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Original Article

Examining the Relationship Between Label Awareness and Eco-Consciousness in Clothing Consumption

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Abstract *- Eco and ethical labels play a crucial role in influencing customer behaviour and have become increasingly important in the rise of sustainable fashion in both academic study and industry practice. This study aimed to investigate the relationship between label familiarity, label knowledge, and eco-consciousness, specifically within the textile and clothing industry, among Singaporean consumers. Additionally, the study explored gender based differences in these variables. 102 participants completed an online survey to collect data, which was then analyzed using visual representation, independent t-tests, Levene's test, and Pearson correlation analysis to look at how these factors related to one another. The findings indicated that there is no statistically significant difference in the familiarity and knowledge of ethical and ecolabels between females and males. However, there was a significant difference in eco-consciousness, with females reporting higher eco-consciousness than males. Moreover, label familiarity is positively correlated with label knowledge. In addition, a small but significant and positive correlation exists between familiarity towards a label and eco consciousness. Eco-consciousness and label knowledge did not significantly correlate. These results confirm that the attitude-behavior gap in sustainable fashion still exists. The results highlight the need for Eco and Ethical label meanings to be communicated more clearly. This study emphasized how companies and policymakers can increase consumer trust and encourage more environmentally friendly buying habits.*

Keywords - *Eco-conscious, Ethical, Familiarity, Knowledge, Label.*

1. Introduction

1.1. General Background

The fashion and textile industry is known globally for using a lot of resources and polluting the environment. The industry used a considerable amount of synthetic fibres like polyester and nylon, which were usually created from petroleum and have been major sources of environmental damage and microplastic pollution [1]. Making polyester and other synthetic fibres takes a lot of energy and needs a lot of metal oxides and metal acetates, which release huge amounts of carbon dioxide [2]. Microfibres have been the most common type of microplastics found in wastewater and freshwaters. They are found in mussels, riverbed organisms, and the intestines of zooplankton. Nearly 35% of the microplastics in the ocean have been estimated to be generated from washing synthetic fabrics [3]. In the past 20 years, the production of these fibres have doubled. In 2020, synthetic fibres comprised 64% of overall fibre production [4]. The rise of fast fashion has contributed to problems like textile waste and unfair working conditions [5]. This leads to the industry being under increasing pressure to use more environmentally friendly and morally sound methods throughout the supply chains.

As people become more aware of the effects of fashion on the environment and society, both consumers and regulators urge for more openness and responsibility. People are becoming aware of the negative effects of clothing that are not as obvious, like pollution, unfair labour practices and excessive production. The increasing concerns additionally create more pressure on clothing companies to be more open about the company's morals when it comes to fast fashion waste and the working conditions in factories. Regulators are making the rules for ethical and sustainable sourcing clearer. In the same way, governments and regulatory bodies also engage in taking action. For example, on February 12, 2025, the U.S.A. brought back the Voluntary Sustainable Apparel Labelling Act. This law would have created a federal program for certifying and labelling sustainable clothing. It would also require the manufacturers to inform customers on how their products would affect the environment and encourage them to reduce their greenhouse gas emissions [6]. Around the globe, similar regulatory trends have begun to emerge that aim to boost sustainable production and consumption in the textile industry.

It is important to use tools like eco and ethical labels that inform people of the standards for Sustainability and ethics. "Ecolabels are certification marks awarded to products that meet defined environmental standards through their lifecycle, such as reduced resource use, low emissions, and responsible sourcing. [7]" The major role is to educate consumers on the ecological effects of their spending and to encourage environmentally friendly

consumption. Although ecolabels emphasize environmental Sustainability, they reflect only one facet of the bigger picture. “Ethical labels have concentrated on identifying products that have obeyed ethical criteria like remunerating workers with fair wages, complying with animal treatment standards and practicing environmentally sustainable procedures. [8]” They have also been key in advancing responsible consumption and occasionally supporting environmental and social justice. “Eco-ethical labels have brought together environmental and social criteria, labeling products that have passed higher criteria for Sustainability and ethical production right along the entire supply chain. [9, 10]”

Some types of certification labels are necessary to connect the goals of Sustainability with consumer behavior in the clothing sector. Those products satisfying rigorous environmental requirements, such as lesser emissions and efficiency of resource use, have been identified by the “Singapore Green Label [11]” and other green labels. Moreover, clothes produced with a minimum of 70% organic fibers have been certified by the “Global Organic Textile Standard (GOTS) [12]” that assess elements such as chemical toxicity and wastewater management in their production process. Conversely, ethical labels have sought to preserve workers’ rights and decent working conditions. For workers and farmers in developing countries, “Fairtrade International [13]” promised fair terms of trade, reasonable prices and good working conditions. They have promoted ethical sourcing by imposing norms that have averted child and forced labour, enabled sustainable production and community development. “WRAP (Worldwide Responsible Accredited Production) [14]” has promoted ethical, humane and legal production. By certifying companies that met its 12 principles, which covered worker rights, health, safety, and legality, it ensured that safe sewn goods were manufactured. A few labels merged ethical and environmental standards, such as B Corporation (B-Corp) and Bluesign. The “B-Corp [15]” is being awarded to companies that meet rigorous accountability, transparency, and social and environmental performance standards. “Bluesign [16]” has certified clothing suppliers and producers to ensure greater Sustainability and secure production. Its central aims are water waste reduction, reduction of dye toxicity, and worker and consumer safety. These labels all vary with regard to their objectives, but ultimately lead producers and consumers to be in a position to make more responsible choices.

1.2. Literature Review

Fashion sustainability has been extensively researched, particularly concerning the influence of ecolabels on consumer behavior. A research study carried out in Italy focused on exploring the influence of certified ecolabels on consumer attitudes, purchase intentions, and willingness to purchase sustainable clothing [17]. Utilizing an online questionnaire administered through Google Forms, the study collected more than 250 responses based on a 5-point Likert scale. The data gathered were analyzed using chi-squared tests, ANOVA, Kruskal-Wallis tests, Levene’s tests, and multiple regression to analyze the impact of awareness and knowledge on consumer decision-making. The findings showed that more sustainability-conscious consumers are more likely to pay a price premium, and certified ecolabels also build brand reputation and loyalty. It also determined a high correlation between consumers’ awareness of social and environmental concerns and how willing they are to pay extra for sustainable fashion products. However, the study established that most consumers are unaware of ecolabels, highlighting the importance of education and transparency. It also noted that women, as well as higher-education participants, showed more positive attitudes towards ecolabels. Research carried out in Lithuania to explore the impact of environmental, ethical, and durability cues on the effectiveness of ecolabels produced similar findings [18]. Information was gathered from 446 participants with an online questionnaire developed through Apklausa and shared via Facebook. The data were computed utilizing regression and correlation models in SPSS to determine associations between ecolabel cues and outcome behaviour. The results revealed that ethical and environmental cues significantly influenced consumers’ purchase intention and willingness to purchase sustainable clothing. While still pertinent, durability cues had a smaller impact. It also revealed that demographic aspects - namely gender, purchasing frequency, and consumption patterns of sustainable products - were the most powerful determinants of consumer attitudes toward ecolabels.

On the other hand, a study conducted in India explored whether ecolabels significantly influenced apparel consumption decisions, with a specific focus on how age and gender impact dependence on sustainable labelling [19]. This study employed a self-administered online survey, where 198 female and 111 male consumers rated the significance of 20 apparel-related cues, including ethical and ecolabels, on a 5-point Likert scale ranging from “strongly agree” to “strongly disagree”. Analysis of the data involved using SPSS Statistics 26, applying ANOVA, independent t-tests, and paired-sample t-tests. The study discovered that Sustainability is a secondary consideration in purchasing decisions. Even though ecolabels are more well-known to younger consumers, personal tastes, fit, comfort, and affordability were more influential factors. Overall, the study concluded that Indian consumers are more usually value-oriented, and even though ecolabels are trusted, they are lower on their list of priorities. On the contrary, a study in Thailand researched how consumer trust and knowledge in ecolabels may influence willingness to pay a price premium for eco-labeled apparel [20]. Adopting a quantitative research approach, researchers collected data using an online survey with participation from 386 respondents. The data were analyzed through IBM SPSS Statistics, employing descriptive statistics, t-tests, regression analysis, and factor analysis. The results showcased that trust in third-party approved ecolabels highly affected and improved the rate of willingness to pay a premium compared to those with

self-declared ecolabels, highlighting the role of certification in reducing concerns regarding greenwashing. Conversely, ecolabel knowledge had a minimal or no impact on consumer willingness to pay. Trust was identified as the most significant factor among the tested variables influencing purchase, highlighting credibility and openness as crucial aspects of sustainable branding.

A Turkish research study utilized the Theory of Planned Behaviour to investigate the influence of social norms, attitude, and perceived behaviour control on sustainable fashion consumption [21]. Researchers gathered data from 339 participants in Turkey via an internet questionnaire, which was analyzed via confirmatory factor analysis and structural equation modeling. The outcomes brought out the fact that attitudes best predicted purchase intention, while perceived behavioural control had little impact on sustainable purchases. Social pressures were more significant in the original Theory of Planned Behaviour Model. But in the extended model, attitudes were influenced by behavioral beliefs, while control beliefs had no effect on perceived control over behavior. Social pressure and normative beliefs are found to have functioned in harmony, influencing purchasing intention. With regards to sustainable fashion consumption, the Theory of Planned Behaviour has been found applicable and valid. In a similar line of reasoning, a research examined the impact of ecolabels in the Fast-Moving Consumer Goods (FMCG) sector in Bangkok, focusing on the marketing mix (product, price, place, promotion), perception, climate change attitudes, and the value consumers place on eco-labeled goods [22]. The study utilized a quantitative approach with a sample of 400 participants from a convenience sample. Data analysis employed multiple regression models alongside descriptive statistics. Results indicated that ecolabels were predominantly driven by price and product quality, while place and promotion had limited impact. Climate change concern was a significant predictor of purchase, and, in general, the concern for environmental responsibility had minimal impact on consumer purchase behavior. This study showed that purchase decisions are impacted positively by fundamental attributes and perceived quality, and negatively by external attributes. Based on these results, businesses can center their strategies on the product's value and price structure rather than ecolabel awareness.

A study in the Netherlands focusing on the credibility of ecolabels determines the impact certified and non-certified ecolabels have on customers' perception of product quality [23]. Using a 3 x 1 experimental design, the 111 Dutch consumers analyzed apparel with certified and non-certified ecolabels, and the perceived quality ratings of blazers and T-shirts were merged for analysis. The study measured ecolabel credibility–trust, honesty, and expertise–along with perceived quality, which included workmanship, durability, and overall quality. The study also applied mediation analysis using the PROCESS macro in SPSS to evoke credibility of ecolabels and the mediation effect, and applied ANOVA to compare perceived quality and credibility of ecolabels across their categorical levels. The conclusion of this research is that ecolabels do emphasize the perceived quality of garments, although certified labels were recognized as more believable, trustworthy, and had a greater impact on the perception of quality. The study supports the notion that the absence of a third-party assurance erodes consumer trust, which means that brands should focus on providing straightforward and trustworthy declarations on sustainability promises. The effect of social responsibility and demographic factors on buying decisions was the focus of the study [24] on the environmentally labeled fashion products. The study collected data using an online survey in which respondents provided answers on a 5-point Likert Scale. The data was analyzed in SPSS Statistical Software, which performed correlation and regression modeling to determine the relationships between the variables. The results showed that income, gender, and education had insignificant impacts on the likelihood of purchasing eco-labeled fashion. However, younger consumers were more inclined to buy eco-labeled fashion. Although consumers acknowledged the importance of certified eco labels, quality and branding strongly influenced purchasing decisions. Furthermore, the study suggested that social and ethical responsibility significantly shape consumer perspectives on ecolabels, while fashion trends exert little influence on purchasing behavior. In addition, consumers were willing to pay more for eco-labeled products, expressing contentment with their environmentally friendly purchases. The study found, however, that the majority of respondents were unfamiliar with many ecolabels, highlighting the need for educational initiatives to support future growth.

A New Zealand-based research study explored the impact of varying formats of ethical labels on consumer purchase behavior [25], where the authors used an experimental design with 400 young female consumers who assessed fast-fashion clothing textiles. These textiles bore the Tearfund complex ordinal ethical rating label, a generic binary or no label. The analysis used fractionally replicated 4 x 5 Latin Squares and ANOVA to measure differences in purchase intentions across the various treatments. The results showcased that the literal presence of an ethical label, no matter if it indicated high or low ethical performance, significantly increased purchase intent for fast-fashion items compared to garments with no label. Consumers also demonstrated little to no ability to differentiate correctly between higher or lower ethical ratings on the ordinal scale. Instead, the label itself was interpreted heuristically, functioning similarly to a binary cue (present/absent), rather than through detailed cognitive processing of its meaning. The study argues that these results reflect the low-involvement, heuristic decision-making typical in fast fashion and fast-moving consumer goods markets.

In contrast, complex label formats that need active interpretation may be less effective than simple, iconic

cues in these settings. This finding underlines the importance of label designs that align with consumer processing styles. This also suggests that binary or highly recognizable labels may be more effective at influencing consumer behaviour in fast-fashion environments. Apart from eco and ethical labels, a study [26] offers a contrasting perspective by shifting the focus from labelling to brand-related influences in consumer purchasing decisions. They studied the impact of brand attachment, brand image, and environmental effects on consumer purchasing decisions in the clothing industry in Sahiwal, Pakistan. The researchers collected data from 150 respondents, such as university students and consumers, through a quantitative approach and a self-designed questionnaire. Methods included descriptive statistics, correlation analysis, and multiple regression. The results demonstrated that among the 3 factors examined, only brand attachment had a moderately positive and statistically significant relationship with purchase decisions. In contrast, brand image showed a weak and statistically insignificant relationship, and environmental effects were found to have a weak and negative influence. Moreover, it is showcased that 47% of the differences in purchase decisions could be explained by these factors. The study concluded that consumers in Sahiwal prioritize loyalty toward specific brands over broader brand image or social and environmental influences when making clothing purchases. Price sensitivity was also highlighted as an important consideration, as respondents were willing to switch brands if product costs increased. The study notes a limitation of the confined sample from Sahiwal and recommends expanding the research for broader generalisability. This research starkly contrasts with studies where environmental and ethical factors have played key roles, leading to the realization of the contextual nature of consumer decisions in fashion markets.

In line with research showing that the impact of labels on consumer behaviour can differ depending on the context, a study carried out in Slovenia looked at consumers' awareness, identification, and consideration of ecolabels when buying clothes, as well as their willingness to pay extra for eco-labeled clothing (Žurga & Forte Tavčer, 2014) [27]. In the study, 535 consumers (80% female, 20% male) of all ages and educational backgrounds responded to a structured online questionnaire utilized during the study. Descriptive statistics were used to analyze the data in order to evaluate purchasing patterns, ecolabel awareness, and self-perceived eco-consciousness. The findings showed that although the majority of respondents had seen ecolabels like the EU Ecolabel (81%) and Oeko-Tex Standard 100 (89%), their actual understanding of their meaning was limited, with up to 72% of them failing to correctly identify some labels' purposes. When buying clothing, only 21% of consumers took ecolabels into account; more important considerations were price, material composition (83%), and fashion trends (59%). Only 5% of respondents were willing to pay more than 20%, and nearly half (47%) were willing to pay up to 10% more for eco-labeled apparel. The primary justifications for paying more were environmental protection (38%) and health concerns (43%). The most willing to pay a premium were middle-aged, highly educated women, which is consistent with demographic trends observed in previous research. In order to promote the consumption of sustainable clothing, the researchers suggested more transparent labelling systems, stricter oversight of eco-related claims, and enhanced consumer education. They came to the conclusion that low knowledge and moderate trust undermine the effectiveness of ecolabels in shifting consumer behaviour.

Building on these conclusions, a study conducted in Malaysia looked at how gender differed in perceived consumer effectiveness, ecologically conscious consumer behaviour, and environmental concern (Ramly et al., 2012) [28]. Self-administered questionnaires on a 7-point Likert scale were used to collect responses from 319 participants in a nationwide survey. Multiple regression and independent t-tests were used to analyze the data in SPSS. The study revealed that even though both men and women displayed strong positive attitudes toward environmental issues, notable differences emerged in perceived consumer effectiveness, with female consumers scoring higher. Additionally, women were more likely to recycle, buy energy-efficient appliances, and choose less harmful products, among other environmentally conscious practices. Importantly, the findings showed that perceived consumer effectiveness was the most powerful indicator of environmentally conscious behaviour across genders. These results highlight the importance of personal belief in one's ability to change issues, implying that cultural norms and gender socialization may influence pro-environmental behaviour. This study provides a useful comparative perspective for research in Singapore by highlighting the larger behavioural and attitudinal habits that support sustainable consumption in Southeast Asia, though it is not specifically focused on sustainable labelling.

1.3. Research Gap & Rationale for Study

Although a lot of research has looked at how ecolabels affect consumer behaviour, little of it has specifically delved into the relationship between eco-consciousness and label familiarity and knowledge. Although trust, label credibility, and demographic factors like age and gender have all been examined previously, only a few studies have targeted the relationship between a consumer's environmental values and their actual knowledge and understanding of eco and ethical labels. Furthermore, although gender has been shown to contribute to attitudes towards Sustainability, its function in influencing familiarity and knowledge of ecolabels has not received a lot of attention. This shows an apparent absence of knowledge about the interactions between all three of these factors, particularly in a Southeast Asian setting like Singapore, where sustainable fashion is growing but under-researched.

The rationale of this study is to better understand the disconnect between growing sustainability awareness and inconsistent consumer action, especially as the presence of eco and ethical labels and sustainable fashion is becoming more prevalent in society. As the number of sustainable options increases, many consumers still place a higher value on brand and price than ethics, frequently because they are unclear about what labels represent. This research provides a spotlight on the behavioural and cognitive obstacles that keep sustainable intentions from transforming into action by examining the relationship between eco-consciousness and familiarity and knowledge of specific labels, as well as whether these relationships differ between genders. This research seeks to assist companies in enhancing consumer communication, fostering trust, and increasing the success of eco and ethical labels in translating consumer awareness to action.

2. Methodology

2.1. Research Aim and Objective

This study examines how eco and ethical labels affect consumer purchasing decisions in Singapore's fashion and textile sector.

- The study specifically focuses on how someone's familiarity with and knowledge of eco and ethical labels relate to their level of eco-consciousness.
- Additionally, it explores whether significant gender-based differences exist across these three factors.
- Moreover, the research explores the other factors that influence the purchasing of textiles.

In order to inform more effective strategies for promoting responsible consumer behaviour, this study gives insight into how sustainability communication tools are perceived and understood by addressing these objectives.

2.2. Research Hypotheses

The following null hypotheses have been formed to assess this study's aim.

H_1: There is a significant difference in the familiarity of labels between females and males.

H_2: There is a significant difference in knowledge of labels between females and males.

H_3: There is a significant difference in eco-consciousness between females and males.

H_4: There is a significant correlation between label familiarity and label knowledge.

H_5: There is a significant correlation between eco-consciousness and label familiarity.

H_6: There is a significant correlation between eco-consciousness and label knowledge.

2.3. Scale and Tools used for the Analysis

These variables allowed for segmentation and deeper analysis of purchasing motivations across different socioeconomic groups. To measure overall environmental concern, Section 2 utilized a Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree). The survey presented participants with a series of 9 statements adapted from a quantitative study [27]. The scale's reliability is supported by typical Cronbach Alpha scores between 0.730 and 0.784, indicating that it is reliable. Section 3 evaluated the importance of 13 different cues influencing fashion-based purchases, using a 5-point scale (1 = Unimportant to 5 = Very Important). These cues were adapted from another research [19] and included both traditional product attributes (colour, style, durability, comfort, garment fit, fabric, quality, longevity, brand, country of origin, and price) and sustainability-related factors (certified eco-friendly and ethical labels). This enabled direct comparison of how sustainability considerations weigh against more conventional purchasing drivers. Section 4 assessed participants' familiarity with Eco labels, Ethical labels, Eco-ethical labels, and Random labels using 8 logos. The Eco labels included the Singapore Green Label and the Global Organic Textile Standard (GOTS). Ethical labels included Fairtrade International and Worldwide Responsible Accredited Production (WRAP). Eco and Ethical labels included Bluesign and B-Corporation. Random labels included OEKO-TEX Standard 100 and ISO 9001. The 8 logos were ordered randomly in this section of the survey, with the question "Are you familiar with this label?" as its caption. The answer box was multiple choice, with the participant able to choose "Yes" or "No." This section aimed to measure baseline consumer awareness and recognition of sustainability, ethical, and random-focused certification labels. In Section 5, respondents were again shown the same 8 logos and asked to classify each as an ecolabel, ethical label, combined eco-ethical label, or random label. This tested not only recognition, but also the depth of consumer knowledge and understanding about the purpose and significance of each certification.

2.4. Data Collection Procedure

The data for this study were collected by utilizing an online survey created using Google Forms. The link to the survey was distributed widely across multiple digital platforms, including email, WhatsApp, and Social Media apps, aiming to reach a diverse demographic of respondents in Singapore. This Data collection procedure ensured accessibility and convenience for participants, allowing for efficient and anonymous data collection. All responses were automatically recorded and securely stored within the Google Forms system for subsequent analysis.

2.5. Sampling and Sample Characteristics

This study has used convenient and targeted sampling to collect the data. In total, 102 valid responses were collected for this study. The distribution of gender was nearly balanced, with 52.4 percent identifying as female and 47.6 percent as male. This sample was predominantly young, with the largest age group being 16-19 years old (37.9%). Smaller portions were distributed across other ages, with representation spanning from 15 years to 62 years, though the majority were concentrated in the late teens and early twenties. In terms of educational attainment, 47.3 percent of respondents were in High School, 28.2 percent completed a Bachelor's Degree, and

19.4 percent had a Master's Degree. Other qualifications, such as a Doctorate, Professional Degree, and specialized studies, accounted for less than 5% of the sample.

Regarding employment status, 35.9 percent of participants identified as students, while 34 percent were employed full-time. Smaller groups included those not working (9.7 percent), part-time employed (6.8 percent), self-employed (10.7 percent), and others (less than 5 percent). For annual income, 40.8 percent of respondents are not earning, and 30.1 percent earned below SGD 200,000. Those earning between SGD 200,000 and SGD 499,999 comprised 18.4 percent, with higher income brackets making up the remainder. When asked about apparel spending, over half (52.4 percent) indicated they spend less than 5% of their income on apparel annually, while 31.1 percent spend 5-10 percent of their annual income. The remaining respondents reported higher spending proportions, with only a small minority allocating more than 15 percent of their income to apparel.

2.6. Statistical Tools and Techniques

A combination of statistical tools and techniques was used to examine consumer familiarity, knowledge, and eco-consciousness with various textile labels. The graphical representation (Figure 1) presents a bar chart that compares participants' familiarity with and knowledge of 8 textile certification labels. This chart helps highlight recognition patterns across specific labels. These visual trends helped to identify gaps in public awareness. Levene's test was employed to understand whether the differences in results between male and female participants were equal for each of the three variables: label familiarity, label knowledge, and eco-consciousness. The Null Hypothesis (H_0) assumes that the variances of the two groups are equal. Suppose the p-value > 0.05; equal variance is assumed. Additionally, using Levene's test ensures the correct version of the t-test is applied (equal or unequal variances). Independent t-tests were used to assess gender-related differences in the three main variables. Its purpose was to compare the mean values between females and males in this study. The Null Hypothesis (H_0) assumes that there is no statistically significant difference in means between the genders. At a 10% significance level ($\alpha = 0.10$), the null hypothesis is rejected if $p < 0.10$. Pearson's correlation was utilized to measure the strength and direction of linear relationships between the three main variables and explore their association. R-values range from -1 to +1. Values closer to ±1 indicate stronger linear relationships. A relationship is considered statistically significant if $p < 0.10$. These tools provided extensive insight into consumer behaviour, awareness, and attitudes toward eco, ethical, eco-ethical, and random certification labels in Singapore.

2.7. Ethical Considerations

To protect the privacy of all participants, this study ensured complete anonymity throughout the data collection and analysis process. During the data collection process, no personally identifiable information, including names, phone numbers, or IP addresses, was collected. Responses submitted via Google Forms were automatically recorded without linking to individual identities. Before starting the survey, each participant was given an informed consent statement that specified the purpose of the study, the voluntary nature of participation, and that they could withdraw at any time without consequences. Confidentiality was strictly maintained as all data was used only for academic purposes, not shared with third parties, and securely stored with access limited to the primary researcher. Results are reported solely in aggregate form, making sure that no individual can be identified from the findings.

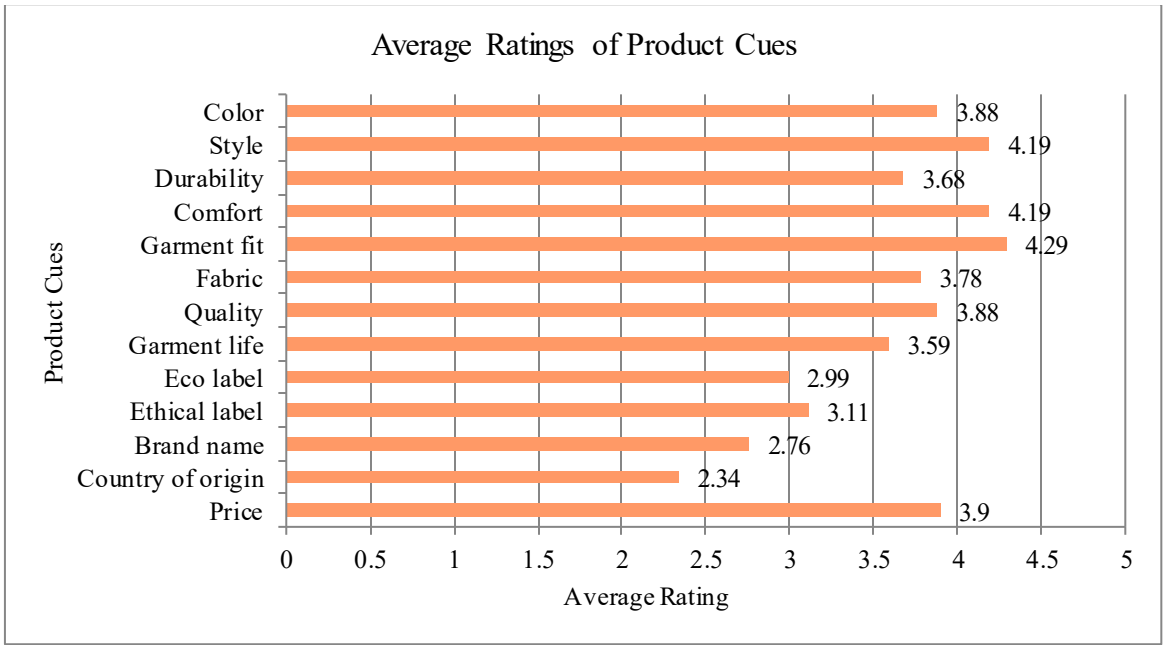

Fig. 1 Average Ratings of Product Cues

3. Results

Figure 1 illustrates the average ratings assigned by respondents to various product cues that influence their clothing purchases. Among the features evaluated, garment fit (4.29), style (4.19), and comfort (4.19) stood out as the most important factors, indicating that consumers prioritize how well the clothing suits their body, its aesthetic appeal, and the overall wearing experience. These attributes play a central role in moulding purchase decisions. On the other hand, factors such as the country of origin (2.34), brand name (2.76), and the presence of certified ecolabels (2.99) or ethical labels (3.11) were rated significantly lower. This suggests that while Sustainability and brand recognition may be relevant, they are secondary to practical and personal attributes like fit and comfort in influencing consumer behavior. Moreover, this can also be attributed to familiarity with and knowledge of these labels, which is discussed in a subsequent section.

Figure 2 presents participants' familiarity with and self-reported knowledge of eight textile-related product labels. The biggest percentage of responders (58.82%) were familiar with the Fairtrade International label. This was followed by the Singapore Green Label (29.41%) and ISO 9001 (46.08%). In contrast, respondents were least familiar with OEKO-TEX® Standard 100 (7.84%) and Bluesign (4.90%), indicating that the sample was not well-informed on these certifications. Notably, the percentages for familiarity and knowledge did not always align. Despite its lower familiarity rate, 63.73% of respondents were able to comprehend the Singapore Green Label. Similar patterns were observed for WRAP (Worldwide Responsible Accredited Production) and the Global Organic Textile Standard (GOTS), with knowledge rates of 24.51% and 40.20%, respectively, compared to lower familiarity levels of 10.78% and 14.71%. This implies that some participants, who might not be able to identify the label name right away, can nonetheless comprehend its meaning or purpose when the logo is displayed. However, even while familiarity was higher at 7.84%, OEKO-TEX® Standard 100 had one of the lowest knowledge rates at 0.98%. This disparity was also seen in Bluesign, where 4.90% of respondents recognized the label and 6.86% claimed knowledge. The information reveals a gap between understanding and awareness. Even while certain labels have strong visibility, customers may not always understand them. On the other hand, the audience for a few specialized certificates seems to be smaller but well-informed. This distinction is important to marketing strategies as well as educational initiatives since it emphasizes how crucial it is to make sure that consumers understand what the labels mean, in addition to raising label awareness.

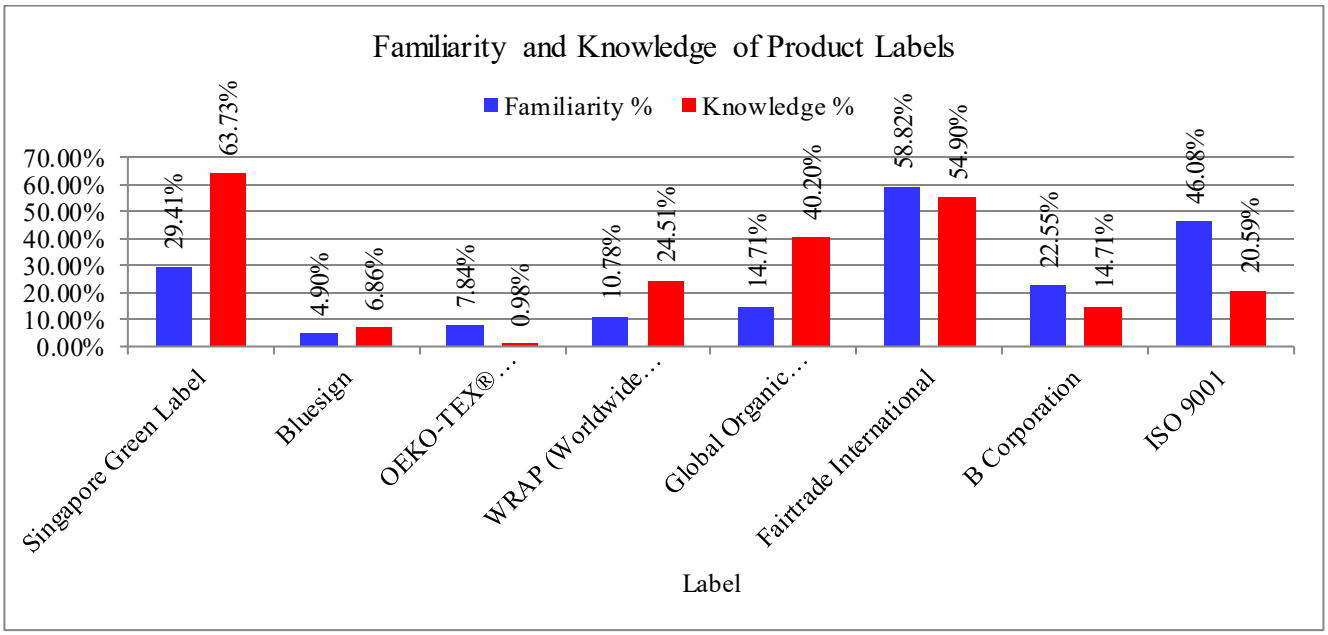

Fig. 2 Familiarity and Knowledge of Product Labels

Table 1. Gender Differences in Label Familiarity, Knowledge, and Eco-Consciousness

Hypotheses	Group	N	Mean	SD	Levene's test p-value	t-value	T-test's p-value
LF_F - LF_M	LF_F	54	2.13	1.57	0.875	1.24	0.219
	LF_M	48	1.75	1.52			
LK_F - LK_M	LK_F	54	2.19	1.36	0.661	-0.65	0.52
	LK_M	48	2.35	1.28			
EC_F - EC_M	EC_F	54	33.59	5.4	0.903	1.75	0.083*
	EC_M	48	31.71	5.44			

** represents $p<0.1$*

Table 1 displays the outcomes of independent samples t-tests performed to investigate gender-based differences in three variables: label familiarity (LF_F for females and LF_M for males), label knowledge (LK_F for females and LK_M for males), and eco-consciousness (EC_F for females and EC_M for males). The assumption of equal variances was evaluated for each hypothesis using Levene's test, and the means of the male and female participants were assessed using a t-test.

Levene's test determines if the two groups' variances are statistically equal. For the t-test, it is assumed that equal variances exist if the p-value of Levene's test is higher than 0.05. Since all three hypotheses in this analysis show p-values for Levene's test above 0.05 ($p\text{-value}_{LF}$ = 0.875, $p\text{-value}_{LK}$ = 0.661, $p\text{-value}_{EC}$ = 0.903), equal variances are assumed in each situation. To determine whether the mean differences between two groups are statistically significant, the t-test is applied. The null hypothesis is rejected at a 10 percent level of significance if the p-value is less than 0.1, implying a significant difference between the two groups.

For hypothesis 1 (LF_F - LF_M), the p-value (0.219) for the T-test is greater than 0.10; hence, the null hypothesis is not rejected. Therefore, there is no statistically significant difference in familiarity with the labels between females and males. The mean score for females was marginally higher (m = 2.13, s.d. = 1.57) than for males (m = 1.75, s.d. = 1.52), but this difference is not significant. Similarly, for Hypothesis 2 (LK_F - LK_M), the t-test's p-value (0.52) is significantly higher than the usual significance levels. Therefore, the null hypothesis is not rejected, implying no noticeable distinction exists in the knowledge of labels of male (m = 2.35, s.d. = 1.28) and female (m = 2.19, s.d. = 1.36) participants. Therefore, it can be depicted that both females and males are not familiar with ecolabels and ethical labels. Moreover, neither group has enough knowledge regarding these types of labels. Contrarily, as seen in the table, the t-test's p-value for hypothesis 3 (EC_F - EC_M) is 0.083, greater than 0.05 but less than 0.10, meaning the null hypothesis is rejected at the 10% significance level. This suggests a statistically significant difference in eco-consciousness between females and males. The average values suggest that females reported higher eco-consciousness (m = 33.59, s.d. = 5.4) than males (m = 31.71, s.d. = 5.44). Hence, females tend to exhibit higher levels of environmental consciousness compared to males. To assess the relationship between the three variables, correlation coefficients have been estimated in the following section.

Table 2. Pearson Correlation Coefficients Between Eco-Consciousness, Label Familiarity, and Label Knowledge

Variables	Statistics	Eco- consciousness	Label familiarity	Label knowledge
Eco-consciousness	**Correlation**	1	0.17	0.06
	p-value		0.095*	0.575
Label familiarity	**Correlation**	0.17	1	0.24
	p-value	0.095*		0.014**
Label knowledge	**Correlation**	0.06	0.24	1
	p-value	0.575	0.014**	

*** represent p<0.05 and * represents p<0.1*

Table 2 presents Pearson correlation coefficients between eco-consciousness, label knowledge, and label familiarity. At the 10% level of significance, there is a weak positive correlation (r = 0.17, p = 0.095) between eco-consciousness and label familiarity. This implies that as eco-consciousness increases, familiarity with labels also increases, and vice versa. However, as depicted from the table, the non-statistically significant association between eco-consciousness and label knowledge (r = 0.06, p = 0.575) suggests that there is a negligible correlation between eco-conscious attitudes and knowledge of ecolabel and ethical labels. Lastly, at the 5% level, there is a significant association (r = 0.24, p = 0.014) between label familiarity and label knowledge. This suggests a weak but statistically significant positive correlation, demonstrating that those who are more accustomed to an environment-conscious lifestyle also tend to know slightly more about the labels.

4. Discussion

The results of the study showed no apparent gender disparities in label familiarity or knowledge, indicating that male and female consumers are exposed to ecolabels and ethical labels at similar levels in their everyday contexts, such as product packaging or online retail platforms. Just seeing labels, however, does not always translate to understanding. Hence, there is a gap between recognition and educated interpretation, as many consumers might recognize the presence of a label without understanding its meaning or credibility [30]. Given that labels by themselves are inadequate to promote sustainable behaviour, this study underscores the need for clearer and conveniently accessible education concerning the meanings of various labels. On the contrary, the study discovered that females had significantly higher eco-consciousness results, which is consistent with prior studies linking female consumers to more value-driven and environmentally conscious purchasing behaviours [31], agreeing with research by C. Fisher, S. Bashyal, and B. Bachman (2012), showing that females are more likely to express pro-environmental practices. This illustrates the effectiveness of using values-based marketing techniques that align with environmental responsibility. Furthermore, repeated exposure to labels could potentially promote improved understanding, as seen by the small but significant positive relationship found between label

familiarity and knowledge [32]. However, the lack of a significant relationship between eco-consciousness and label understanding suggests that even those who care about the environment may not possess the knowledge or resources necessary to properly interpret sustainable certifications [33]. By combining emotional appeal with useful information on the relevance and credibility of labels, initiatives can shift consumers from passive concern to informed actions. This will be necessary to close this behaviour gap.

A recurring problem among consumers, regardless of their gender, is a general lack of awareness and comprehension of eco and ethical labels [34], aligning with research by K. Laitala and I. G. Klepp (2013), which acknowledges that, in general, knowledge surrounding textile ecolabels is minimal. Recognizing labels and interpreting their meaning are both impacted by this gap in knowledge. Firstly, there are hundreds of ethical and eco labels in the world, each with a distinct set of standards and certification processes [35]. This abundance creates confusion and makes it even more difficult for the typical consumer to comprehend or differentiate between them. Moreover, it may cause the eco or ethical label to lose its credibility [36]. Secondly, many eco and ethical labels do not offer enough clarity in their standards and may give too much or too little information about the label [37]. This lack of transparency affects a consumer's ability to make responsible decisions while purchasing. Thirdly, there is a general lack of knowledge or exposure to what different eco and ethical labels represent specifically [38]. This knowledge is not commonly taught or promoted in everyday settings, which means that there may be equally low recognition and comprehension of these labels for both genders. Furthermore, the uniform experience with sustainability messaging across platforms in Singapore may also be the reason for the lack of statistically significant gender differences in consumers' familiarity and knowledge of eco and ethical labels. In Singapore, national environmental campaigns are usually spread through public outreach, schools, and government-supported media channels that equally reach females and males [39]. However, there is limited knowledge distribution regarding eco and ethical labels in the textile industry.

Along with this, consumers usually purchase from the brands they are familiar with, which have provided them with satisfactory outcomes, regardless of gender [40]. This suggests that label familiarity, meaning recognition and understanding of brand labels (including sustainable clothing labels), is equally distributed among both genders. It is found that both female and male customers tend to showcase similar habits of buying clothing from recognizable brands [40], aligning with our findings that brand recognition and interaction with sustainable clothing labels are not inherently gendered. Furthermore, while factors like colour, style, durability, comfort, fit, fabric, quality, and garment life are important in influencing preferences and purchasing decisions, they do not directly affect the underlying awareness or familiarity with clothing labels [41]. Hence, preferences in fashion are dependent on the product cues rather than the labels and environmental factors. These fashion preferences are related to product selection rather than to actual knowledge of what a sustainable label represents.

In this study, regarding clothing purchases, Figure 1 shows that consumers of any gender place the highest value on tangible and practical product cues, including garment fit, style, comfort, colour, fabric, and quality. On the other hand, sustainability-related cues, including certified ecolabels and ethical labels, have lower average ratings, suggesting that most respondents do not consider them to be critical when making decisions right away. This general trend indicates that consumer preferences are dominated by personally relevant and useful aspects, and may take priority over abstract or less familiar attributes like ecolabels or brand reputation. The little variance between females and males in terms of label familiarity and knowledge may also be caused by the emphasis on practical product features. Both groups may be similarly restricted in their exposure to ecolabels and ethical labels, even if they offer an interest toward environmental and social labelling [42], or if they place greater emphasis on fit, comfort, and style than on sustainability indicators. Research indicates that over 30% of consumers prioritize factors such as price/value, size/fit, quality, convenience of purchase, and materials, compared to 8% of respondents who picked environmental factors as more important [43]. Further research suggests that although some consumers show interest in sustainable clothing and environmental concerns, most are unwilling to sacrifice practical factors, including price, style, or quality, even if they support Sustainability in theory. For many consumers, fashion trends and peer opinion outweigh sustainability indicators [44]. Therefore, although Sustainability may matter to some consumers, it remains secondary to practical and personal preferences for both females and males when it comes to purchasing attitudes and decisions. Consequently, there is no noticeable increase in the familiarity or comprehension of these labels for either gender.

Furthermore, a factor that influences the label familiarity and knowledge is the environmentally conscious behaviour of an individual. The results showed that there is a notable disparity in eco-consciousness, with females reporting higher eco-consciousness scores than males. This is in accordance with a significant amount of research by Z. Zhao, Y. Gong, Y. Li, L. Zhang, and Y. Sun (2021) and Y.-H. Tien and J. Huang (2023) demonstrating that females are more likely than males to exhibit eco-friendly activities, express stronger green consumption intentions [45, 46] - plastic ban policies, using a recyclable bag for shopping, etc. [47] -, and purchase more eco-friendly products [45], including sustainable apparel made from environmentally friendly fabrics. Studies have further confirmed that female consumers' purchasing choices are

decided because of environmental concerns and intention [47, 48].

Females may also choose to purchase eco-friendly clothing because of fashion or quality of the piece, and may possibly express an enthusiastic attitude toward eco-friendly products due to the idea of strengthening their ethics and self-identity [45]. Females tend to understand and have deep concern for the ecological impacts of unsustainable clothing rather than only functionality or price, and they engage more in sustainable consumption practices such as purchasing second-hand or vintage clothing, swapping, redesigning, and extending the lifecycle of apparel [49].

The relationship between label familiarity and label knowledge is explained by the correlation analysis. Label familiarity and knowledge have a slight but statistically significant link ($r = 0.24$, $p = 0.014$). This implies that as familiarity with a label increases, the individual is more likely to know that label. This finding can be validated by research by L. M. S. Miller and D. L. Cassady (2015), which showed that more exposure to ecolabels or ethical labels tends to improve consumers' comprehension of their meaning and purpose [50]. Individuals are more likely to engage with, inquire about, or investigate a label when familiar with it, enhancing their knowledge. Moreover, according to the Knowledge-Attitude-Behaviour (KAB) model, this is supported by the idea that knowledge that has been gathered from repeated exposure and experience can affect attitudes and, eventually, behaviour [51].

According to the mere exposure theory, even if information is viewed passively, people are more likely to process and remember it after seeing it repeatedly [52]. Labels that consumers see on goods, packaging, or advertisements on a regular basis become more recognizable and are more likely to trigger active processing and learning. This effect explains why people prefer things they have been exposed to frequently, even if the exposure is brief and does not capture their entire attention [53]. Frequent exposure enhances familiarity and likeability; initial exposures are especially effective at developing recognition.

According to marketing research, repeated exposure also improves brand recall and cognitive association. Ecolabels are more likely to become cognitively embedded if they are regularly encountered, especially if they are linked to environmental or ethical messaging. Associative branding and frequent exposure improve recognition and assist in helping customers remember particular details regarding the standards, certifiers, or mission of the label [54]. Research indicates that consumers with greater ecolabel knowledge are more inclined to use prior knowledge and established decision criteria while processing information, hence reinforcing the relationship between familiarity and knowledge, whereas consumers with less knowledge rely more on external cues and information [37].

Social influence and peer learning are potential factors in this explanation. Customers are likely to get used to ecolabels through repetition if they keep encountering them in public social environments such as group conversations, reviews, or influencer feeds [55]. This can lead them to request or explain to people within their network. This informal knowledge-sharing process reinforces understanding and recognition, which suggests that social learning processes often lead ecolabel familiarity to grow alongside knowledge. Additionally, based on the dual-process theory of consumer decision-making, consumers tend to shift from heuristic (superficial) to systematic (in-depth) processing when they are faced with familiar stimuli [56]. Consumers are more likely to perceive a label to be relevant and worth exploring when they recognize it, which enables them to understand what the label is about on a deeper level. Therefore, the high correlation between familiarity and knowledge in sustainability contexts can be attributed to this shift from recognition to cognitive engagement.

5. Conclusion

The focus within this study centers specifically on the influence of gender on eco-consciousness, label knowledge, and knowledge familiarity within the framework of sustainable fashion in Singapore. The focus was primarily on whether there were meaningful differences between the two genders concerning these factors and their interactions. For this purpose, a structured survey was employed to gather the needed data, which was analyzed using Pearson correlation analysis, Levene's tests for equality of variance, and independent samples t-tests. Group differences, variance assumptions, and the relationships between the evaluated variables were tested using the outlined statistical methods. The graphs show that while participants were most familiar with Fairtrade International (58.82%) and ISO 9001 (46.08%), their knowledge percentages did not always align, and some labels showed high familiarity but lower knowledge.

Additionally, the independent samples t-tests indicated that there were no statistically significant gender differences in label familiarity or label knowledge. However, a significant difference was found in eco-consciousness, where females reported higher levels than males ($p = 0.083$). Furthermore, correlation analysis showed a weak but statistically significant positive relationship between label familiarity and label knowledge ($r = 0.24$, $p = 0.014$), and a marginally significant positive correlation between eco-consciousness and label familiarity ($r = 0.17$, $p = 0.095$). However, there was no significant correlation between eco-consciousness and label knowledge. These results indicate that even though participants may recognize certain labels, their understanding of what the labels represent remains limited, irrespective of gender. The statistically significant correlation between label familiarity and knowledge suggests that repeated exposure can lead to better understanding. The gender gap in eco-consciousness supports prior research indicating that females are generally more environmentally aware. This is reflected in females' stronger green consumption intentions

and a greater likelihood of engaging in sustainable behaviours. For example, using reusable bags, supporting plastic bans, and buying eco-friendly clothing. Their higher eco-consciousness may also drive a deeper emotional or ethical connection to Sustainability. This, in turn, may influence their responsiveness to ecolabels, even if their actual label knowledge is similar to that of males. However, the lack of difference in label familiarity and knowledge between females and males points to broader gaps in label education across demographics. The study highlights that awareness alone does not translate into knowledge or action, underlining the ongoing attitude-behaviour gap in sustainable fashion consumption. In conclusion, this study underscores the importance of more effective ecolabel education, communication, and methods to close the gap between the intentions of consumers and their actual purchasing behaviour.

Policy Implications and Limitations

The study's conclusions provide insightful information for various stakeholders in the sustainable fashion industry. In order to bridge the gap between consumer intent and action, policymakers can utilize this data to create focused awareness campaigns that clarify the significance and legitimacy of ecolabels and ethical labels. Building on these results, researchers may investigate how socioeconomic factors influence eco-consciousness and label recognition in various populations. For manufacturers and producers, the findings underscore how crucial it is to not only display labels but also to clearly and concisely explain their significance. Moreover, marketers may find it beneficial to concentrate on strategies that appeal to consumers' values and beliefs in addition to providing them with information. The weak correlation between eco-consciousness and knowledge indicates that in order to effectively influence sustainable purchasing behaviour, educational efforts should be combined with emotionally compelling messaging.

Nevertheless, some of the insights gathered continue to pose challenges. First, collecting data from only 102 survey participants significantly limited the scope of the study and, as a result, the possibility of generalizing findings. The survey respondents being solely from Singapore added to this problem by restricting the results' applicability to additional cultural or socioeconomic contexts. The Singapore respondents displayed limited variation in demographic factors, such as wealth and education. Therefore, it was difficult to understand the impact of the ecolabels on respondents' ecolabel knowledge, familiarity, and eco-consciousness, as the majority of respondents shared the same socioeconomic and educational level.

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