

DENIM JEANS: A SUSTAINABILITY ANALYSIS

Individual Research

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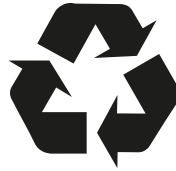
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MARKET RESEARCH

2020
market size
\$21.8b

2026
market size
\$26.0b

3%
Projected
Annual growth
2021-2031



The number of jeans made from recycled materials have increased by 440% since 2019. The industry is moving towards more sustainable practises and maximising materials, with many major brands making commitments to use recycled materials.

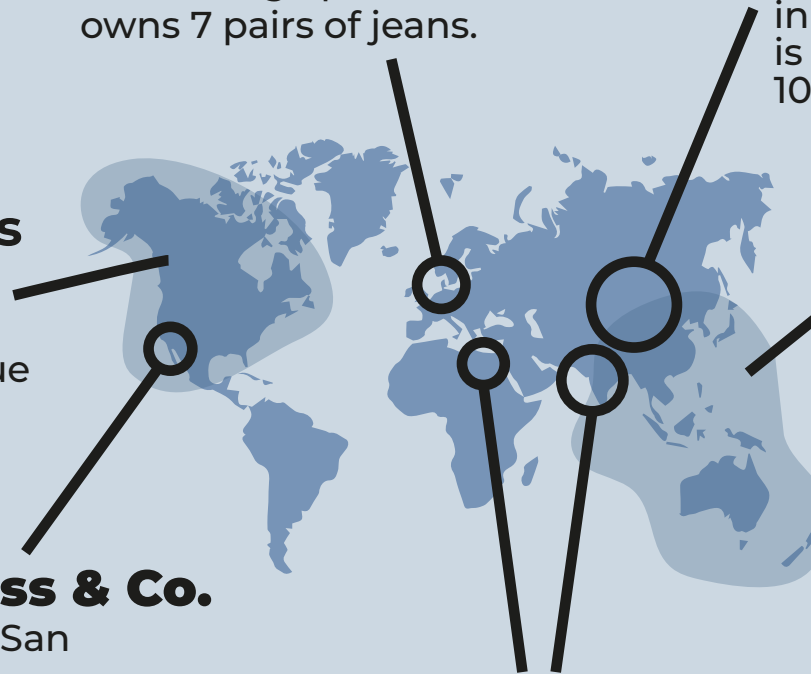
Holland is the capital of denim use and quality.
The average person in Holland owns 7 pairs of jeans.

China is the largest exporter of denim in the world

This is due to low labour cost and innovative technology. Production is expected to double in the next 10 years.

35% of global denim jeans sales come from North America

This market is the most valuable due to large average income and a culture of consumerism



Asia-Pacific region is an emerging market

Annual growth rate over the next 10 years is projected to be 6%, double the global average. This is due growing population and economic stability, so consumers are able to buy more clothing, following the trends of the western world.

Pakistan, India & Egypt are the next largest exporters of denim after China.
Combined, their exports are valued at \$776 billion.



Levi Strauss & Co.
Established in San Francisco

Holds the largest share of the jeans market, with over \$4.45 billion of sales in 2020. Their 501 jeans are considered a classic and a staple design in the jeans industry.

Sources

<https://www.statista.com/statistics/1010223/leading-exporters-of-denim-worldwide>

<https://www.factmr.com/report/321/denim-jeans-market>

<https://www.statista.com/topics/5959/denim-market-worldwide/>

THE IMPACT OF DENIM

Analysing the social & environmental issues caused by the denim industry

MANUFACTURING

The majority of denim production happens in developing countries where labour is cheap and working conditions and chemical disposal remain largely unregulated.

Factories in countries like China and India pollute water sources with toxic chemicals, essentially poisoning a whole population of people. This also affects wildlife with these chemicals entering the food chain, killing off species and disrupting migration patterns.

CONSUMER USE

A significant amount of energy and water is used when washing jeans.

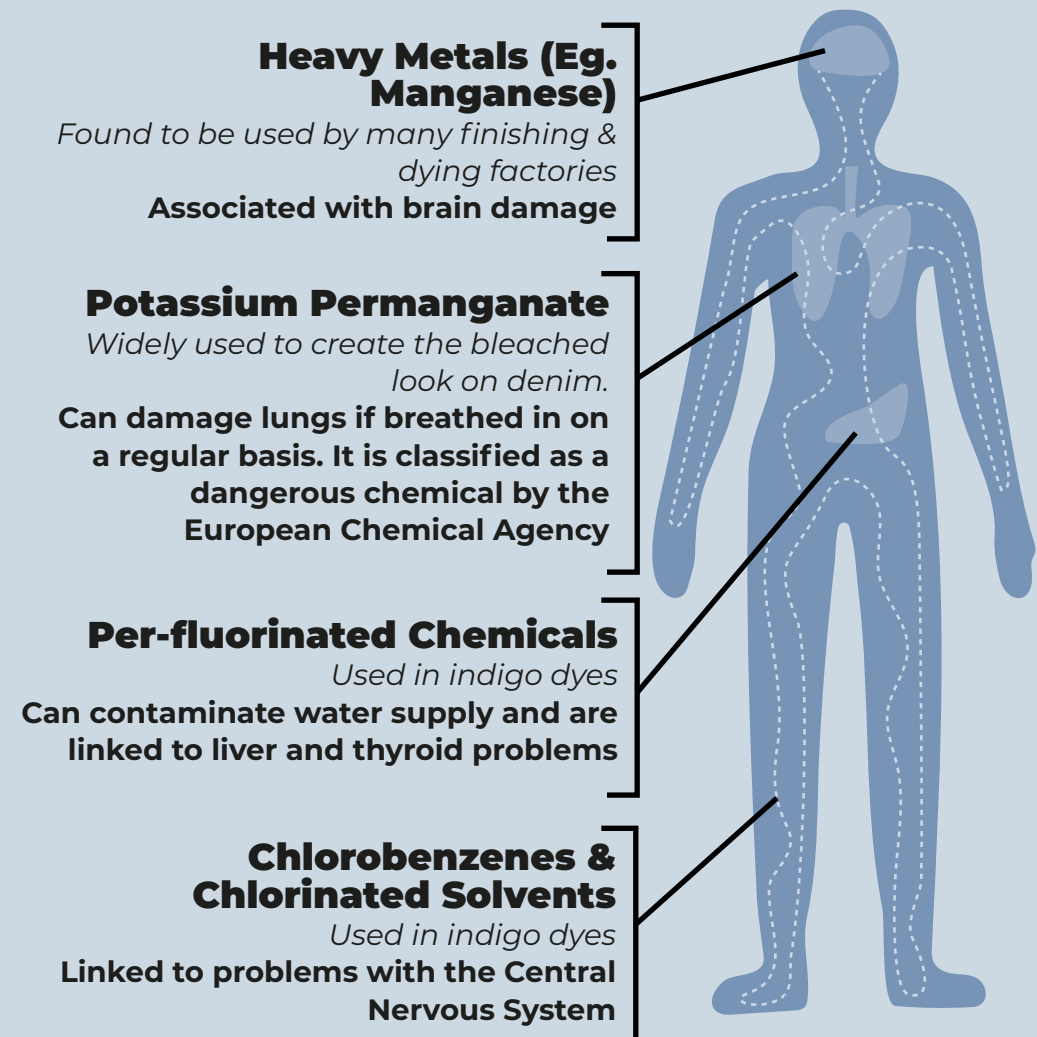
In a life cycle assessment conducted by Levi's, it was found that washing every 10 times a product is worn instead of every 2 times reduces energy use, climate change impact and water intake by up to 80%.

END OF LIFE

Over 70% of denim ends up in landfill, with only a small portion being reused or recycled. This causes landfills to be overfilled, having an adverse effect on the surrounding environment with toxic chemicals in the dyes to leach into the groundwater.

How do factory conditions effect health?

Many workers have long shifts without sufficient breaks, causing long-term fatigue. They are also subjected to the effects of many toxic chemicals without protection from gloves or masks.



USER RESEARCH

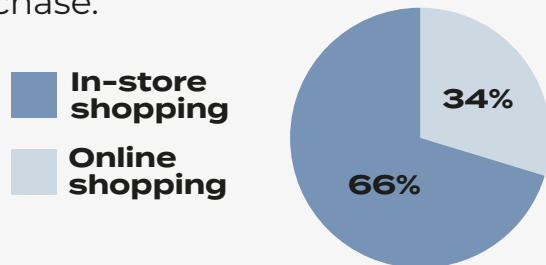
INITIAL RESEARCH

Who shops for jeans?

18 - 34 year olds make up the largest portion of the sales of jeans. Most advertising is targeted at this demographic. Women tend to buy more jeans than men, with women's jeans accounting for 3/5 of the entire market. Jeans are thought of as a staple in anyone's wardrobe so people across many different cultures and economic backgrounds will own them.

How do people shop for jeans?

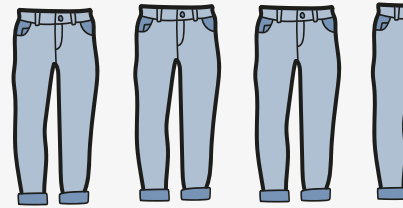
In-store shopping dominates as the average consumer's preferred method of buying jeans. This may be due to the ability to try them on before committing to a purchase.



Source:
<https://www.factmr.com/report/321/denim-jeans-market>

USER SURVEY RESULTS

Further information on user behaviour was gained through a short survey on 18-34 year olds as this is the largest demographic buying denim jeans. Deeper insights can be gained using these users' specific preferences.



Average number of jeans that one person owns: **3.5**

How long are jeans expected to last?

2.5 years

How often are new jeans purchased?

Every year

This means that the average person will replace jeans faster than they degrade them to the point of breaking, leaving them with a surplus of jeans that they don't wear.

MOST POPULAR BRANDS



Expected price of a pair of jeans: **£40**

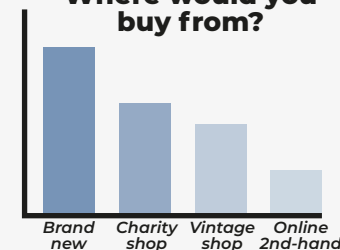
and most users would not want to spend more than £65.

60% of people don't notice what material their jeans are made out of

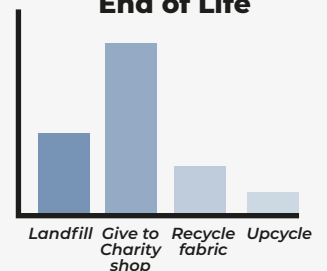
Affordability
Comfort
Durability
Versatility
Style
Material
Environmental impact of the brand

↑ Most important
↓ Least important

Where would you buy from?



End of Life



PERSONAS

Archetypes based on user research

2 major users groups can be identified; eco-aware and eco-unaware. Behaviours & needs for these groups differ greatly, but it is important to contrast them to understand why some people are unable to shop in an eco-friendly way. Finding similarities may also be helpful in identifying what could potentially drive these groups to the same goal.

Eco-unaware



What do they care about?

- Affordability
- Convenience
- Quick service
- Easy disposal
- Following trends

Which styles do they choose?

This user likes to follow trends in clothing, buying new styles fairly frequently. They don't mind pre-distressed jeans and have a range of washes that they like.

Which brands do they like?

H&M, Primark, Zara

Behaviours

This user typically won't have much time to pick out their jeans, so will go for whichever pair is a good compromise of price and style. They don't tend to consider what materials the jeans are made from. They will take whatever packaging they are offered if it makes it easier for them. The denim will distress more easily because it is frequently washed. At their end of life, the jeans will end up either in a charity shop or landfill.

Lifetime of jeans: 1-2 years

They will replace jeans when they find a better pair

Price of jeans: £20 - £40

They don't want to spend too much on jeans so they will go for cheaper brands.

What do they care about?

- Social / environmental impact of the company / brand
- Materials used & how they're sourced
- Comfort & versatility
- Eco-friendly disposal

Which styles do they choose?

This user will opt for more classic styles rather than following trends. They prefer raw denim that hasn't been stonewashed or ripped.

Which brands do they like?

Everlane, MUD Jeans

Behaviours

They will do more research on which brands and take longer to choose which product is best. They will also choose not to take the jeans home in a plastic bag, but bring their own reusable bag. When it comes to washing jeans, they will do it as little as possible, aiming to only spot wash small stains. They will actively try to reuse, upcycle or recycle the denim once they reach the end of their life.

Lifetime of jeans: 5 - 10 years

Use the jeans until they are no longer wearable

Price of jeans: £60 - £100

Willing to spend more on jeans that will last a long time from more expensive brands.



Eco-aware

PRODUCT ANALYSIS

Product Details

Z1975 Mid-Waist Skinny Jeans

Brand: Zara

Cost: £27.99

Country of manufacture: Turkey

FADED MID-WAIST JEANS WITH A FIVE-POCKET DESIGN. FEATURING RIPPED KNEES AND ZIP FLY AND TOP BUTTON FASTENING.



50% recycled materials



Brass button & fixtures

Brass zipper

'Whiskers' created from bleaching out dye

Small abrasions

Stonewashed

Ripped knees

99% cotton, 1% elastane

Indigo Dye

Cotton thread

Finishing techniques

Brand Research: ZARA

Flagship brand of the Inditex Group

Zara holds a large portion of the European clothing market, with close to 3000 stores. They're international, spanning over 96 countries. Zara's constantly evolving range of garments and affordable prices make them very much part of the fast fashion industry.

Sustainability

On Zara's website it says: ***"We are moving towards the achievement of the zero waste objective"***

Zara's 'Join Life' collection is their most recent push on more sustainable practises. They're claim to do this by :

- ✓ Redesigning packaging to be completely recycled and reduce unnecessary waste
- ✓ Optimising transport systems
- ✓ Increasing the use of recycled material in garment manufacture
- ✓ Funding research and education on material circularity

However, there is minimal evidence that Zara is on track to meet its goal of zero carbon emissions. The brand is also not very transparent on their manufacturing process, receiving a Transparency Index of 50-60% from Fashion Revolution.

The organisation Good On You says that Zara's business model is "inherently harmful to the environment" and rates Zara's sustainability as 'Not good enough'

ECO AUDIT

COMPARING ZARA WITH COMPETITOR BRANDS
Calculated using Granta Edupack & information
from manufacturers



Materials	Manufacture	Transport
184g virgin cotton. 184g recycled cotton. 4.5g brass fixtures & button & zip. 3g cotton thread.	Cotton is spun into yarn and woven (fibre production). Brass is shaped using die casting.	3,300 km air freight travel from Turkey to UK. 20 km last mile transport on 4-axle truck.

Phase	CO2 eq. (kg)	Embodied Energy (MJ)
Material	1.61	70.9
Manufacture	0.345	4.34
Transport	5.81	80.7
Washing	3.64	0.0104
TOTAL	11.43	156

CONSUMER USE (washing)



Product life: **3 years**
Washing frequency: **every 2 weeks**
No. of washes: **78**
Washing cycle CO2 eq: **0.7kg**
Washing cycle energy use: **2kJ**
Volume of washing load: **1/15 jeans**

CO2 Eq.
 $78 * 0.7 * 1/15 = 3.64\text{kg}$

Energy use
 $78 * 2,000 * 1/15 = 10.4\text{kJ}$

The most significant factors for carbon footprint and embodied energy is transport and consumer care, although these factors can change drastically depending on country of manufacture and how each individual cares for their jeans. There's opportunity to greatly reduce the effect of these factors by encouraging local production and educating consumers about washing their jeans less often and on colder washing cycles.

COMPETITOR PRODUCTS



MUD JEANS
Sky Rise
Skinny Jeans
£101

MUD brand jeans are made from entirely organic cotton, with no pesticides. They claim to use 92% less water than average jeans.

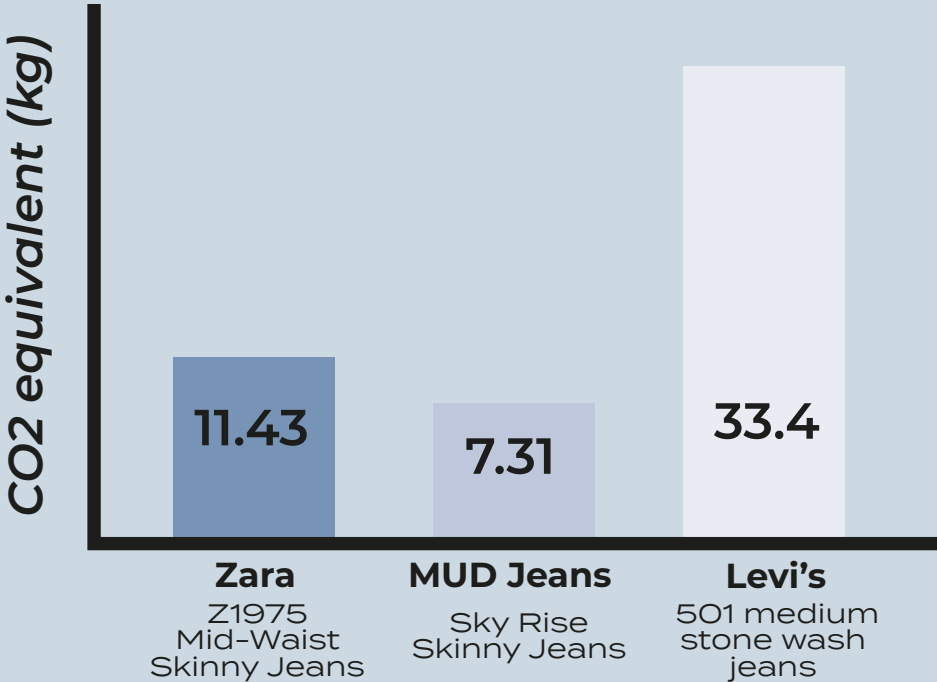
water usage: 577 litres



Levi's
501 medium
stone wash
jeans
£84.95

LCA on their 501 jeans showed that the growing of cotton and fabric production has the most significant effect. Transport, packaging and end of life had less of an environmental impact.

water usage: 3,781 litres

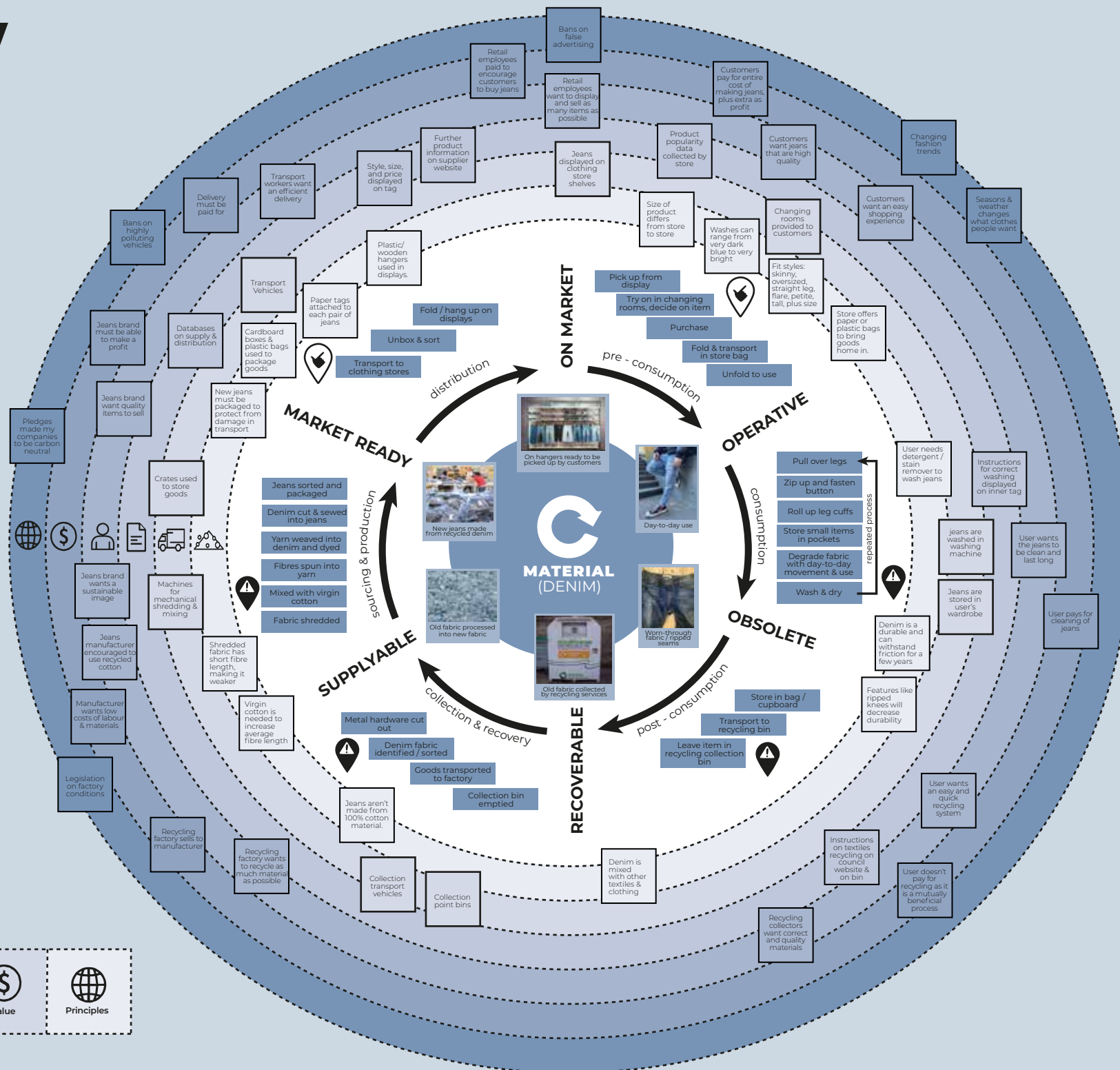


FLOW MAP













Analysing the services involved in purchase, use, maintainable, disposal and recycling of denim jeans.

PRODUCT & COMPONENT	MATERIAL
<p>Blue Jeans (from the fast fashion industry)</p>	<p>Denim (99% cotton, 1% elastane)</p>
PRODUCT FUNCTION	CUSTOMER(S)
<p>Covers legs, provides warmth & comfort, allows user to express themselves, presents status & occasion</p>	<ol style="list-style-type: none"> 1. People who want to dress casually and/or trendy. 2. People who want durable and comfortable trousers to work in
WHERE IS THE PRODUCT USED	CONSUMPTION FREQUENCY
<p>At home, going out to casual social events, going to work/school with casual dress code.</p>	<p>Worn every day / every other day. A new pair purchased yearly / every few years.</p>

System Elements



PIVOTAL PROCESSES

PROCESS		WHY IS IT PIVOTAL?	RELEVANT ELEMENTS					
			 Resource	 Infrastructure	 Data	 Actors	 Value	 Principles
Try on in changing rooms, decide on item		The user has the choice to buy from a brand that offers a solution to their specific needs, whether that is sustainability, affordability, durability etc. The element of choice that the customer has means that the industry is held more accountable, as customers will only buy from brands that they align with.	Size of product differs from store to store	Changing rooms provided to customers	Product popularity data collected by store	Customers want jeans that are high quality	Customers want the best price	Changing fashion trends
Wash & dry		The life cycle of the jeans is impacted by how the user chooses to take care of them. If they're washed too often, the denim will degrade faster so the user cannot get as much wear out of them. If they're stained and not washed then they will be rendered completely unwearable.	User needs detergent / stain remover to wash jeans	jeans are washed in washing machine	Instructions for correct washing displayed on inner tag	User wants the jeans to be clean and last long	User pays for cleaning of jeans	
Leave item in recycling collection bin		The ease of Recycling will change whether or not the user chooses to recycle a product. If the recycling bins are not unavailable or made known then the service will be used significantly less. Many users will instead throw their old jeans into landfill.	Denim is mixed with other textiles & clothing	Collection point bins	Instructions on textiles recycling on council website & on bin	User wants an easy and quick recycling system	User doesn't pay for recycling as it is a mutually beneficial process	
Denim fabric identified / sorted		Recycling services struggle most with sorting and finding textiles that can actually be recycled. There will be a lot of material that they will have to put in landfill as they have been put in the bin incorrectly. It is difficult to easily separate different fabrics as there is minimal technology to help with this.	Denim is mixed with other textiles & clothing	Collection point bins	Instructions on textiles recycling on council website & on bin	Recycling collectors want correct and quality materials	Recycling factory sells to manufacturer	
Mixed with virgin cotton		Denim cannot usually be made of entirely recycled materials as the quality of the material would significantly drop. This means that some raw material must be added, so the process isn't entirely circular and self-sufficient.	Shredded fabric has short fibre length, making it weaker	Machines for mechanical shredding & mixing		Jeans brand want quality items to sell		Pledges made my companies to be carbon neutral
Transport to clothing stores		The transport companies benefit from having a more efficient system to cut costs. This also cut to Amount of fuel and energy that goes into moving goods around. With help from computerised systems, unnecessary energy usage is kept to a minimum.	Cardboard boxes & plastic bags used to package goods	Transport vehicles	Databases on supply & distribution	Transport workers want an efficient delivery	Delivery must be paid for	Bans on highly polluting vehicles

PRODUCT SERVICE SYSTEMS

Existing system: Online clothes shopping

Business to consumer, product-oriented

Many retailers have online stores where users can look through all possible products, purchase the product(s) that they want and have them delivered straight to their door. These websites can include tools such as size quizzes which are more result-oriented. This system can be more sustainable as customers don't need to make individual trips to shops; the delivery of products is optimised to reduce fuel costs. However, it can encourage over-consumption due to ease of use.

Touchpoints: website, delivery/return bag

INNOVATIVE / NEW SYSTEMS

Clothes Renting

Business to consumer, result oriented

Brands like MUD jeans offer a service to temporarily own a pair of their jeans, then send them back to be reused by another customer. This is targeted at consumers who aren't in a position to afford a new pair of sustainable jeans as the service is significantly cheaper.

This service system encourages jeans to be used to their full potential and taken care of more mindfully.

Personalised Jeans

Business to consumer, product oriented

Jeanologica has developed some new technology in which jeans are selectively faded using lasers, as if the jeans are being printed on. This replaces the harmful chemicals that are usually used when creating a faded look. This opens up the opportunity for consumers to get unique designs printed on their jeans.

This would create a more personal attachment, meaning the user will take better care of their jeans and won't as easily abandon them.

Clothes Swaps

Consumer to consumer, product oriented

Clothes swaps are becoming increasingly popular. They encourage reuse of previously obsolete products and can bring together communities of like-minded people. The costs are very low and the system has practically no carbon footprint.

Consumers who take their old clothes to be swapped with other consumers shifts the goal away from profit and towards sustainability. The consumer then has more control and power over the circularity of their goods.