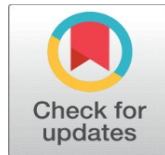
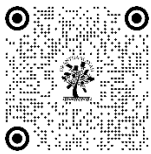


DEVELOPMENT OF A SUSTAINABLE BUSINESS MODEL FOR DENIM

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ABSTRACT

Globally, over a billion dollars are spent on denim jeans each year, and that number is still growing. As a result of this expansion, the production of waste in the systems is also increasing. According to the Environmental Protection Agency (EPA), roughly 5% of all landfill space is textile waste, including denim. One of the least ecological industries in the world is the denim industry. This calls for more intensive interventions in the design of sustainable development, as it calls into question the key criteria of sustainability. This topic has been covered by various models of industrial sustainability, although these models focus on solving global problems, assuming small improvements and growth. Consequently, a sustainable business model approach is necessary to drastically rethink how firms should operate to support system-level sustainability. This paper will provide comprehensive background information on the denim business and its operations before offering some notable case studies of well-known companies that use environmentally friendly practices. The result of this document will be a comprehensive analysis and building of a sustainable business model for the denim sector.

Keywords: Denim, Sustainability, Environmental Impact, Denim Processing, Business Model

1. INTRODUCTION

Given the huge demand for denim in the apparel industry, the denim revolution is worth exploring. By definition, denim is a woven fabric made entirely of cotton yarn. One of its key characteristics is the amount and variety of extra-structural effects that can be induced on denim. [Hamja \(2013\)](#) A strong cotton twill fabric called denim has a weft that passes under two or more warp threads (hence the name "double"). This twill weave creates the familiar diagonal ribbing of the fabric. It has a gray weft and a coloured warp. Most denim is made using a left-handed or right-handed twill in a 2/1 or 3/1 pattern. [Arjun et al. \(n.d.\)](#)

Probably the most interesting feature of denim is its irregularity. While fabric manufacturers work hard to ensure their products are free of structural and design

flaws, denim is designed to feel a bit rebellious and modern. [Hamja \(2013\)](#) Another important factor behind the popularity of denim is its utility. Although it originated with cowboys who used knitted denim as workwear, today denim is widely used.

A technique called denim washing is used to soften the material and give it a worn look. It is done to stabilize the product's dimensions due to fabric shrinkage and create effects such as colour fading, wrinkling, seam puckering, hairiness, pilling, softened hand feel, etc. Since denim makes up most of the laundry that is washed, the word "wash" started to refer to the manufacturing process of denim clothing. [Csanák \(n.d.-b\)](#)

Washing denim Dry is a key part of washing denim. Daily dry procedures are quite common when washing denim. Before the wet process, the dry denim process uses mechanical abrasion to change the visual appearance of the fabric without affecting its structure or properties. [Islam & Hassan \(2021\)](#)

Denim is undoubtedly one of the flexible textiles for all seasons, however, this material also has a disadvantage in terms of environmental impact. It is believed that one of the worst ecological and ethical footprints (impact on the human environment, business, activity, etc.) in the fashion business is left by the denim sector. According to a Greenpeace report, 1.7 million tons of synthetic compounds are needed to create two billion pairs of jeans consistently, and water usage in production can reach up to 7,000 litres per set. [Jiby \(2017\)](#) Despite the environmental reality, denim continues to be a thriving segment of the fashion sector. It is important to remember that one of the most environmentally damaging technologies is washing denim. In 2010, the facts were considered. [Csanák \(n.d.-b\)](#) Therefore, it is crucial that denim businesses take responsibility for their actions, engage in innovation, and promotes sustainability to prevent environmental abuse later in the supply chain.

Additionally, the denim industry is among the worst when it comes to promoting consumerism (selfish and pointless accumulation of goods or economic idealism). They are increasingly driven by a classical market economy system that lays the foundations for a throwaway society based on economies of scale, planned product obsolescence, short product life cycles, and subsequently ever-increasing consumer demand for new goods. and services. [De Brito \(2008\)](#)

Although the technologies commonly used now are more environmentally friendly when combined with modern, less polluting chemicals and suitable wastewater treatment facilities, disadvantages such as high energy and water consumption, multi-stage production process, and great efforts by denim industry professionals to promote waste management in developing new, more ecological ones. [Csanák \(n.d.-b\)](#) Due to the vast amount of chemicals used in the denim supply chain, there is an obvious potential for businesses to use less harmful chemicals and materials to increase their environmental sustainability quotient. The denim industry has seen an increase in social and environmental responsibility, and businesses in the industry are trying to focus on the new demands of the denim supply chain. Because of this trend, the production of traditional jeans and denim collections requires a different aesthetic and technological approach.

2. LITERATURE REVIEW

Denim jeans are massively wasted each year, with 2.16 million metric tons of them ending up mostly in landfills. [Haque & Naebe \(2022\)](#) The widespread fabric known as denim is also one of the most polluting industries in the textile and clothing sector. The second most polluting industry in the world is the denim

industry, which is also its most polluting subsector. Many parts of industrial water pollution are caused by the processing and dyeing of textiles, especially denim. Tons of dyes are lost to wastewater each year, while most wastewater in the developing world is discharged directly into rivers.

Starting with what gives the fabric its signature indigo shade, the process of dyeing and finishing jeans is extremely energy and water intensive. After dyeing, the garments are subjected to various chemical treatments and washings, including bleaching, to soften, fade or texturize the fabric.

Denim clothes are washed with a pumice stone. During the procedure, the stone is ground into a powder; some will remain in the liquor and some will adhere to the clothing. A significant amount of water is required for many wash cycles to successfully remove pumice deposits from denim. Pumice dust and rich contribute to environmental pollution. Silica sand is used in a mechanical finishing process known as sandblasting. When microscopic silica dust becomes airborne, it can cause serious respiratory problems such as silicosis.

The ethical and denim industries prominently and publicly address the fundamental challenges of sustainability, which are often highlighted in line with the textile and fashion industries. To incorporate best practices into its system, the denim sector has become receptive to discussing denim sector issues. To deal with future difficulties and sustain themselves in creating companies with reduced environmental impacts, companies in the denim sector must reduce the use of resources, especially energy, raw materials, water, and chemicals.

The business model must constantly evolve to add value beyond what competitors can provide. They must also understand how society changes over time and take this into account when developing a model in the present. Understanding the current environmental scenario will help the denim sector incorporate it into its new business model.

The fact that denim is produced in massive quantities and then thrown away in even greater quantities is one of the major problems facing the industry. Two main effects: create less and produce more efficiently. As less is produced, items can be shared, rented, rented, sold second-hand, and fixed to achieve the same or greater use. Smarter use of resources and recycling of materials minimizes the impact of production on the environment.

For example, H&M has launched a program that allows its customers to donate clothes that H&M collects. [Neema \(2019\)](#) Customers can donate their gently worn clothes and get rewards for them, which will help H&M move the process forward. Depending on the condition, the clothes and textiles are subsequently modified using different methods. Textiles are not usually used to make new clothes; they can be recycled into cleaning rags or used as insulating fibres.

A separate collaboration between American Eagle and Blue Jeans Go Green is used. This American company transforms recycled denim and denim waste into insulation that is used, for example, between the walls of buildings. [Neema \(2019\)](#)

People in the apparel industry are increasingly focusing on sustainability to meet the industry's need to become more sustainable and develop business models that also take sustainability into account as major issues in the industry, such as carbon emissions, water consumption, and potential pollution issues, along with increased customer interest in environmental issues have become more apparent. [Holtström et al. \(2019\)](#) Organizations must improve their internal structure and collaborate with external stakeholders to achieve system-level sustainability.

Research Objectives:

- to study the processes of manufacturing in the denim industry
- to examine some of the business models of the old and modern denim business brands
- to develop a sustainable business model

3. RESEARCH METHODOLOGY

This study focuses on denim production and its process to make the business sustainable. This research paper is done using descriptive methods. The data collected for analysis comes from several secondary sources. The study examines 50 denim brands, listed as, Hudson Jeans (USA), Diesel (Italy), Sugarcane (Japan), Samurai (Japan), Nudie Jeans (Sweden), Doodlage (India), Tommy Hilfiger (USA), Levi's (USA), Lee Jeans (USA), Wrangler (USA), AG Jeans (USA), 7 For All Mankind (USA), True Religion (USA), Rag & Bone (USA), G-Star RAW (Netherlands), A.P.C. (France), Acne Studios (Sweden), Balmain (France), Evisu (Japan), Big John (Japan), Momotaro Jeans (Japan), Pure Blue Japan (Japan), Iron Heart (Japan), Edwin (Japan), Blue Blue Japan (Japan), Naked & Famous (Canada), Fidelity Denim (Canada), Paige (USA), Joe's Jeans (USA), Citizens of Humanity (USA), Current/Elliott (USA), Frame Denim (USA), J Brand (USA), Bluer Denim (USA), Imogene + Willie (USA), Tellason (USA), Denham (Netherlands), Kings of Indigo (Netherlands), Neuw Denim (Australia), Outland Denim (Australia), Sass & Bide (Australia), Rollas Jeans (Australia), Mavi Jeans (Turkey), Replay (Italy), Pepe Jeans (UK), River Island (UK), Topshop (UK), AllSaints (UK), Zara (Spain), Mango (Spain). Three brands are selected for further research because they incorporate sustainable practices into their business strategy. Other brands were not selected because they do not engage in sustainable work, some do not have evident sustainability measures on their websites, and some we could not reach. Many brands were not selected because they do not actively engage in sustainable practices. Without clear initiatives or commitments to sustainability, these brands do not provide valuable case studies for developing a sustainable business model in the denim industry. For example: True Religion: Limited sustainable practices and lack of comprehensive sustainability strategy. Some brands do not prominently feature their sustainability efforts on their websites, making it difficult to assess their commitment and effectiveness in implementing sustainable practices. Examples include: Balmain: While it might have some sustainable collections, the lack of detailed sustainability information makes it less ideal for study. Certain brands were excluded because information about their sustainability measures was not accessible or they did not respond to inquiries. Examples include: A.P.C.: Despite having high-quality materials and craftsmanship, there is limited public information on their sustainability efforts. The brands chosen for this study were Doodlage, Tommy Hilfiger, and Levi's.

Doodlage is an innovative brand that has made significant strides in sustainability by focusing on upcycling and zero-waste production. The brand transforms fabric scraps into fashionable, high-quality garments, thus addressing textile waste head-on. This makes Doodlage an exemplary case of how to integrate circular economy principles into the fashion industry.

Tommy Hilfiger has committed to a comprehensive sustainability strategy, including the use of sustainable materials, reducing water and energy consumption, and ensuring ethical labor practices. The brand's global reach and influence make its sustainable practices impactful, and its transparent reporting offers valuable insights into how large-scale operations can be managed sustainably.

Levi's is a pioneer in sustainable denim production, known for its Water<Less® technology and participation in the Better Cotton Initiative. The brand's long history and continuous efforts to improve sustainability make it an important model for understanding how legacy brands can innovate and lead in sustainable practices.

By selecting Doodlage, Tommy Hilfiger, and Levi's, we focus on brands that not only have clear, impactful sustainability strategies but also provide comprehensive information about their practices. This ensures a robust and informative study that can guide the development of a sustainable business model for the denim industry.

Information about these brands is collected from various sources: OCS (Online Clothing Study), Issuu, and Business Insider India.

4. LIMITATION

In this study, three brands are examined and researched, which is a limitation of the study; if more brands were studied, the paper would be more comprehensive and detailed.

This study focuses mainly on the denim industry and its business approach, which is only one type of textile industry among many that can be studied.

This research paper is open for future studies where the proposed business model can be explored and tested as the proposed business model is not tested within the industry. [Csanák \(n.d.-a\)](#)

5. FINDINGS

5.1. CASE STUDY-1: TOMMY HILFIGER

One of the most recognized luxury lifestyle brands, Tommy Hilfiger has been inspiring and motivating people since 1985. Tommy Hilfiger of PVH Corp., a clothing company that "wastes nothing and welcomes everyone," launched Make it Possible. A bold strategy for social and environmental sustainability. [Bureau \(2020\)](#) The brand has set 24 challenging goals for 2030. These goals are divided into four pillars and focus on inclusiveness and circularity.

- **Circularity:** Create something that is perfectly circular and part of a stable loop.
- **Made for Life:** From what they buy to where they sell, they consider and act on global constraints such as climate change, land use, freshwater use, and chemical pollution.
- **Inclusive:** They will remain an inclusive and accessible company for all customers.
- **Opportunity for All:** At Tommy Hilfiger, they remove all barriers to success and provide equitable access to opportunity.

More than 80 percent of Tommy Hilfiger's designers have been trained in circular design principles to date, and 72 percent of the cotton used worldwide in 2019 came from greener sources. In addition, two million strands of denim were finished using less water and energy, saving even more resources. This is double the volume of Spring 2020, as evidenced by the 50% increase in sustainable styles planned for Spring 2021. [Bureau \(2020\)](#) Unused buttons from last season's inventory are used to make labels and all sewing threads are made from recycled PET. Bottle. Using advanced laser technology for final washing, each piece of denim uses less water and energy to complete the finishing process. [Sarkar \(2020\)](#)

5.2. CASE STUDY-2: LEVI STRAUSS & CO.

Levi Strauss & Co., also known as Levi's, is the world's largest jeans manufacturer, known for its blue denim and eco-friendly jeans. Levi's has set standards for employee safety, ethical behaviour, and respect for the environment. [Fashinza. \(n.d.\)](#) When customers buy jeans, Levi's business strategy for sustainable design encourages them to be more aware that this is not a one-time event.

In five major regions, including Germany, the United Kingdom, Canada, the United States, and Japan, Levi's offers a 15 percent discount when consumers donate their used clothing for recycling. [Fashinza. \(n.d.\)](#) This program encourages others to donate used clothes and reduces clothing waste. Levi's supply chain recycles clothing, reduces waste, and creates a safer and healthier environment.

The two main effects that can be easily seen are:

Saving and recycling water: In addition to saving more than 3.5 billion litres of water in the final stages of the denim production process, we have recycled more than 5 billion litres of water.

Processing: They have tumbled jeans with bottle caps and golf balls that completely remove water from the wash and keep 96% of it for finishing, instead of only washing with fabric softener that gives them a worn-in feel. [Sarkar \(2020\)](#)

5.3. CASE STUDY-3: DOODLAGE

Doodlage is the first internet-branded casual wear company founded in 2012 in India with the direct idea of producing superior and unique eco-friendly products. Doodlage has used recycling techniques to transform industrial waste into women's and men's clothing, including repair, reuse, renovation, and recycling.

Denim products and more are available in the product catalogue in different shades, patterns, and materials like organic cotton, corn fabric, banana fabric, and more.

The main goals they pursue are:

- **Plastic-free packaging:** The company promotes that every product is produced responsibly and all packaging is made without plastic.
- **Waste Management:** Doodlage strives to reduce production waste; what is left over is used to make bags and home decorations.
- **Healthy collaboration:** The company obtains waste fabrics and defective garments from many large companies and other fabric exporters through which it has partnerships.
- **Sustainable production:** They create fabrics for post-consumer waste using certified recycled yarns on both hand and power looms. They do not use substances made with polluted water or materials that contain any chemicals. Therefore, they actively promote waste reduction throughout their operations. [Srinivasan \(2022\)](#)

6. SUGGESTED BUSINESS MODEL

Each case study is examined before we arrive at this suggestive Sustainable business model for denim.

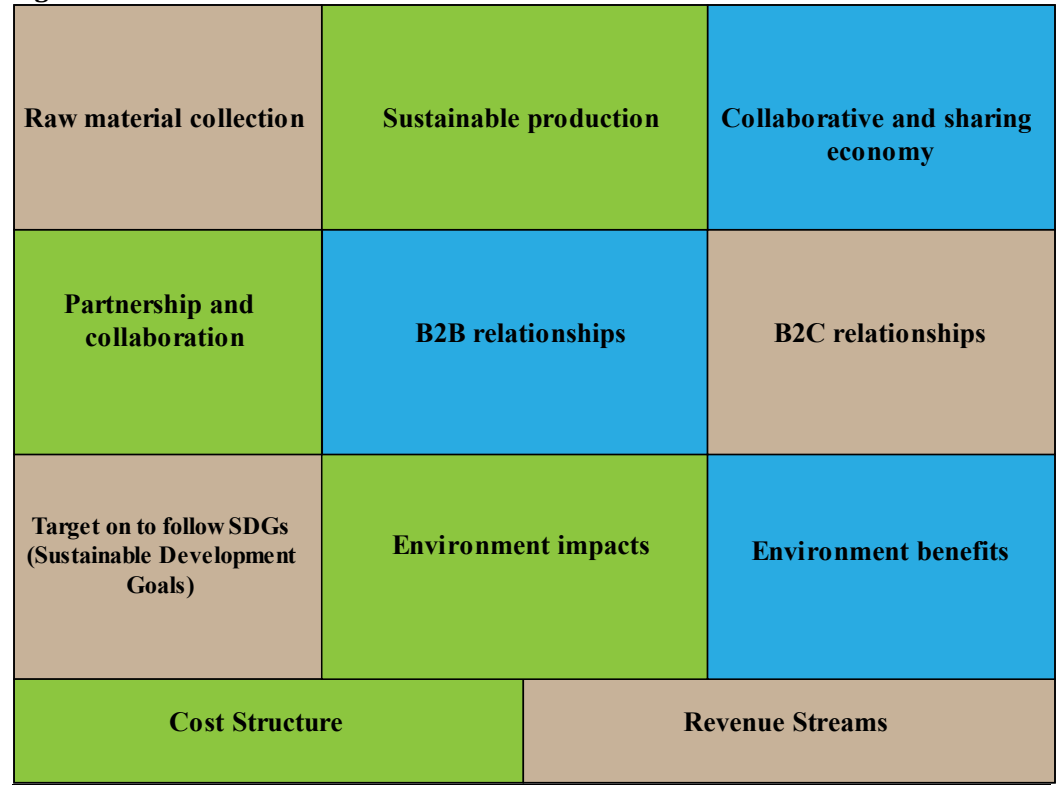
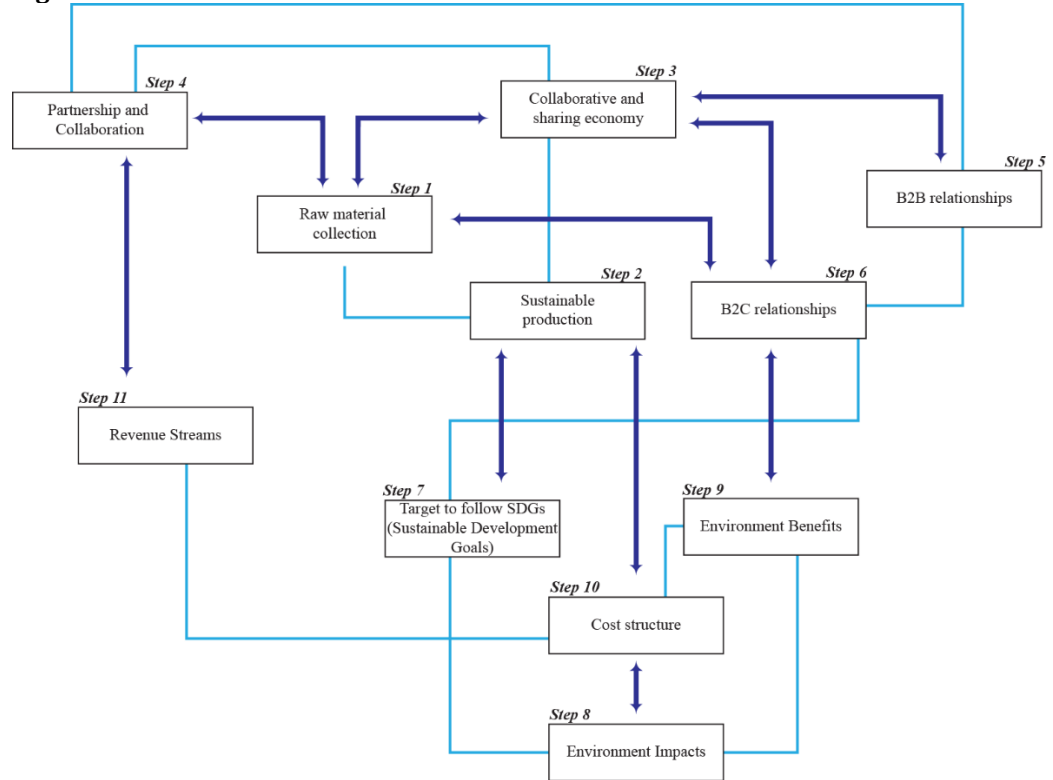
Figure 1

Figure 1 Frame for Suggested Business Model

Table 1
Table 1 Proposed Business Model Discussed in Details with Recommendations

Steps	Action	Sustainable Factors	Application	Recommendations
Step 1	Raw material collection	- Circular economy - Waste product management	Circular economy in denim sourcing can be said to involve markets that encourage the reuse of denim products rather than their scrapping and subsequent resource extraction as well as the reuse of waste in the production unit. For example, start using old denim products and upcycle them to make something new. The management of waste products is linked to the circular economy, which means adding less waste to the environment and extracting raw materials from the waste produced by the denim industry.	Eliminating material and energy waste through the user, user, and post-user stages while creating beautiful, design-oriented denim garments that customers will love and enjoy. And when the clothes reach their end of life, send them back to the company for further recycling. The waste produced by the industry when cutting a large number of pieces of denim patterns can be further used for other small items or can easily be sent to be converted into fibers for a textile process.
Step 2	Sustainable production	- Technology upgradation - Dry techniques of denim manufacturing - Eco-friendly dyes - Enzyme finish in denim washing - Laser/dry treatment	The ability to develop technological innovations and to adapt, adopt and improve technologies is one of the first steps toward sustainable development in the denim industry. There are many types of dry cleaning for denim such as Whiskering, sandblasting, etc. These techniques will certainly minimize water consumption.	The laser machine (CO₂ laser) is used to create whiskering or burn on denim garments. This process is done after the washing process. Different intensities of light are used to get the desired design. The laser is produced by a combination of CO₂ and direct current. NoStone® technology has different abrasion levels that are determined by

			Introducing eco-friendly dyes will undoubtedly help offset the negative health effects of harmful chemicals used to produce denim colors or materials on the environment and the health of the employees who use them. Cellulase enzymes are applied to denim as part of a process known as "enzyme wash" or "bio stone" in the textile industry. Similar to regular stone washing, desired results are a faded look and a softer feel. The combination of ecological washing machines and laser technology for the final treatment of jeans or denim has brought remarkable environmental benefits.	the fineness of the texture on the boards. The time in the machine also determines the level of the stonewash effect. The NoStone® process reduces water consumption, production costs, emissions, waste, processing time, and manual labor. Sustainable Denim Finishing. (n.d.) Natural indigo, various plants have provided indigo throughout history, but most natural indigo has been obtained from those in the genus <i>Indigofera</i>, which are native to the tropics, particularly the Indian subcontinent. The dye extracted from the indigo plant is first reduced in an alkaline vat, the material is then immersed in the vat several times according to the desired depth of color, and exposed to air between every two successive immersions. The color changes from yellow to green to blue through oxidation. natural indigo can be used to dye both yarn and fabric in a wide range of shades, from light to dark. Dyeing is done in a cold-dye bath. Handloomdenim. (n.d.)
Step 3	Collaborative and sharing economy	Sustainable approach toward customers' needs in different regions	Goods and services are shared, exchanged, traded, rented, etc. In this way, waste will be controlled and everyone can use the product equally.	It can be linked to the circular economy, like renting designer denim clothes to people who can't afford them, then they can return them to the company after use and the company can make them wearable again for the next customer.
Step 4	Partnership and Collaboration	• Connection with different sectors of the industry • Better education within industry artisans and labour.	This will help the denim industry to learn and grow in different sectors and healthy cooperation led to a healthy future. Working together, the denim industry can educate its workers to be safer at work, leading to a healthy life for human beings.	Denim is not just one company, but it is a tribe with different branches, it has a company focused on denim fabrics, a small developer of denim products, and so on. In this way, one small company can connect with another denim fabric manufacturer to get its raw materials from the denim fabric manufacturers and also can give its denim waste to fabric manufacturers to recycle it again and make the fabric again. Big institutes and big denim brands can start training artisans by visiting industries or through online webinars for a better sustainable future.
Step 5	B2B relationships	• Sustainable growth • Possible co-development	A sustainable transaction or trade is made between one denim store and another. Like when you make denim products from some small business manufacturers etc. As stated earlier, this will lead to possible joint development in industries.	As mentioned above, waste from one industry can be used as raw material for other industries. Getting help from small businesses, like getting the denim garment produced on a small scale from a small or local sustainable industry, can encourage them to make things sustainably, and this

				connectivity will bring companies together.
Step 6	B2C relationships	Establish long-term relationships with consumers	Like B2B relationships, B2C is equally important to strengthen the denim business with the target group and gain customer loyalty.	Customers are encouraged to recycle their old denim products with the promise of some discount on future purchases when they return the used clothing.
Step 7	Target to follow SDGs (Sustainable Development Goals)	Goal 12: Ensure sustainable consumption and production patterns	To preserve a way of life for current and future generations, Goal 12 calls for sustainable consumption and production practices. Not just one goal, but goals like gender equality, no poverty, life under water Life on land, etc. can be sought for a more sustainable denim industry.	Products that benefit society and the environment in the production and consumption processes and contribute to shaping a sustainable future for humanity. Such as producing denim with less or no water wastage, using eco-friendly dyes, etc. to promote sustainable living.
Step 8	Environment Impacts	• Checking on • high water usage, • energy consumption, and • chemical pollution	Checking the carbon footprint (the total amount of greenhouse gases produced by one's activity) after all the main sustainable measures in a certain period. Always control the production line, waste of energy, etc. in the denim industry.	Industries cannot stop their waste products at a single stage. But they can try to see through the business model like this, control the toxic chemicals used, and use less water by using recycled denim fibers to fabric, etc. to make the environmental impact less.
Step 9	Environment Benefits	• Control on carbon footprints • Plantation method	The use of post-industrial denim minimizes the water-intensive process of growing cotton and prevents residues from being placed in landfills. Not only will creating or living in a circular economy help a company take root, but adding plants and trees to the earth is an environmentally friendly initiative that a business can take into the future. It provides a thorough platform to increase the number of customers for a product or service. It guarantees the expansion and development of countries and businesses.	With each sale, the denim company can give their customers some plant seeds so that not only they but also their customers can learn and cultivate a sustainable plantation life.
Step 10	Cost structure	• Selecting or precisely defining the ideal business model • Sustainable decision making • Organizing resources to implement decisions	Assess costs, areas where savings can be made, and look at cost structure. This can be achieved by creating a sustainable business model for the company so that it is easy to follow and the results are beneficial. It will lead to better decision-making and a more sustainable allocation of resources.	When getting raw materials from other companies' waste, this will be one of the easy ways to save costs. There are many more ways to save costs.
Step 11	Revenue Streams	• A potent source of frequent income • Partnerships that encourage participation and commitment	Take this chance to (re)examine how one can change their company to better serve customers in the future. There are various ways a business can make money by selling goods or sustainably providing services.	In the end, a good relationship with the customers helps in a lot of revenue and also the sustainable way of producing denim is less damaging to the company's infrastructure and directly saves a lot of money.

Figure 2**Figure 2** The Interconnective Cycle of Each Step

7. RECOMMENDATIONS

The given findings help us in learning the sustainable business models of various big brands and help in the suggestive business model for denim start-ups. More and more attention is paid not only to society but also to the environmental impacts of textiles and clothing, especially for certain specific types of products, such as denim clothing. The demand for textiles that are more environmentally friendly is constantly growing and at the same time saves natural resources.

With a sustainable business model, brands will have their reputation by improving their environmental and social behaviour. It also builds strong ties between customers and companies by involving them in sustainability initiatives. Technological innovations in terms of denim production and processing will certainly be one of the relevant solutions for the sustainability of denim. The business model should always update in a particular time period so that the company will always balance its production in terms of sustainability.

8. CONCLUSION

The primary approach of this research is to provide a sustainable business model in the denim industry. This research consists of three parts and shows a certain view of business development from planning to practical application. The first part focuses on the denim manufacturing process and how it leaves toxic chemicals in the water and pollutes the environment with its impact. The second part includes case studies of three major brands on their sustainable approach. And the third part discusses the development of a detailed suggestive business model for denim companies. Each step, in a given suggestive business model can be seen as a

separate or connected opportunity for the denim industry to develop easy sustainable denim production. Denim is known for producing a lot of waste and using water for production, but with this suggestive model, companies can see an alternative in their production process and can easily balance their carbon footprint in nature. Further research is necessary to experiment with a suggestive business model of how the internal organization of established companies responds to these practices, which are similar to the described cases.

CONFLICT OF INTERESTS

None.

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None.

REFERENCES

- Arjun, D., Hiranmayee, J., & Farheen, & M. N. (n.d.). MNF Technology of industrial denim washing Technology of Industrial Denim Washing: Review.
- Bureau, I. R. (2020, September 2). India Retailing Bureau. Retrieved From India Retailing. Accessed on February 2, 2024.
- Csanák, E. (n.d.-a). Developing a Sustainable Denim Collection: Views, Aspirations & Methods of Ethical Denim.
- Csanák, E. (n.d.-b). Sustainable Concepts and Eco-Friendly Technologies in the Denim Industry.
- De Brito, M. P., Carbone, V., & Blanquart, C. M. (2008). Towards a Sustainable Fashion Retail Supply Chain in Europe: Organisation and performance. *International Journal of Production Economics*, 114(2), 534–553. <https://doi.org/10.1016/j.ijpe.2007.06.012>
- Fashinza. (n.d.). Levi's and its Business Guide of Sustainable Fashion and How it has Changed the Industry. Retrieved From Fashinza. Accessed on February 2, 2024.
- Hamja, A. (2013). Development of Denim; How the Fashion World Looks Into it. Handloomdenim. (n.d.). Retrieved From Slow Made India. Accessed on February 10, 2024.
- Haque, A. N., & Naebe, M. (2022). Sustainable Biodegradable Denim Waste Composites for Potential Single-Use Packaging.
- Holtström, J., Bjellerup, C., & Eriksson, J. (2019). Business Model Development for Sustainable Apparel Consumption: The Case of Houdini Sportswear. *Journal of Strategy and Management*. 12(4). 481–504.
- Islam, Md. T., & Hassan, Md. N. (2021). The Basic Layout of a Denim Textile Industry: A Basic Review. *Journal of Management Science & Engineering Research*, 5(1). <https://doi.org/10.30564/jmser.v5i1.4068>
- Jiby, B. (2017). The Indian Denim Industry in a Market Driven Environment. *International Journal of Advanced Research*, 5(5), 1189–1196. <https://doi.org/10.21474/IJAR01/4231>
- Neema, T. (2019). Denim Production and Sustainable Development Neema Tindwa.
- Sarkar, P. (2020, July 29). Making Denim & Jeans More Sustainable Way - Initiatives by Top Apparel Brands.
- Srinivasan, B. (2022, April 25). Doodlage- CSR Activities.
- Sustainable Denim Finishing. (n.d.). Retrieved From. Accessed on February 10, 2024. Cottonworks.