Article

Consumption of Sustainable Denim Products: The Contribution of Blockchain Certified Eco-Labels

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Abstract: Consumers' growing interest in the environmental and social impacts of products has increased demand for sustainable fashion items, particularly denim. Emerging technologies such as blockchain technology and labeling certifications have been developed to address sustainability issues by improving supply chain transparency and efficiency. This research investigates the trade-offs consumers make when purchasing sustainable denim jeans and the impact of sociodemographic factors on their decision-making process. Employing a conjoint analysis approach, four attributes were examined: price, brand name, types of materials, and eco-labeling. The results indicated that price is still the most influential factor, followed by material, brand name, and eco-label. Although eco-labeling is of little importance to consumers, it offers valuable insights for effective communication of sustainable practices. Consumers prefer denim with a blockchain eco-label, followed by a fair-trade certificate. This research enhances the understanding of consumer behavior toward sustainable consumption and offers strategic insights for denim producers and marketers.

1. Introduction

According to the UN Alliance for Sustainable Fashion [1], the fashion industry is responsible for 8–10% of global greenhouse gas emissions and contributes to 20% of wastewater pollution. The unsustainable methods of production and consumption in the fashion industry are leading to environmental issues, including water, air, and soil pollution as well as resource depletion and the loss of diversity [2]. In particular, the denim sector has a significant environmental impact due to the substantial quantity of denim products produced and consumed worldwide [3]. With growing environmental awareness, sustainability has emerged as a key concern among consumers and has created a new demand for sustainable fashion products [4,5]. Consumers now expect brands to publicly disclose their sustainability initiatives and seek transparency in the production process [6].

Consumers rely on various attributes to guide their decision-making process. Most previous research on the product attributes of sustainable fashion consumption has centered on organic cotton apparel [7–9]. For denim products, the existing literature mainly focuses on consumers in other countries such as China and India [10], Australia [11], and Brazil [12], necessitating research focusing on U.S. consumers. Given that denim is a staple in American fashion and denim jeans sales are consistently rising, projected to reach USD 20.7 billion in the U.S. market by 2026 [13], it is imperative to investigate which product attributes U.S. consumers prioritize when purchasing sustainable denim jeans.

Consumer preference for sustainable fashion products requires trade-offs between sustainable and non-sustainable attributes. Previous studies indicated that consumers are more influenced by non-sustainable attributes. For example, Wang et al. [14] found that price was the most crucial attribute influencing consumers' purchasing intentions

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toward sustainable outdoor jackets. A similar consumer preference for price over other sustainable attributes was revealed in Rothenberg and Matthews' [9] study of organic T-shirts. In addition to price, Rahman and Koszewska [15] discovered that other non-sustainable attributes such as fit, comfort, quality, and style also carried a heavier weight in consumers' decisions regarding sustainable fashion consumption. Therefore, it is important to understand what attributes consumers value the most, how these attributes influence their choices, and the underlying reasons for the importance of certain attributes to promote sustainable fashion consumption.

Furthermore, while previous studies revealed that there has been a gradually increasing emphasis on sustainable features [12] along with the dominant influence of price, not much attention has been paid to assessing consumers' preferences among sustainable attributes such as type of materials, eco-labels, supply chain transparency, and others. Recently, emerging technologies and labeling certifications have emerged to address sustainability issues in the fashion industry. Blockchain technology, for instance, can be leveraged to enhance transparency and traceability in the supply chain by offering consumers a clear history of the product's journey, from raw material sourcing to final production. This enhanced transparency helps in promoting responsible sourcing and verifying sustainable manufacturing practices. Labeling certifications such as Certified B Corporation and Fair-Trade Certification offer insights into the social and environmental credentials of a product. Understanding whether consumers are willing to engage with and support these technologies can guide brands in effectively communicating their sustainability efforts.

In addition, previous studies have reported conflicting findings on the influence of sociodemographic factors, including age, gender, income, and education level, on sustainable consumption behavior. Wang et al. [14] emphasized the role of gender, education, income, and past purchasing experiences in determining the trade-offs consumers are willing to make. In contrast, Brand and Rausch [16] identified gender as the only demographic factor affecting sustainable fashion consumption. According to their research, women tend to prioritize sustainability-related factors more than men, who regard price as a more important factor in their purchasing decisions. Given that denim is a staple fashion item for the majority of Americans, regardless of demographics, it is critical to investigate the impact of sociodemographic factors on U.S. consumers' denim consumption behaviors.

The purpose of this study is to investigate the influence of product attributes on U.S. consumer preferences for sustainable denim jeans and to identify the trade-offs they are willing to make in their decision-making process. Four attributes were examined: price, brand name, types of material, and eco-labeling. Additionally, this study aims to explore the impact of sociodemographic factors such as age, gender, income level, and education level on sustainable denim consumption behaviors. Conjoint analysis was utilized to measure the complex trade-offs consumers make when purchasing denim products in more realistic settings. The results of the study contribute to the existing literature on consumer behavior toward sustainable fashion consumption and offer insights for denim manufacturers and retailers in their product development and marketing strategies.

2. Literature Review and Research Questions

2.1. Environmental and Social Impacts of the Demin Industry

Denim jeans are one of the most popular apparel items in consumers' wardrobes in the U.S. They transcend age, gender, and style preferences and are viewed as durable, comfortable, classic, hardworking, and reliable [17]. According to a survey by the Cotton Incorporated Lifestyle Monitor [18], the average American owns approximately 10 pairs of denim jeans. In recent years, the denim industry has exhibited substantial financial growth. It was valued at USD 64.5 billion in 2022 and is forecast to be worth around USD 95 billion by 2030 [19].

Apart from its growth, the denim industry generates significant environmental impacts at each stage of the product life cycle. Firstly, cotton, which is the raw material of denim, requires an extensive amount of water and large quantities of harmful inputs such as

fertilizers and pesticides during cultivation [20]. Specifically, producing a pair of jeans consumes 1729 L of blue water and 2031 L of green water at the raw material stage, making it the most water-intensive phase in the production process [21]. Moreover, substantial resources, energy, and water are used in transforming cotton fibers into denim fabric. According to Amutha [22], 100–150 L of water is required for every kilogram of textile produced. In denim manufacturing, the fabric assembly stage generates the most CO_2 emissions [23]. The use of indigo dye leads to groundwater pollution and disrupts the balance in broader ecosystems [22]. Lastly, finishing techniques such as stone washing and wet finishing require not only significant water but are also responsible for 80% of effluents discharged into water bodies [3].

The denim industry faces not only environmental issues but also significant social challenges. Aguilar Johansson and Björkner's [24] social life cycle assessment of denim fabric highlighted child labor as the most significant social impact. In major cotton-producing countries, child labor and forced labor were prevalent, especially in pesticide application [22]. Additionally, cotton cultivation and fabric production activities pose high risks in terms of working hours and health and safety conditions [24]. Workers in the denim industry are often exposed to hazardous conditions that can lead to serious health problems such as respiratory diseases [22]. Other prevalent social challenges consistent in the textile and apparel industries include low wages, poor working conditions, extended working hours without overtime compensation, and the use of child labor [25].

2.2. Blockchain Technology in the Fashion Industry

New technologies hold significant potential to contribute to sustainability in the fashion industry. One such technology is blockchain technology, which is a digital, decentralized, and distributed public ledger that records data, tracks transactions, and updates information [26]. Blockchain technology facilitates detailed tracking of a product throughout its lifecycle from raw materials to consumers [27]. This tracking contains a large amount of information, including the origin and history of items, handling specifics, supplier information, and the location and condition of the product at different time points [28]. By recording every step of the supply chain, consumers are able to verify the origins and history of their clothing, making sure that the materials were sourced ethically and sustainably and that the products were made using fair labor practices. Due to blockchain technology's immutable structure, the recorded data cannot be altered, deleted, or destroyed, which guarantees the authenticity and security of the information [27]. More importantly, this transparency extends to all stakeholders, including consumers, retailers, and suppliers.

The integration of blockchain technology into the fashion industry is rapidly gaining attention. Designer Martine Jarlgaard showcased her clothing line, which is tracked through blockchain technology at the 2017 Copenhagen Fashion Summit [29]. Each piece of clothing features a tag with a QR code that reveals the complete supply chain history of the garment when scanned with a smartphone [29]. Luxury brands such as Prada, Louis Vuitton, and Cartier have invested in this innovative approach to enhance product authenticity and traceability. For instance, Louis Vuitton integrated RFID tags and microchips with blockchain technology to offer detailed information on the dates, materials, and manufacturing practices associated with each product [30]. Similarly, Prada and Cartier adopted blockchain in 2021 to provide consumers with access to comprehensive product histories and proof of authenticity [31]. Given blockchain's role in improving transparency and traceability in fashion, it is important to examine how consumers perceive blockchain technology and how this influences their purchasing decisions. Understanding this relationship not only builds trust between consumers and brands but also promotes conscious consumerism.

2.3. Consumer Decision-Making toward Denim Products

Consumer decision-making centers on how individuals select, acquire, use, or dispose of goods and services [32]. Product attributes, which include both tangible and intangible features, represent the sum of all components associated with a product [33]. During the

decision-making process, certain product attributes are more influential than others in shaping consumer perceptions and preferences. Consumers prioritize specific attributes to maximize the overall utility of a product [34]. This process involves weighing the pros and cons of each attribute to obtain the greatest benefit from the product. More importantly, consumers base their selections on an overall assessment of the perceived benefits of multiple product attributes simultaneously, and they make trade-offs when important attributes conflict with one another [35].

In the existing literature, several key attributes have been identified as important for denim products, with the majority of them not sustainability-related, including country of origin, price, brand, design/style, quality, and fitting [10,11]. Recent studies suggested a gradual emphasis on sustainable attributes such as water consumption during denim production, labor rights [11,12], and the use of sustainable materials [11]. While the results regarding these attributes were inconsistent, price consistently emerged as the most important attribute across all studies. Brand was identified as the second most important factor for young Austrian consumers [11], whereas for Brazilian consumers, it was the least critical, with environmental and social concerns being perceived to be very important, only second to price [12].

As more young consumers enter the marketplace as independent purchase decision makers, and with new technologies like blockchain being integrated into the fashion industry to address sustainability concerns, other sustainability-related features might emerge as important factors in determining consumers' purchase decisions for denim products. Considering the social and environmental impact that occurs at each stage of the denim industry, such features could include transparency certification via blockchain technology. Fashion products differ significantly from others, such as food, where the direct impact on personal health can be a more powerful motivator for sustainable choices [36]. Thus, investigating how consumers prioritize various attributes in their sustainable fashion choices becomes even more crucial.

2.4. Product Attributes of Sustainable Denim

2.4.1. Price

When purchasing denim jeans, price has been identified as one of the most significant factors influencing consumer preferences [11,12]. For many consumers, there is a perceived correlation between the price of jeans and their quality, fit, and style. Sustainable fashion products, compared to non-sustainable ones, generally carry a higher price tag [37]. This increase in price can be attributed to the higher production costs associated with using sustainable materials and eco-friendly production practices.

Previous research has investigated consumers' willingness to pay a premium for sustainable apparel, suggesting that the role of pricing in sustainable purchasing decisions is multifaceted. Pham et al. [38] found that Gen Z consumers were willing to pay a premium of 21.22% for apparel labeled as organic and 37.72% for those marked as eco-friendly. Similarly, Rothenberg and Matthews [9] identified price as the most important attribute to consumers when purchasing organic t-shirts. Ellis et al. [7] found that, on average, consumers were willing to pay a 25% premium for a t-shirt made of organic cotton. Ha-Brookshire and Norum [8] reported that consumers were willing to spend an additional USD 5 on a USD 30 t-shirt if it was made of organic and sustainable cotton. Despite these findings, several studies found a reluctance among consumers to pay a premium for sustainable clothing. For example, according to Rahman and Koszewska [15], while many consumers were interested in eco-fashion, they were unwilling to pay additional prices for the environmental advantages these products offer.

2.4.2. Brand Name

A brand name is a fundamental element of a brand's identity. Along with symbols, design, and logos, it differentiates a company from its competitors [39]. Consumers often perceive products holistically, associating all attributes and satisfactions experienced with

the brand name during the purchase and use of a product [40]. A strong brand name not only enhances awareness and positive associations with the brand but also reduces perceived risks when purchasing new products.

Previous work has suggested a positive impact of brand names on consumers' perceptions of quality and their purchase intentions [41]. Consumers often rely on the brand name to guide their choices, especially when they are unfamiliar with the product category or when they have limited time to conduct thorough research [39]. A recent study conducted by Rahman et al. [42] found that male consumers relied significantly more on brand names compared to female consumers, as they tend to be less sensitive to fashion and less knowledgeable about clothing properties. Furthermore, a strong brand name can be a powerful tool for fostering trust and establishing an emotional connection with consumers. This trust significantly influences consumers' perceptions of a brand's commitment to environmental and social responsibility [43].

2.4.3. Type of Material

The adoption of recycled materials has become increasingly popular within the fashion industry. Denim brands such as Levi Strauss & Co., Agolde, and Everlane are incorporating recycled components in their products [44]. Brand and Rausch [16] found that consumers favored apparel made from 100% recyclable materials, followed by those made from 100% biodegradable materials and those with 50% recyclable content.

Previous research has indicated a greater willingness among consumers to pay for products made from recycled materials [45]. According to Chi et al. [46], millennial consumers were more likely to choose sustainable products made from recycled polyester if such products performed as well as or better than those made from virgin materials. Dobbelstein and Lochner [47] revealed a stronger preference among South African consumers for purchasing textile products made from recycled materials, compared to German consumers. Moreover, product quality plays a significant role in shaping consumers' intentions to purchase fashion products made from recycled materials. Consumers were reluctant to pay a premium for recycled fashion products if they did not perceive the quality to be comparable to that of non-recycled alternatives [48].

2.4.4. Eco-Labeling

Eco-labels identify products, materials, or companies that adhere to the standards defined by specific organizations or government agencies. These standards may include aspects such as organic content, sustainability, and safety for humans, animals, and the environment [49]. Unlike traditional labels, eco-labels provide information about the social and environmental aspects of a product.

The Certified B Corporation is commonly used and granted to companies that meet certain social and environmental standards evaluated by the non-profit B Lab [50]. The B Lab assesses a company's environmental and societal impact using the B Impact Assessment (BIA), which comprises 150 questions across five areas of impact: governance, employees, community, environment, and customers [51]. This certification considers a variety of sustainability metrics, including carbon/GHG emissions and offsets, energy production/sources, and material use [52]. As of 2023, there are over 6400 B Corporations in more than 80 countries and across over 150 industries, with a substantial increase in certified fashion companies from 2008 to 2022 [53]. Brands such as Patagonia and Eileen Fisher Inc. have earned B Corp certification.

Fair-Trade Certification is another widely recognized label focusing on promoting human rights and improving working conditions within supply chains [54]. This certification aims to improve living standards and empower communities and businesses by encouraging collaboration among workers, organizations, and governments. Products with this label guarantee that the workers involved have received living wages [54]. With rising consumer awareness, there is an increasing preference for fair-trade-labeled products. Ma et al. [55] found that young female consumers were more inclined to purchase fair-trade

products if they held strong beliefs in the principles of fair trade. Similarly, Eberhardt et al. [56] highlighted that consumers' knowledge positively correlated with their purchase intention and actual buying behavior of fair-trade products.

The blockchain eco-label serves as a tool that offers transparent records of supply chain transactions through a digital public ledger system [26]. These labels enable consumers to track the journey of a garment and verify claims about sustainable practices such as organic farming, reduced water and energy consumption, and ethical labor practices. Consumers can access this information through a QR code or a digital platform. Limited research has been carried out on consumers' perceptions and behaviors toward blockchain eco-labels. Remme et al. [57] found that "blockchain trademarked" labels were not as influential as "low price" and "high product rating" to consumers. However, these labels had a greater impact on consumers who lead sustainable lifestyles. According to Remme et al. [57], blockchain could significantly enhance trust in sustainability labels. Similarly, Navas et al. [26] found that blockchain eco-labels positively affected Generation Y consumers' trust and knowledge, thereby influencing their purchasing decisions.

2.5. Research Questions

In relation to the literature review, the following research questions were formulated:

1. Which product attributes do consumers prioritize when purchasing sustainable denim jeans?
2. Within these attributes, which specific levels of each attribute are most preferred by consumers?
3. How do consumer preferences for different product attributes and their respective levels vary according to demographic factors?

3. Methodology

3.1. Experimental Design with Conjoint Analysis

This study employed a conjoint analysis approach to investigate the relative importance of various attributes influencing consumers' preferences toward sustainable denim jeans as well as the trade-offs they make in the purchasing process. Conjoint analysis has been widely used in marketing research to understand how people value different attributes of a product in scenarios that mimic real-life purchasing situations [58]. It serves as an effective method for examining the combined impact of a set of product attributes on consumer preferences and for identifying the most favored combination of attributes [8]. Moreover, conjoint analysis facilitates the evaluation of not only the significance of individual attributes but also the respective levels of each attribute [10]. Specifically, "attributes" refer to the features of a product that can influence consumer choice, and "levels" represent the different variations of each attribute [58].

Out of the different types of conjoint analysis, rating-based conjoint analysis was selected for this study. Rating-based conjoint analysis has been widely applied to the analysis of commercial goods [59]. Compared to choice-based conjoint analysis, rating-based tasks are easier for respondents to understand and complete. Additionally, rating-based conjoint allows participants to express varying degrees of preference for each option, which is suitable for studies that primarily focus on consumer preferences [60]. Using this approach, participants are presented with conjoint cards that profile identified attributes and attribute levels. Four attributes of denim jeans were investigated in this study, including price, material, brand name, and eco-labeling.

To determine the levels of each attribute, focus group interviews and internet searches were two commonly used methods in previous studies [14,35]. In this study, a comprehensive internet search was conducted on denim jeans available in the marketplace to determine the attribute levels. Based on the prices of denim jeans from different brands, three price levels were defined: USD 79, USD 99, and USD 129. As for the material attribute, organic cotton jeans and jeans made from recycled materials are the two dominant sustainable options on the market. Given that most previous research on the product attributes of

sustainable fashion consumption has centered on organic cotton materials [7,8], recycled materials versus non-recycled materials were identified as the two levels of the material attribute. To evaluate the effect of brand name on consumer choice, this research used Levi's to represent a well-known denim brand and an imaginary brand called Blue Star to represent an unknown brand. Regarding eco-labels, four options were included: Fair-Trade Certification, the Certified B Corporation, blockchain eco-label, and the absence of an eco-label. Table 1 summarizes the four attributes along with their corresponding levels.

Table 1. The attributes and levels.

Attributes	Levels
Price	USD 79
	USD 99
	USD 129
Materials	Made of recycled materials
	Made of non-recycled materials
Brand name	Levi's
	Blue Star
Eco-label	No eco-label
	Fair-Trade Certification
	The Certified B Corporation
	Blockchain eco-label

In theory, there could be a total of 48 (3 × 2 × 2 × 4) possible combinations of product attributes. To simplify the evaluation process while still obtaining the most precise estimates, a fractional factorial design was employed to reduce the number of conjoint cards. The resulting set, known as an orthogonal array, is designed to capture the main effects of each factor level. This study used the orthogonal design in SPSS to generate this array and reduced the number of cards from 48 to 9, as presented in Table 2.

Table 2. Conjoint cards.

Cards	Price	Material	Brand Name	Eco-Label
1	USD 99	Non-recycled materials	Blue Star	The Certified B Corporation
2	USD 79	Recycled materials	Levi's	No eco-label
3	USD 129	Non-recycled materials	Blue Star	Blockchain eco-label
4	USD 99	Recycled materials	Blue Star	Fair-Trade Certification
5	USD 99	Non-recycled	Levi's	No eco-label
6	USD 99	Recycled	Levi's	Blockchain eco-label
7	USD 129	Recycled	Levi's	The Certified B Corporation
8	USD 79	Non-recycled	Blue Star	No eco-label
9	USD 129	Non-recycled	Levi's	Fair-Trade Certification

3.2. Survey Instrument

A questionnaire was designed to collect data from consumers regarding their responses toward sustainable jeans. In the questionnaire, participants were first asked about their awareness and knowledge of different eco-labels in general. In the next section, participants were asked to imagine as if they were shopping for a pair of jeans. Assuming the jeans described can match their favorite style, color, and size, the jeans varied in terms of price, material, brand name, and eco-label. Participants were then asked to review the conjoint cards, one at a time, and indicate their purchase intention on a 7-point Likert scale, where 1 represented "most unlikely to purchase" and 7 represented "most likely to purchase". An example of a conjoint card is displayed in Figure 1. The final section collected demographic information, including gender, age, education, and income level.
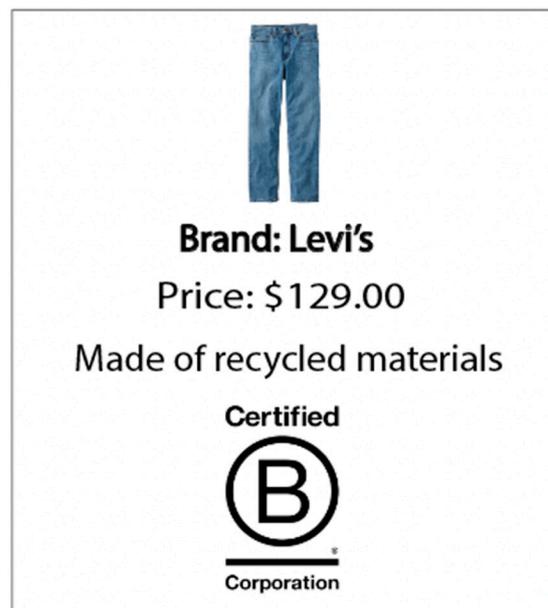
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Figure 1. Conjoint card example.

3.3. Data Collection and Sample Profile

The questionnaire was distributed online through a sampling company. Convenience sampling was used to recruit participants for the survey. A screening question was used at the beginning of the survey to exclude minors under 18 years old. After filtering out responses completed in less than 3 min and those exhibiting straight-line answer patterns, a total of 417 valid responses were retained for data analysis. According to Orme [61], the general rule of thumb for conjoint analysis is a minimum of 200 to 300 completed surveys. The sample profile is presented in Table 3. The sample was relatively balanced in terms of gender, with 49.4% male and 48.7% female. The age distribution was fairly even among the age groups, though there was a slightly higher representation in the 25–30 age range. The majority of respondents identified as White (68.3%), followed by Black or African American (16.5%). In terms of education, most participants were high school graduates (28.5%), held a Bachelor's degree (25.4%), or had an Associate degree (24.7%). Regarding marital status, nearly half of the participants were single (47.2%), and married participants constituted 38.6%. The income levels were diverse, with the largest income group earning less than USD 40,000 (33.6%), followed by 17.5% earning between USD 50,001 and USD 75,000, and 15.8% earning more than USD 125,000. More than half of the participants (58.27%) were aware of the Fair-Trade Certification of textile and apparel products. In contrast, 36.93% had seen the Certified B Corporation label, and 15.35% had noticed the blockchain-eco-label on these products.

Table 3. Sample profiles.

Demographics	Percentage (%)		Percentage (%)
Gender		Education	
Male	49.4%	Less than high school	4.1%
Female	48.7%	High school graduate	28.5%
Others	1.9%	Associate degree/some college education	24.7%
Age		Bachelor's degree	25.4%
18–24	16.5%	Advanced degree	17.3%
25–30	17.7%	Marital Status	
31–35	13.2%	Single	47.2%
36–40	13.4%	Married	38.6%
41–45	13.2%	Divorced	8.9%

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Table 3. *Cont*.

Demographics	Percentage (%)		Percentage (%)
46–50	13.7%	Widowed	2.6%
51 and over	12.3%	Other	2.7%
Ethnicity		Income Level	
White	68.3%	Less than USD 40,000	33.6%
Black or African American	16.5%	USD 40,001–USD 50,000	13.4%
American Indian or Alaska Native	0.7%	USD 50,001–USD 75,000	17.5%
Asian	5.0%	USD 75,001–USD 100,000	12.5%
Latino or Hispanic	7.4%	USD 100,001–USD 125,000	7.2%
Other	2.1%	More than USD 125,000	15.8%

4. Results and Discussion

4.1. Which Product Attributes Do Consumers Prioritize When Purchasing Sustainable Denim Jeans?

Data were analyzed using the conjoint program provided in SPSS to examine the relative importance of each attribute and the preferred level for each attribute. Pearson's R and Kendall's Tau are measures of goodness of fit for the conjoint analysis model. In this study, Pearson's R is 0.994 and Kendall's Tau is 0.944, indicating a very strong correlation between the observed preferences and the model-predicted preferences, thus confirming the high validity of the model.

The relative importance of each attribute is calculated as the percentage of the total product utility contributed by each attribute [62]. This calculation reflects the weight respondents place on each attribute when making decisions. The larger the number, the more important the attribute is to the consumer. According to the relative importance value presented in Table 4, price had the highest relative importance (50.43%), followed by material (17.76%), brand name (16.71%), and eco-label (15.10%). Thus, price is the dominant factor influencing consumers' choices for sustainable denim jeans. The eco-label is the least influential factor, suggesting that while consumers care about sustainability, other factors such as price, materials, and brand name play more significant roles in their purchasing decisions.

Table 4. Conjoint analysis results.

Attributes	Relative Importance (%)	Levels	Part-Worth Utility
Price	50.43%	USD 79	0.514
		USD 99	−0.004
		USD 129	−0.510
Material	17.76%	Recycled	0.180
		Non-recycled	−0.180
Brand Name	16.71%	Levi's	0.170
		Blue Star	−0.170
Eco-Label	15.10%	No eco-label	−0.079
		Fair-Trade Certification	0.102
		The Certified B Corporation	−0.165
		Blockchain Eco-label	0.142

4.2. Part-Worth Utility Estimates

For each attribute, consumers' preferences of each attribute level are measured by the part-worth utility score. A positive part-worth suggests a preference for that particular attribute level, with higher part-worth utilities indicating stronger preferences [62]. A negative part-worth utility indicates a lesser preference for that attribute level. The absolute value of the part-worth utility reflects the magnitude of preference. As presented in Table 4, denim jeans priced at USD 79 had the highest mean utility value (0.514), followed by jeans priced at USD 99 (−0.004). Jeans priced at USD 129 had the lowest mean utility value

(−0.510) among all price levels. In terms of materials, respondents were more likely to purchase denim jeans made of recycled material (0.180) but were reluctant to buy those made of non-recycled materials (−0.180). Regarding brand names, the results indicated that participants had a stronger preference for sustainable jeans from the well-known brand "Levi's" (0.170) compared to the imaginary made-up brand "Blue Star" (−0.170). Lastly, respondents showed a stronger preference for sustainable denim jeans with a blockchain eco-label (0.142), followed by those with a Fair-Trade Certificate (0.102). On the other hand, sustainable denim jeans without any eco-label (−0.079) or with a Certified B Corporation label (−0.165) were less appealing to participants.

In line with prior research, consumers were found to prioritize price in their sustainable purchasing decisions for fashion products [12,14,16,63]. These findings indicate that consumers are price-sensitive and prefer to purchase sustainable denim jeans at more affordable prices. High prices are often cited as a primary barrier to purchasing sustainable fashion products [64]. Consumers were confused about how sustainability is incorporated into fashion products and were skeptical about the higher prices [37]. Contrary to the current finding, Jegethesan et al. [11] discovered that young Australian consumers were willing to pay a higher price for denim jeans, ranging between USD 250 and USD 400. The preference for lower prices in the current study might be attributed to the distinct demographics of the respondents. Specifically, 64.5% of the respondents in this study reported having a medium to low income, with an annual income of less than USD 75,000.

Material was identified as the second most significant factor for consumers when purchasing sustainable denim products. Similarly, Brand and Rausch [16] found that material was the second most influential factor, following price, in determining consumer choices for sustainable apparel. The preference for materials in the current study aligns with prior research, suggesting that consumers value sustainable materials in their purchasing decisions [14,65]. Utilizing recycled materials in apparel manufacturing not only significantly reduces environmental impacts such as water and energy use, land utilization, and chemical application, but also extends the life span of the garments [3].

Brand name was the third most important factor when purchasing sustainable denim jeans. This finding confirms previous research suggesting that consumers tend to prefer well-known brands [66]. Brand names symbolize quality, trustworthiness, and prestige [67]. They also influence consumer perceptions of sustainable products. Whang et al. [68] discovered that brand name and brand popularity positively influenced Korean consumers' evaluation of green products. Thus, when consumers perceive a brand favorably and have an inherent trust in it, their positive perceptions are magnified when the brand offers sustainable products, which in turn enhances their intention to purchase such products.

Lastly, respondents assigned little importance to eco-labeling. While this result could be seen as discouraging, it provides great insights regarding how to effectively communicate with consumers about sustainable practices in the production process by choosing the most convincing label certification. For sustainable jeans offered by the same company with the same recycled material at the same price, the choice of labeling will make a significant difference in consumers' purchase decisions. Specifically, consumers showed a greater willingness to purchase sustainable denim jeans with a blockchain eco-label, followed by those with a Fair-Trade Certificate. The transparency and traceability provided by blockchain technology enhance the credibility of the eco-label [26]. As a result, consumers gain more confidence in the information presented and become less susceptible to greenwashing, which in turn encourages sustainable purchasing. In addition, consumers were more likely to purchase fashion products that have third-party certifications verifying fair labor practices. This supports the findings from Hustvedt and Bernard's [69] study, which found that consumers were willing to pay more for t-shirts with labor-related information on the labels. On the other hand, there was a clear reluctance to buy sustainable denim jeans without any eco-label. This is in line with the findings of Wang et al. [14], who suggested that consumers were hesitant to buy sustainable apparel that lacks an eco-label. Furthermore, respondents showed even less interest in sustainable denim jeans with a

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Certified B Corporation label. In the survey, 63% of respondents indicated that they had not seen such labels on textile and apparel products, suggesting that consumers are not well-informed about Certified B Corporations. When consumers are unfamiliar with both the meaning and the certification process of the label, the label alone may not be effective enough to generate deeper consumer engagement.

4.3. Preference Analysis by Demographics

Additional analysis was conducted to examine the influence of demographics on consumers' preferences for sustainable denim products, including age, gender, education, and income level. Instead of comparing all subgroups for each demographic, a recategorization was conducted to consolidate these subgroups. For example, the seven age groups were consolidated into three categories: Gen Z (18–24), Gen Y (25–30, 31–35, and 36–40), and others (41–45, 46–50, and 51 and over). In terms of gender, since only a very small portion (1.9%) identified as "others," the analysis included only female and male groups. Education was recategorized to include those with less than a college degree and those with a college degree or higher. Lastly, income is classified into two categories: below USD 75k and above USD 75k. A conjoint analysis was performed on these demographic sub-groups. Table 5 presents the part-worth utilities for each subgroup. Across all sub-groups, consumers' preferences for material and brand name were consistent. Consumers universally preferred denim jeans made from recycled materials and from the well-known brand "Levi's".

Table 5. Conjoint analysis results by demographics.

Sub-Groups	Price			Materials		Brand Name		Eco-Label			
	USD 79	USD 99	USD 129	Recycled	Non-recycled	Levi's	Blue Star	No eco-label	Fair-Trade Certification	The Certified B Corporation	Blockchain eco-label
Age											
Gen Z	0.687	−0.059	−0.628	0.179	−0.179	0.145	−0.145	−0.038	−0.091	−0.197	0.326
Gen Y	0.500	−0.044	−0.456	0.162	−0.162	0.147	−0.147	−0.073	0.171	−0.126	0.028
Others	0.456	0.066	−0.522	0.203	−0.203	0.208	−0.208	−0.104	0.104	−0.196	0.196
Gender											
Male	0.561	−0.021	−0.539	0.137	−0.137	0.128	−0.128	−0.056	0.068	−0.111	0.098
Female	0.498	0.005	−0.503	0.211	−0.211	0.228	−0.228	−0.113	0.137	−0.208	0.184
Education											
Before College	0.582	−0.031	−0.551	0.200	−0.200	0.198	−0.198	−0.064	0.083	−0.194	0.174
After College	0.420	0.034	−0.454	0.153	−0.153	0.130	−0.130	−0.100	0.127	−0.124	0.097
Income Level											
Low Income (Less than USD 75,000)	0.560	−0.029	−0.531	0.184	−0.184	0.171	−0.171	−0.073	0.119	−0.194	0.149
High Income (More than USD 75,000)	0.435	0.039	−0.475	0.174	−0.174	0.167	−0.167	−0.089	0.071	−0.113	0.130

However, preferences regarding price varied across different sub-groups. Gen Z (0.687) and Gen Y (0.500) respondents were more sensitive to price. They preferred sustainable jeans only at the lowest price point. In contrast, older generations had a positive attitude towards jeans priced not only at USD 79 but also at USD 99. Previous research has shown that younger generations are more receptive and more concerned about the environment. Consequently, they exhibited a stronger willingness to purchase sustainable fashion products than older consumers [16,51]. However, the current study suggests that Gen Z and Gen Y rely more on price to evaluate clothing than older consumers. This could be due to older generations having more disposable income than Gen Z and Gen Y [70]. Younger generations, especially Gen Z, who might still be in school or early in their careers, often have lower disposable incomes.

When examining gender differences, it appears that female respondents were generally more willing to invest in sustainable denim jeans than male respondents. Females were

open to paying both USD 79 (0.498) and USD 99 (0.005), while males were only willing to pay USD 79 (0.561) for a pair of sustainable jeans. Similar findings are also observed in Dangelico et al.'s [71] research, which found that women were more prepared to pay a premium for garments made of organic materials compared to men.

Regarding education, respondents with higher education levels were less price-sensitive. They showed a preference for jeans priced at both USD 79 (0.420) and USD 99 (0.034). In contrast, those with a relatively lower education level tended to prefer jeans priced only at USD 79 (0.582). According to Starr [72], education enhances an individual's ability to quickly and effectively acquire and evaluate information about the social, ethical, and environmental impacts of their consumption decisions. People with a higher educational background are more likely to buy sustainably, given that college-level education often encourages individuals to consider the broader well-being of society.

Consistent with previous research [12,71], income also significantly influenced price preferences. As seen in Table 5, the group with an income level above USD 75,000 was more willing to accept a higher price compared to the group with an income level of USD 75,000 or less. Consumers with higher incomes can absorb the additional costs associated with sustainable products and are more willing to pay a premium for sustainable fashion products.

In terms of eco-label, age was the only demographic factor that significantly influenced consumers' preferences. Regardless of gender, education, and income level, consumers favored sustainable denim jeans that have either a blockchain eco-label or Fair-Trade Certification. Surprisingly, as shown in Table 5, Gen Z respondents preferred only the blockchain eco-label (0.326), whereas other age groups valued both the blockchain eco-label and Fair-Trade Certification. Gen Z consumers have grown up in a digital age and are more open to innovative technologies [73]. As a result, they are more familiar with and comfortable with technology-based solutions and are more likely to understand and trust blockchain technology as a reliable source of information. Additionally, Gen Z is more environmentally conscious compared to previous generations [16]. Given that blockchain eco-labels offer a more accurate and verifiable way to assess the environmental impact of products and can be easily accessed digitally, they align well with the beliefs and lifestyle of Gen Z.

5. Conclusions

5.1. Implications

Consumers are showing a growing interest in the environmental and social impacts of the products and services they purchase. This has led to an increasing demand for sustainable fashion items, particularly denim. In response to the rising popularity of sustainable denim and the increasing consumer demand for such products, this research investigated the trade-offs consumers make when purchasing sustainable denim jeans and the impact of sociodemographic factors on their decision-making process. Four attributes were examined: price, material, brand name, and eco-labeling. The results indicated that price is the most influential factor, followed by material, brand name, and eco-label. These findings offer valuable insights for both academic researchers and industry professionals.

From an academic perspective, this study fills a gap in the literature regarding consumers' trade-offs between sustainable and non-sustainable attributes in sustainable denim purchases. While previous studies have primarily focused on non-sustainable product attributes such as country of origin, price, design, quality, and fit [10–12], this research emphasizes the relative importance of price and brand name compared to sustainable attributes like material and eco-labels. Furthermore, there is a growing demand among consumers for transparent communication [6]. Responding to this shift, this research represents one of the first empirical studies to examine how the integration of blockchain technology in eco-labeling affects consumers' purchasing decisions. This research enhances the understanding of the role of blockchain technology in the fashion industry and sheds light on how digital technologies can contribute to consumers' sustainable consumption.

In addition, the findings help fashion marketers understand the importance consumers place on product attributes when buying denim jeans. Among the attributes, price is the most important factor influencing consumers' purchase decisions. Given consumers' preference for an affordable price, fashion marketers and practitioners should consider offering sustainable denim jeans at competitive price points to attract a larger consumer base. Additionally, fashion brands need to clearly communicate the unique benefits or features that justify the premium pricing of sustainable denim jeans. For example, fashion marketers could utilize marketing campaigns, product tags, and in-store displays to highlight these unique selling points and convey them to consumers. Second, given consumers' positive attitudes towards recycled materials, fashion brands should actively source and incorporate sustainable materials into their product lines. It is important for fashion marketers to educate consumers about the environmental benefits of using recycled materials. Third, brand name was found to be an important criterion. Thus, establishing a strong brand name is a key element for successful marketing strategies. Lastly, fashion brands should consider leveraging blockchain technology to highlight their commitment to sustainability and engage in transparent communication about their ethical practices. By providing verifiable evidence of such practices, they can appeal to environmentally and socially conscious consumers. Fashion brands should also consider offering consumers access to blockchain information regarding their products to increase engagement and foster trust. When consumers are confident about the ethical and sustainable practices of a brand, they are more likely to remain loyal [74]. Marketers could also use blockchain to educate consumers about the importance of sustainability in fashion. This education can guide them to make informed purchasing decisions, potentially shifting consumer habits towards more sustainable choices. Moreover, brands should increase consumers' awareness and understanding of lesser-known certifications like the Certified B Corporation label through social media or in-store displays. The findings also suggest that marketing managers and practitioners should take consumers' sociodemographic factors into consideration when developing marketing strategies. By doing so, fashion marketers can develop more effective and targeted strategies tailored to the unique needs and preferences of different consumer segments.

5.2. Limitations and Future Research Directions

This research has some limitations but also offers opportunities for future studies. First, while this research examined the impact of socio-demographic factors such as age, gender, education, and income level, other factors like consumers' environmental knowledge, environmental consciousness, and purchase experience could also influence consumers' preferences for sustainable fashion products. These factors should be further explored in future studies to offer a more holistic understanding of sustainable fashion consumption. Second, this study used Levi's to represent a well-known brand and a fictitious brand, Blue Star, to represent an unknown brand. Future research could explore the impact of sustainable brand image on consumer choice by including a sustainable brand such as Everlane. Third, this study found a preference for blockchain eco-labels among consumers. Future research could employ a qualitative approach, such as in-depth interviews, to understand the reasons why the blockchain eco-label is most preferred by consumers. Lastly, the data for this study were collected from U.S. respondents, which limits the generalizability of the findings. To obtain more generalizable results, future studies could include consumers from different countries with varied demographics.

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References

1. The UN Alliance for Sustainable Fashion. Home—The UN Alliance for Sustainable Fashion. 4 April 2022. Available online: https://unfashionalliance.org/ (accessed on 18 October 2023).
2. Fuchs, M.; Hovemann, G. Consumer preferences for circular outdoor sporting goods: An Adaptive Choice-Based Conjoint analysis among residents of European outdoor markets. *Clean. Eng. Technol.* **2022**, *11*, 100556. [CrossRef]
3. Aki, S.U.; Candan, C.; Nergis, B.U.; Önder, N.S. Understanding Denim Recycling: A Quantitative Study with Lifecycle Assessment Methodology. In *Waste in Textile and Leather Sectors*; IntechOpen: London, UK, 2020. [CrossRef]
4. Kim, Y.; Oh, K.W. Which Consumer Associations Can Build a Sustainable Fashion Brand Image? Evidence from Fast Fashion Brands. *Sustainability* **2020**, *12*, 1703. [CrossRef]
5. Vătămănescu, E.-M.; Dabija, D.-C.; Gazzola, P.; Cegarro-Navarro, J.G.; Buzzi, T. Before and after the outbreak of COVID-19: Linking fashion companies' corporate social responsibility approach to consumers' demand for sustainable products. *J. Clean. Prod.* **2021**, *321*, 128945. [CrossRef]
6. Buell, R.W.; Kalkanci, B. How Transparency into Internal and External Responsibility Initiatives Influences Consumer Choice. *Manag. Sci.* **2021**, *67*, 932–950. [CrossRef]
7. Ellis, J.L.; McCracken, V.A.; Skuza, N. Insights into willingness to pay for organic cotton apparel. *J. Fash. Mark. Manag. Int. J.* **2012**, *16*, 290–305. [CrossRef]
8. Ha-Brookshire, J.E.; Norum, P.S. Willingness to pay for socially responsible products: Case of cotton apparel. *J. Consum. Mark.* **2011**, *28*, 344–353. [CrossRef]
9. Rothenberg, L.; Matthews, D. Consumer decision making when purchasing eco-friendly apparel. *Int. J. Retail. Distrib. Manag.* **2017**, *45*, 404–418. [CrossRef]
10. Jin, B.; Park, J.Y.; Ryu, J.S. Comparison of Chinese and Indian consumers' evaluative criteria when selecting denim jeans: A conjoint analysis. *J. Fash. Mark. Manag. Int. J.* **2010**, *14*, 180–194. [CrossRef]
11. Jegethesan, K.; Sneddon, J.N.; Soutar, G.N. Young Australian consumers' preferences for fashion apparel attributes. *J. Fash. Mark. Manag. Int. J.* **2012**, *16*, 275–289. [CrossRef]
12. De Abreu, M.C.S.; Ferreira, F.N.H.; Silva, J.F.B.A. To be or not to be sustainable in an emerging market? Conjoint analysis of customers' behavior in purchasing denim jeans. *J. Fash. Mark. Manag. Int. J.* **2021**, *26*, 452–472. [CrossRef]
13. Euromonitor International. "Jeans in the US". 2023. Available online: https://www.euromonitor.com/jeans-in-the-us/report (accessed on 25 October 2023).
14. Wang, L.; Xu, Y.; Lee, H.; Li, A. Preferred product attributes for sustainable outdoor apparel: A conjoint analysis approach. *Sustain. Prod. Consum.* **2021**, *29*, 657–671. [CrossRef]
15. Rahman, O.; Koszewska, M. A study of consumer choice between sustainable and non-sustainable apparel cues in Poland. *J. Fash. Mark. Manag. Int. J.* **2020**, *24*, 213–234. [CrossRef]
16. Brand, B.M.; Rausch, T.M. Examining sustainability surcharges for outdoor apparel using Adaptive Choice-Based Conjoint analysis. *J. Clean. Prod.* **2020**, *289*, 125654. [CrossRef]
17. Little, D. *Denim: An American Story*; Schiffer Publishing Limited: Atglen, PA, USA, 2007.
18. Cotton Incorporated Lifestyle Monitor. "Denim in 2022". 2021. Available online: https://lifestylemonitor.cottoninc.com/denim-in-2022/ (accessed on 25 October 2023).
19. Statista. Value of the Global Denim Jeans Market 2022–2030. 2023. Available online: https://statista.com/statistics/734419/global-denim-jeans-market-retail-sales-value/ (accessed on 25 October 2023).
20. Kazan, H.; Akgul, D.; Kerc, A. Life cycle assessment of cotton woven shirts and alternative manufacturing techniques. *Clean Technol. Environ. Policy* **2020**, *22*, 849–864. [CrossRef]
21. Vos, R.O. The Spatially Explicit Water Footprint of Blue Jeans: Spatial Methods in Action for Sustainable Consumer Products and Corporate Management of Water. *Case Stud. Environ.* **2019**, *3*, 1–14. [CrossRef]
22. Amutha, K. Environmental impacts of denim. In *Sustainability in Denim*; Woodhead Publishing: Cambridge, MA, USA, 2017; pp. 27–48.
23. Levi Strauss & Co. The Life Cycle of a Jean. 2015. Available online: https://www.levistrauss.com/wp-content/uploads/2015/03/Full-LCA-Results-Deck-FINAL.pdf (accessed on 25 October 2023).

24. Aguilar Johansson, I.; Björkner, M. Social Life Cycle Assessment of Denim Fabric Produced from Turkish Organic Cotton. 2022. Available online: https://odr.chalmers.se/server/api/core/bitstreams/88d2dce1-3c07-4060-a1b5-2fd64070ce78/content (accessed on 25 October 2023).

25. Köksal, D.; Strähle, J.; Müller, M. Social Sustainability in Apparel Supply Chains—The Role of the Sourcing Intermediary in a Developing Country. *Sustainability* **2018**, *10*, 1039. [CrossRef]

26. Navas, R.; Chang, H.J.; Khan, S.; Chong, J.W. Sustainability Transparency and Trustworthiness of Traditional and Blockchain Ecolabels: A Comparison of Generations X and Y Consumers. *Sustainability* **2021**, *13*, 8469. [CrossRef]

27. Agrawal, T.K.; Sharma, A.; Kumar, V. Blockchain-based secured traceability system for textile and clothing supply chain. In *Artificial Intelligence for Fashion Industry in the Big Data Era*; Springer: Singapore, 2018; pp. 197–208. [CrossRef]

28. Chakrabarti, A.; Chaudhuri, A.K. Blockchain and its scope in retail. *Int. Res. J. Eng. Technol.* **2017**, *4*, 3053–3056.

29. Beckwith, C. Fashion Blockchain Startups—A Survey of Players in The Field, Q1 2018. Available online: https://fashiontechguru. medium.com/fashion-blockchain-startups-a-survey-of-players-in-the-field-q1-2018-36727660bb14 (accessed on 10 November 2023).

30. Bagaholic, A. What Are Louis Vuitton Microchips? Bagaholic. 21 April 2021. Available online: https://lvbagaholic.com/blogs/ lv_bagaholic/what-are-louis-vuitton-microchips (accessed on 10 November 2023).

31. Rauturier, S. Can Blockchain Technology Make Fashion More Transparent?—Good on You. Good on You. 24 March 2023. Available online: https://goodonyou.eco/blockchain-technology-fashion-transparency/ (accessed on 10 November 2023).

32. Soler, C. Frank-Martin Belz and Ken Peattie: Sustainability Marketing. A Global Perspective. *J. Consum. Policy* **2010**, *33*, 425–426. [CrossRef]

33. Reynolds, T.M.; Olson, J.C. *Understanding Consumer Decision Making*; Psychology Press: London, UK, 2001. [CrossRef]

34. Allen, M.W.; Ng, S.H.; Wilson, M. A functional approach to instrumental and terminal values and the value-attitude-behaviour system of consumer choice. *Eur. J. Mark.* **2002**, *36*, 111–135. [CrossRef]

35. Lee, H.; Rothenberg, L.; Xu, Y. Young luxury fashion consumers' preferences in multi-channel environment. *Int. J. Retail. Distrib. Manag.* **2020**, *48*, 244–261. [CrossRef]

36. Joergens, C. Ethical fashion: Myth or future trend? *J. Fash. Mark. Manag. Int. J.* **2006**, *10*, 360–371. [CrossRef]

37. Ritch, E.L. Consumers interpreting sustainability: Moving beyond food to fashion. *Int. J. Retail. Distrib. Manag.* **2015**, *43*, 1162–1181. [CrossRef]

38. Pham, T.C.A.; Le, M.H.; Vu, T.K.O. Generation Z willingness to pay for sustainable apparel: The influence of labelling for origin and eco-friendly material. *J. Int. Econ. Manag.* **2020**, *20*, 42–59. [CrossRef]

39. Grewal, D.; Krishnan, R.; Baker, J.; Borin, N. The effect of store name, brand name and price discounts on consumers' evaluations and purchase intentions. *J. Retail.* **1998**, *74*, 331–352. [CrossRef]

40. Ambler, T.; Barrow, S. The employer brand. *J. Brand Manag.* **1996**, *4*, 185–206. [CrossRef]

41. Erlangga, H.; Erlangga, H. Did brand perceived quality, image product and place convenience influence customer loyalty through unique value proposition? *J. Contemp. Issues Bus. Gov.* **2021**, *27*, 2854–2867.

42. Rahman, O.; Fung, B.C.; Chen, Z. Young Chinese Consumers' Choice between Product-Related and Sustainable Cues—The Effects of Gender Differences and Consumer Innovativeness. *Sustainability* **2020**, *12*, 3818. [CrossRef]

43. Shen, B.; Wang, Y.; Lo, C.K.; Shum, M. The impact of ethical fashion on consumer purchase behavior. *J. Fash. Mark. Manag. Int. J.* **2012**, *16*, 234–245. [CrossRef]

44. Farra, E.; Fass, M. 15 Sustainable Denim Collections You Should Know About Now. Vogue. 2 January 2023. Available online: https://www.vogue.com/article/best-sustainable-denim-brands (accessed on 28 October 2023).

45. Park, H.J.; Lin, L.M. Exploring attitude–behavior gap in sustainable consumption: Comparison of recycled and upcycled fashion products. *J. Bus. Res.* **2018**, *117*, 623–628. [CrossRef]

46. Chi, T.; Ganak, J.; Summers, L.; Adesanya, O.; McCoy, L.; Liu, H.; Tai, Y. Understanding Perceived Value and Purchase Intention toward Eco-Friendly Athleisure Apparel: Insights from U.S. Millennials. *Sustainability* **2021**, *13*, 7946. [CrossRef]

47. Dobbelstein, T.; Lochner, C. Factors influencing purchase intention for recycled products: A comparative analysis of Germany and South Africa. *Sustain. Dev.* **2023**, *31*, 2256–2277. [CrossRef]

48. Luu, T.T.A.; Baker, J.R. Exploring Consumers' Purchase Intention of rPET Bottle-Based Apparel in an Emerging Economy. *J. Open Innov. Technol. Mark. Complex.* **2021**, *7*, 22. [CrossRef]

49. Choudhury, A.R. Development of Eco-labels for Sustainable Textiles. In *Textile Science and Clothing Technology*; Springer: Singapore, 2015; pp. 137–173. [CrossRef]

50. Richardson, A.; O'Higgins, E.; Center, P.D. B Corporation Certification Advantages? *Bus. Prof. Ethic J.* **2019**, *38*, 195–221. [CrossRef]

51. Gazzola, P.; Grechi, D.; Ossola, P.; Pavione, E. Certified Benefit Corporations as a new way to make sustainable business: The Italian example. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *26*, 1435–1445. [CrossRef]

52. Ranasinghe, L.; Jayasooriya, V. Ecolabelling in textile industry: A review. *Resour. Environ. Sustain.* **2021**, *6*, 100037. [CrossRef]

53. B Corp. B Corp Certification Demonstrates a Company's Entire Social and Environmental Impact. 2023. Available online: https://www.bcorporation.net/en-us/certification (accessed on 16 November 2023).

54. The Fairtrade Foundation. What Is Fairtrade?—Fairtrade Foundation. Fairtrade Foundation. 21 February 2023. Available online: http://www.fairtrade.org.uk/en/what-is-fairtrade (accessed on 16 November 2023).

J. Theor. Appl. Electron. Commer. Res. **2024**, *19*

411

55. Ma, Y.J.; Littrell, M.A.; Niehm, L. Young female consumers' intentions toward fair trade consumption. *Int. J. Retail. Distrib. Manag.* **2012**, *40*, 41–63. [CrossRef]

56. Eberhardt, T.; Hubert, M.; Lischka, H.M.; Hubert, M.; Lin, Z. The role of subjective knowledge and perceived trustworthiness in fair trade consumption for fashion and food products. *J. Consum. Mark.* **2020**, *38*, 58–68. [CrossRef]

57. Remme, A.-M.R.; Stange, S.-M.; Fagerstrøm, A.; Lasrado, L.A. Blockchain-enabled Sustainability Labeling in the Fashion Industry. *Procedia Comput. Sci.* **2022**, *196*, 280–287. [CrossRef]

58. Bajaj, A. Conjoint analysis: A potential methodology for IS research. In Proceedings of the Fifth Americas Conference on Information Systems (AMCIS), Milwaukee, WI, USA, 13–15 August 1999.

59. Carroll, J.D.; Green, P.E. Psychometric Methods in Marketing Research: Part I, Conjoint Analysis. *J. Mark. Res.* **1995**, *32*, 385–391. [CrossRef]

60. Roea, B.; Boyle, K.J.; Teisl, M.F. Using Conjoint Analysis to Derive Estimates of Compensating Variation. *J. Environ. Econ. Manag.* **1996**, *31*, 145–159. [CrossRef]

61. Orme, B.K. *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*; Research Publishers LLC: Madison, WI, USA, 2006.

62. Green, P.E.; Krieger, A.M.; Wind, Y. Thirty Years of Conjoint Analysis: Reflections and Prospects. *INFORMS J. Appl. Anal.* **2001**, *31* (Suppl. S3), S56–S73. [CrossRef]

63. Riesgo, S.B.; Codina, M.; Sádaba, T. Does Sustainability Matter to Fashion Consumers? Clustering Fashion Consumers and Their Purchasing Behavior in Spain. *Fash. Pract.* **2022**, *15*, 36–63. [CrossRef]

64. Jacobs, K.; Petersen, L.; Hörisch, J.; Battenfeld, D. Green thinking but thoughtless buying? An empirical extension of the value-attitude-behaviour hierarchy in sustainable clothing. *J. Clean. Prod.* **2018**, *203*, 1155–1169. [CrossRef]

65. Grazzini, L.; Acuti, D.; Aiello, G. Solving the puzzle of sustainable fashion consumption: The role of consumers' implicit attitudes and perceived warmth. *J. Clean. Prod.* **2020**, *287*, 125579. [CrossRef]

66. Schuitema, G.; de Groot, J.I.M. Green consumerism: The influence of product attributes and values on purchasing intentions. *J. Consum. Behav.* **2015**, *14*, 57–69. [CrossRef]

67. Abraham-Murali, L.; Littrell, M.A. Consumers' Conceptualization of Apparel Attributes. *Cloth. Text. Res. J.* **1995**, *13*, 65–74. [CrossRef]

68. Whang, H.; Ko, E.; Zhang, T.; Mattila, P. Brand popularity as an advertising cue affecting consumer evaluation on sustainable brands: A comparison study of Korea, China, and Russia. *Int. J. Advert.* **2015**, *34*, 789–811. [CrossRef]

69. Hustvedt, G.; Bernard, J.C. Consumer willingness to pay for sustainable apparel: The influence of labelling for fibre origin and production methods. *Int. J. Consum. Stud.* **2008**, *32*, 491–498. [CrossRef]

70. Statista. Mean Disposable Household Income in the United States in 2022, by Generation. 2023. Available online: https://www.statista.com/statistics/825883/us-mean-disposable-household-income-by-generation/ (accessed on 12 December 2023).

71. Dangelico, R.M.; Alvino, L.; Fraccascia, L. Investigating the antecedents of consumer behavioral intention for sustainable fashion products: Evidence from a large survey of Italian consumers. *Technol. Forecast. Soc. Chang.* **2022**, *185*, 122010. [CrossRef]

72. Starr, M.A. The social economics of ethical consumption: Theoretical considerations and empirical evidence. *J. Socio-Econ.* **2009**, *38*, 916–925. [CrossRef]

73. Priporas, C.-V.; Stylos, N.; Fotiadis, A.K. Generation Z consumers' expectations of interactions in smart retailing: A future agenda. *Comput. Hum. Behav.* **2017**, *77*, 374–381. [CrossRef]

74. Singh, J.J.; Iglesias, O.; Batista-Foguet, J.M. Does Having an Ethical Brand Matter? The Influence of Consumer Perceived Ethicality on Trust, Affect and Loyalty. *J. Bus. Ethic* **2012**, *111*, 541–549. [CrossRef]