with an industry that was continually developing and introducing new things, which made it at the beginning also hard to scope sometimes.

In my initial proposal, I wrote that this project would be an opportunity to prove that rating systems can be of high value when changing consumer behaviour and that working collaboratively with project- and industry-stakeholders can achieve this. I still believe that this is true, but this project learned that the actual collaboration is of much more value.

I also wrote that this project would be an opportunity to prove I can successfully integrate the needs and wishes of several stakeholders into one final advice and I believe I proved myself right; all needs and wished were consistently taken into account when iterating on the design.

During this project, I also challenged myself in a new way of working: lean development. I must say that it felt a bit weird to present a "complete" concept halfway through a project, but it has undoubtedly taught me that the sooner you get into the details, the more you can enrich and develop them. Presenting a concept instead of just sketches or thoughts also helps stakeholders to take your ideas more seriously, which helped a great deal during my presentation for the advisory board.

Working on a concept so soon in the process also had its downside: because of the agile development, I had no time to write down my findings and process in the first 8 weeks of the project. So, after the first feedback session, I had to spend a few weeks writing continuously. This made me feel like I lost the momentum and creativity in the project, and I had a hard time getting this back.

Before this project, writing has never been my strong suit, and I tend to postpone it to the very last minute. Because I really had to push myself to write during this project (because no one else was going to do it), I experienced that writing can also be a great way to see parallels and better understand certain underlying connections. For the first time during my studies, I felt proud of the things I wrote, and after some chapters, I even caught myself thinking 'If I can write this I am ready to graduate'.

Graduation has been an extremely valuable experience, where I got to develop myself in a true strategic designer. I loved working on a project for a non-profit organisation and seeing that my work as a designer can have a lot of positive impact. Hopefully, there will be many more of these projects in the future!

CONTRIBUTORS OF THIS THESIS

Many people were involved during the development of this project. I would like to thank each and everyone of the denim experts, jeans fanatics, connectors, strategists, consumers, friends and fellow students for their contribution, inspiration and positive energy: without you this would not have been possible!

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All 53 survey respondents
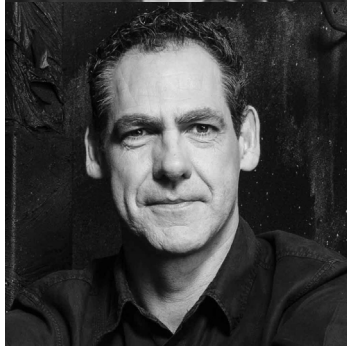
Thank You !

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