

RESEARCH ARTICLE

Environmental apparel knowledge and purchase intention towards recycled clothing: Insights from an emerging market

Xiaofang Jin¹, Azizah Omar^{2,*}

¹ PhD candidate at School of Management, Universiti Sains Malaysia, Penang, 999004, Malaysia

² Professor of Marketing in School of Management, Universiti Sains Malaysia, Penang, 999004, Malaysia

* Corresponding author: Azizah Omar, aziemar@usm.my

ABSTRACT

Growing environmental concerns and the rising demand for sustainable consumption have driven research into consumer behaviour toward recycled clothing. Understanding purchase intentions is essential for advancing sustainable fashion, particularly in emerging markets like China. This study applies an expanded Knowledge-Attitude-Behaviour (KAB) framework, integrating perceived value and perceived responsibility to examine key factors influencing Chinese consumers' willingness to buy recycled clothing. A quantitative approach was used, collecting 597 responses via structured online surveys and analysed through structural equation modeling (SEM). The findings reveal that environmental apparel knowledge, perceived value, and perceived responsibility significantly influence purchase intention, with perceived value ($\beta = 0.54$) emerging as the strongest mediator, while environmental apparel knowledge ($\beta = 0.42$) and perceived responsibility ($\beta = 0.37$) exert direct effects. This study extends the KAB model by demonstrating the mediating roles of perceived value and responsibility, offering new theoretical insights into sustainable consumption. By focusing on Chinese consumers, this study provides a culturally relevant perspective on sustainable fashion adoption in an emerging market, enhancing the applicability of the KAB model in non-Western contexts. The findings highlight the importance of economic and social benefits in promoting recycled clothing, offering practical implications for businesses and policymakers. Future research should explore diverse populations and methodological approaches to improve the model's generalizability.

Keywords: Fashion industry; recycled clothing; environmental apparel knowledge; perceived value; perceived responsibility; attitude; purchase intention; China

1. Introduction

The fashion industry is increasingly recognized for its significant environmental footprint, particularly regarding textile waste generation and resource depletion^[1-3]. Globally, textile waste has exceeded 92 million tonnes annually, highlighting the industry's unsustainable practices^[4]. In China alone, textile waste generation reaches approximately 26 million tonnes per year, yet the volume of recycled clothing produced remains minimal, at less than 0.25 million tonnes^[5]. Such a substantial disparity underscores an urgent need for effective recycling practices within the industry. Purchasing recycled clothing offers several significant

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advantages^[6]. First and foremost, it directly contributes to reducing textile waste, helping to alleviate the growing problem of landfill overflow and environmental pollution caused by discarded garments^[7]. Secondly, recycled apparel conserves valuable natural resources, such as water, energy, and raw materials, by reducing the demand for virgin fibre production^[8]. This leads to a lower carbon footprint compared to conventional clothing, as the manufacturing process for recycled materials typically requires less energy and generates fewer greenhouse gas emissions^[9]. In addition to these environmental benefits, buying recycled clothing supports the development of a circular economy within the fashion industry, promoting resource efficiency and sustainability throughout the product life cycle^[10]. By choosing recycled garments, consumers can actively participate in sustainable consumption practices, aligning their purchasing decisions with environmental protection efforts. Furthermore, the increased demand for recycled clothing can encourage more brands and manufacturers to adopt eco-friendly production methods, driving systemic change towards a greener and more responsible fashion industry.

Despite the recognized environmental benefits, recycled clothing has yet to gain substantial consumer traction in China. According to the China National Textile & Apparel Council^[11], low consumer uptake remains a major obstacle that prevents meaningful market expansion. Several key factors contribute to this situation. First, many consumers exhibit low purchase intention, often due to perceptions that recycled clothing is inferior in terms of quality, hygiene, and design compared to new products^[12]. Second, there are widespread negative attitudes toward recycled clothing, driven by social stigma associated with second-hand goods and concerns about product safety and cleanliness^[13]. Third, consumers generally perceive limited value in purchasing recycled clothing, believing it offers neither significant cost savings nor added functional benefits. Lastly, there is a lack of awareness regarding personal responsibility for environmental pollution caused by the fashion industry^[14]. Many consumers do not recognize that their purchasing behaviour can play a critical role in reducing textile waste and promoting sustainable consumption.

To address this issue, the present study adopts the Knowledge-Attitude-Behaviour (KAB) model, which has been widely used to explain how individual knowledge influences attitudes and subsequently affects behavioural intentions. This model is particularly appropriate in the context of recycled clothing, as it provides a structured framework for examining how environmental knowledge shapes consumers' attitudes towards sustainable apparel and how these attitudes translate into purchase intentions^[16]. In China, many consumers lack sufficient knowledge about the environmental impacts of clothing consumption and the ecological benefits of recycled apparel^[17]. According to previous research, limited environmental knowledge often results in weak pro-environmental attitudes and low levels of sustainable purchasing behaviour. Therefore, the KAB model is suitable for capturing the cognitive and attitudinal gaps that exist among Chinese consumers in this domain^[18].

In addition, this study incorporates perceived value and perceived responsibility as key mediating variables within the KAB framework. Prior studies have highlighted that perceived value—which encompasses the consumer's evaluation of the environmental, functional, and emotional benefits of a product—plays a pivotal role in shaping purchase intentions toward sustainable products^[19]. In the context of recycled clothing, if consumers perceive greater value in terms of environmental protection and quality, they are more likely to develop favourable attitudes and behavioural intentions^[20]. However, Chinese consumers often hold misconceptions about the quality and hygiene of recycled clothing, which diminishes their perceived value and reduces their willingness to purchase such products. Similarly, perceived responsibility—the extent to which consumers feel personally accountable for contributing to environmental protection—has been identified as a significant factor influencing sustainable consumption behaviours. In China, where collective environmental responsibility is still evolving, enhancing consumers' sense of

personal responsibility could motivate more proactive engagement in eco-friendly practices, including the purchase of recycled clothing. Previous research suggests that perceived responsibility can bridge the gap between environmental knowledge and sustainable behaviour by fostering a moral obligation to act. Furthermore, existing literature predominantly addresses Western contexts, with limited attention given to Asian markets, despite China's rapid growth in fashion consumption ^[22-25]. By focusing specifically on Chinese consumers, this study seeks to bridge this critical geographical gap. Accordingly, the research addresses the following questions:

1. What is the impact of environmental apparel knowledge on Chinese consumers' intentions to purchase recycled clothing?
2. How does environmental apparel knowledge influence the attitudes, perceived value, and perceived responsibility of Chinese consumers?

2. Literature review and hypotheses development

2.1. Knowledge-attitude-behaviour (KAB) model

The Knowledge-Attitude-Behaviour (KAB) model, originally introduced by Kallgren and Woods in 1986, describes a sequential process in which consumers first acquire specific knowledge, which subsequently shapes their attitudes toward a particular behaviour and ultimately influences their actions—either positively or negatively^[26]. This model provides a structured and logical framework for explaining how individuals process information and translate it into behaviour. It is particularly relevant to this study for several reasons.

First, the KAB model is well-suited to understanding the behavioural dynamics of Chinese consumers in the recycled clothing market^[27]. In China, recycled clothing consumption remains relatively low despite growing environmental concerns^[28]. This suggests that consumers' purchasing decisions are not purely driven by environmental awareness but are also influenced by their attitudes toward the quality, hygiene, and social perceptions of recycled products^[29]. By employing the KAB framework, we aim to examine how Chinese consumers' environmental knowledge translates into attitudes and whether these attitudes effectively predict their purchase intentions regarding recycled clothing.

Second, the KAB model has been widely applied in the field of environmental education and pro-environmental behaviour research. For example, Indrani et al.^[30] investigated the link between environmental knowledge, attitudes, and sustainable product purchases, while Hossain et al.^[31] examined how eco-label awareness and environmental knowledge shape consumer attitudes and pro-environmental actions. In sustainable fashion consumption, scholars such as Blazquez et al. and Leclercq-Machado et al.^[32,33] have emphasized the persistence of the knowledge-behaviour gap, where high levels of environmental knowledge do not consistently lead to sustainable purchasing behaviours. This gap is particularly pronounced in China's emerging recycled clothing market, where consumers may have limited knowledge about environmental issues but still face barriers such as negative perceptions of recycled clothing and low perceived product value.

Third, while the KAB model provides a useful starting point, it has been criticized for its linear and overly simplistic structure, if knowledge directly leads to behaviour through attitude alone. More recent studies suggest that additional factors—such as perceived value, perceived consumer responsibility, and external contextual variables—play a significant role in bridging the gap between knowledge and behaviour^[34]. In the Chinese context, perceived value is particularly important because consumers often question the

economic and functional benefits of recycled clothing. Likewise, perceived responsibility reflects the extent to which consumers feel accountable for addressing environmental pollution caused by the fashion industry.

Based on these insights, our study extends the traditional KAB model by incorporating perceived value and perceived responsibility as additional mediators between knowledge and purchase intention. This extended model provides a more comprehensive framework for understanding Chinese consumers' decision-making processes in the recycled clothing market. By doing so, our research not only addresses the knowledge-behaviour gap identified in prior literature but also offers practical insights for promoting sustainable fashion consumption in China.

2.2. Purchase recycled clothing intention (PRCI)

Ajzen and Fishbein define intention as an individual's willingness to make a voluntary effort to engage in a specific behaviour^[35]. Maria et al. further explains that purchase intention refers to a consumer's inclination to buy a product after thoroughly evaluating it^[36]. In traditional marketing research, purchase intention is often used to explore the relationship between attitudes and behaviours, serving as a predictor of future consumer actions^[37]. This concept is especially important in sustainable consumption research, given the strong correlation between purchase intention and actual buying behaviour^[38]. Our study focuses on the intention to purchase recycled clothing, which reflects the likelihood of consumers choosing to buy these products.

2.3. Environmental apparel knowledge (EAK)

Environmental knowledge, which refers to an individual's understanding of environmental issues—including fundamental concepts, facts, and the relationships related to natural ecosystems—plays a key role in explaining sustainable consumption behaviour^[39]. However, scholars differ in their views regarding the extent to which environmental knowledge influences behaviour. For instance, Saari et al.^[40] found a strong link between general environmental knowledge and the purchase of sustainable products. Similarly, recent studies suggest that individuals with greater environmental awareness are more likely to allocate a larger portion of their budget to eco-friendly products and exhibit a higher willingness to purchase sustainable goods^[41].

Nevertheless, other research argues that environmental knowledge alone is not a consistent or strong predictor of pro-environmental behaviours^[42]. Meramveliotakis and Manioudis^[43] contend that, while knowledge may not directly predict behaviour, it is crucial for overcoming psychological barriers such as unconscious biases, fear, or misinformation. Lehrer^[44] further argues that insufficient or inaccurate knowledge can impede informed decision-making about environmental issues.

This study focuses specifically on environmental apparel knowledge, which refers to consumers' understanding of the environmental impacts caused by the fashion industry^[45]. Prior research has demonstrated a positive relationship between environmental apparel knowledge and sustainable fashion consumption, making it a key concept for investigation in this study^[46,47]. Studies by Byrd and Su^[48], Kim and Bye^[49], and Arora and Manchanda^[50] have also emphasized the general lack of consumer awareness regarding the environmental consequences of fashion production and consumption. This knowledge gap often results from consumers' failure to associate fast fashion with its negative environmental effects, which subsequently hampers their ability to prioritize sustainable clothing choices.

Therefore, understanding how knowledge of the fashion industry's environmental impact influences sustainable consumption behaviours is crucial for promoting sustainability within the fashion sector. Based on these insights, we propose the following hypothesis:

H1: Environmental apparel knowledge significantly influences purchase intention toward recycled clothing.

2.4. Mediating Effect of perceived value (PV)

A widely accepted definition of perceived value is "the consumer's comprehensive evaluation of the usefulness of a product (or service) based on perceptions of what is received and what is delivered"^[51]. Other scholars, such as Wu et al., have expanded on this concept, characterizing perceived value as a source of competitive advantage^[52]. According to Aulia et al.^[53] perceived value encompasses a customer's preference for and evaluation of product attributes, attribute performance, and the resulting outcomes from use, which either facilitate or hinder the attainment of the customer's objectives.

In the context of recycled clothing, environmental value serves as a primary factor distinguishing it from conventional apparel. Compared to ordinary garments, recycled clothing offers significant ecological benefits, such as reducing textile waste, conserving natural resources, and lowering carbon emissions associated with traditional production processes^[54]. Consumers are increasingly aware that purchasing recycled apparel contributes directly to waste reduction and promotes the efficient use of materials, thereby alleviating the environmental burden caused by the fashion industry. This heightened environmental awareness enhances the perceived value of recycled clothing, making it a more appealing choice for consumers who prioritize sustainability^[55]. For example, the practice of recycling—transforming discarded textiles into new garments—not only minimizes resource consumption but also reduces environmental pollution from landfilling and incineration. As a result, recycled clothing is often perceived as a tangible contribution to environmental protection, further strengthening consumers' sense of responsibility and encouraging sustainable consumption behaviours.

From a theoretical perspective, both expected utility theory and prospect theory highlight how perceptions of value influence decision-making. In this study's context, the environmental value embedded in recycled clothing plays a critical role in shaping positive consumer attitudes and purchase intentions^[56]. If consumers perceive recycled apparel as providing substantial environmental benefits—such as reducing ecological damage and conserving resources—they are more likely to develop favourable attitudes and a stronger intention to purchase these products^[57]. Prior research consistently demonstrates that perceived environmental value is a key driver of sustainable consumer behaviour and plays a significant role in encouraging the adoption of eco-friendly products.

These perceived environmental benefits are strongly linked to consumers' environmental apparel knowledge^[46,58,59]. Given the impact of perceived value, when consumers are aware of the benefits of purchasing recycled clothing, they are likely to perceive greater value in doing so^[60]. Moreover, prospect theory posits that consumers establish a baseline for evaluating deviations (gains or losses)^[61]. This suggests that priming with information can help reframe perceived losses as gains, with gains perceived as greater deviations from the initial reference point^[62]. Therefore, we propose the following hypotheses:

H2: Environmental apparel knowledge significantly influences perceived values.

H3: Perceived values significantly influence purchase intention towards recycled clothing.

H4: Perceived values mediate the relationship between environmental apparel knowledge and purchase intention towards recycled clothing.

2.5. Mediating effect of perceived responsibility (PR)

In the field of environmental responsibility, much of the scholarly literature has focused on corporate environmental responsibility, as noted by Cabedo-Peris et al. and Wen et al.^[62,63]. However, this study shifts

the focus to consumer environmental responsibility, as explored by Kumar et al. and, Kumar and Ghodeswar define environmental responsibility as an individual's intention to engage in actions that address environmental challenges^[64,65]. This shift from a purely consumer-centred perspective to a citizen-consumer approach places greater emphasis on societal and environmental well-being. Embracing environmental responsibility allows individuals to acknowledge the negative impacts of their actions on the environment, integrate this awareness with a sense of accountability, and adjust their decision-making and behaviours, accordingly, leading to more proactive pro-environmental actions^[66,67].

Previous studies have demonstrated a strong correlation between consumers' environmental responsibility and their exposure to environmental education. Kumar et al., identified a positive relationship between consumer environmental responsibility and eco-friendly behaviours^[64]. Similarly, Zafar et al. found that individuals with a heightened sense of environmental responsibility are more likely to have a positive attitude and a greater tendency to purchase sustainable products^[68]. While environmental consumerism has been gaining momentum in China, there is still a lack of research specifically focused on the Chinese cultural context. As a result, empirical studies are needed to explore the relationship between consumer ecological responsibility and sustainable consumption practices in China.

Additionally, several studies have identified environmental responsibility as a mediating factor in explaining consumers' pro-environmental behaviours. Hojnik et al. explored the mediating role of environmental responsibility in the relationship between environmental concern and the intention to purchase sustainable products^[69]. With growing environmental awareness, Chinese consumers have been encouraged to enhance their environmental knowledge through various educational efforts. This has led to a heightened sense of accountability and a stronger commitment to addressing environmental issues, thereby increasing their likelihood of purchasing recycled clothing. Based on this discussion, we propose the following hypotheses:

H5: Environmental apparel knowledge significantly influences perceived responsibility.

H6: Perceived responsibility significantly influences purchase intention toward recycled clothing.

H7: Perceived responsibility mediates the relationship between environmental apparel knowledge and purchase intention toward recycled clothing.

2.6. Mediating effect of attitude (ATT)

Attitude is defined as a psychological tendency in which individuals evaluate a specific entity with varying degrees of favour or disfavour^[70]. It is regarded as a key predictor of behaviour. Consequently, attitude plays a central role in several theories that explain human behaviour, such as the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB)^[70]. According to the Theory of Planned Behaviour, attitude reflects an individual's positive or negative evaluation of performing a specific behaviour. When consumers hold favourable attitudes toward a product—such as recycled clothing—they are more likely to develop a stronger intention to purchase it. This is because attitude shapes consumers' overall perception of the benefits and value associated with the product, reducing uncertainty and enhancing their motivation to act^[70]. Moreover, attitudes serve as a cognitive and emotional filter through which consumers assess information related to the product. Positive attitudes can increase perceived benefits (e.g., environmental contribution, ethical satisfaction), while mitigating perceived risks (e.g., quality or hygiene concerns). In the context of recycled clothing, consumers with favourable attitudes are more inclined to view such products as socially responsible and personally valuable, which directly enhances their purchase intention.

Multiple studies on sustainable consumption have established that a consumer's attitude is a key factor driving both purchase intention and actual buying behaviour^[71-74]. Most research models indicate that individuals need to change their attitude towards the environment before they can alter their behaviour^[72,75,76]. Similarly, it is expected that consumers' attitudes towards sustainable fashion products will influence their purchase intentions. Many studies have also explored the connection between environmental knowledge and attitude. For instance, Waris and Hameed found that knowledge of eco-labels significantly influences energy-saving attitudes^[77]. Liu et al.^[78] demonstrated that environmental knowledge about ethical fashion positively affects Chinese consumers' attitudes towards purchasing ethical fashion products. Additionally, Betzler et al.^[79] found that environmental knowledge has a significant impact on attitudes toward purchasing sustainable products. Based on this, we propose the following hypotheses:

H8: Environmental apparel knowledge significantly influences attitudes toward purchasing recycled clothing.

H9: Attitudes toward purchasing recycled clothing significantly influence purchase intention for recycled clothing.

H10: Attitudes toward purchasing recycled clothing mediate the relationship between environmental apparel knowledge and purchase intention for recycled clothing.

2.7. Perceived values and attitude

Zeithaml (1988)^[51] argues that perceived value plays a fundamental role in shaping customer relationships, as it encompasses key factors such as consumer attitudes, satisfaction, and loyalty. When consumers perceive that a product delivers value consistent with or exceeding their expectations, they are more likely to form favourable attitudes toward that product. For example, Salehzadeh and Pool^[80] found that perceived value directly contributes to the development of positive attitudes, which in turn influence purchase decisions. Similarly, Khoi et al.^[81] emphasize that perceived value is a critical factor in consumers' decision-making processes, affecting their attitudes, perceptions, and subsequent behaviours. Perceived value can be understood as an individual's overall assessment of the product's utility, based on what is received (benefits) and what is given up (costs). In this sense, perceived value reflects and reinforces consumers' attitudes toward both the product and the behaviour of purchasing it. Empirical studies further support this relationship. Liao et al.^[82] found that green customer value significantly and positively impacts consumer attitudes toward environmentally friendly products. Moreover, positive attitudes derived from perceived value are associated with stronger purchase intentions for eco-friendly products. Sultan et al.^[83] demonstrated that the perceived value of organic food influences consumers' behavioural intentions indirectly through their attitudes. Similarly, Pauluzzo and Mason^[84] observed that the perceived value of sustainable products positively shapes consumer attitudes toward purchasing these items. Based on these findings, this study proposes the following hypothesis:

H11: Perceived value significantly influences attitudes toward purchasing recycled clothing.

2.8. Perceived responsibility and attitude

Bedard et al. suggest that an individual's sense of environmental responsibility can embody spiritual qualities such as courage, perseverance, self-restraint, and a commitment to the public good when addressing ecological challenges^[85]. Aligned with this view, environmental responsibility is regarded as a strong motivator, encouraging individuals to take accountability for their impact on the environment, shift their mindset, and engage in actions that promote environmental well-being^[86].

The study's findings suggest that consumers seek to meet their personal needs while also fulfilling their environmental responsibilities, which in turn shapes their attitudes toward sustainable consumption and their purchasing decisions. Patwary et al. found that individuals with a heightened sense of environmental responsibility are more aware of environmental issues and tend to have positive attitudes toward green hotels, driven by the belief that humans are accountable for environmental problems^[87]. Similarly, Liang et al. argue that individuals with a stronger sense of environmental responsibility prioritize environmental benefits and recognize the interdependence between humans and the environment, especially when they feel responsible for maintaining ecological balance^[88]. As a result, these individuals are more likely to adopt proactive approaches to addressing environmental challenges. Moreover, Zheng et al. found that consumers' attitudes toward green products and their purchasing decisions are significantly shaped by their personal sense of responsibility, including moral obligations or personal norms^[89,90]. Based on this discussion, we propose the following hypothesis:

H12: Perceived responsibility significantly influences attitudes toward purchasing recycled clothing.

Based on the above discussion, the research model was constructed as shown in **Figure 1**

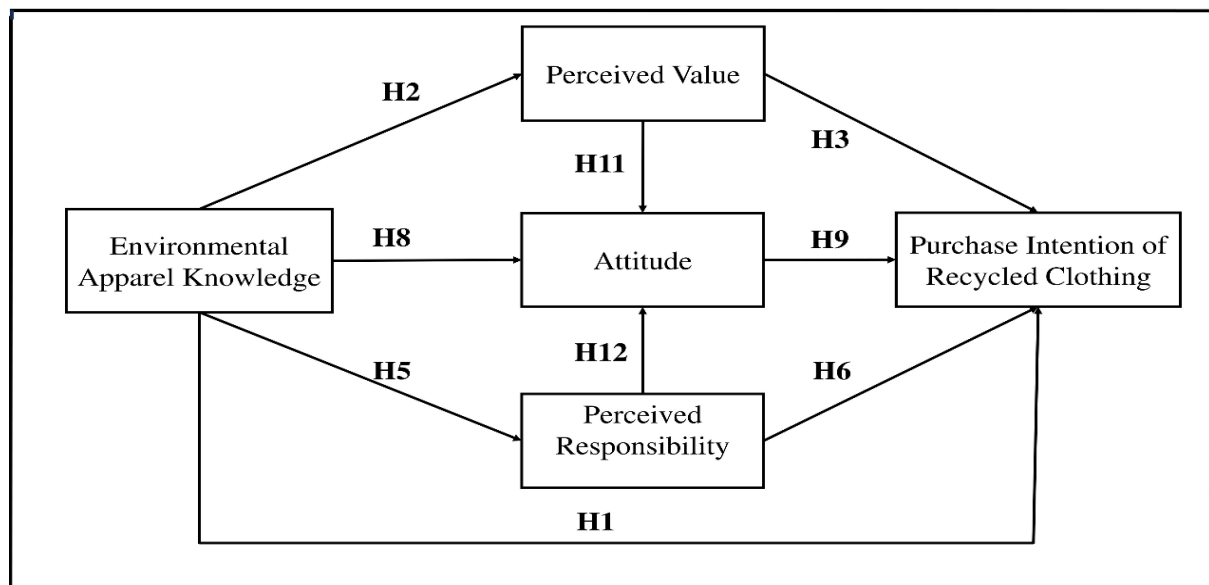


Figure 1. Hypothesized research model.

3. Research methodology

3.1. Questionnaire and instrument development

The study introduces a theoretical framework comprising five latent variables that can be directly measured. To assess these variables, a self-administered questionnaire was developed, structured into two main sections. The first section collects demographic information such as gender, education level, and monthly expenditure. The second section evaluates participants' environmental apparel knowledge, purchase intention towards recycled clothing, and perceptions of value, responsibility, and attitude. Established measures from existing literature were adapted for this study. However, given the limited selection of items, some may not fully capture the intended theoretical dimensions, potentially measuring aspects of other constructs. To address this, reliability and validity tests were conducted. Future research should consider expanding the item pool to enhance measurement precision. Table 1 details the constructs, associated items, and their sources. Responses were recorded on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5).

In this study, the dimension Environmental Apparel Knowledge was measured by adapting items from previous research conducted by Kim and Damhorst^[91] as well as Li and Leonas^[47]. These items evaluate consumers' awareness of the environmental impact associated with the fashion industry, including pollution, water waste, greenhouse gas emissions, and the potential benefits of using natural fibres. The dimension Perceived Values was assessed through items adapted from Zeithaml^[47] and Dodds et al.^[90]. This dimension captures consumers' perceptions regarding the benefits of recycled clothing compared to traditional clothing, specifically focusing on reducing environmental problems, saving energy, minimizing waste, and enhancing social approval. The dimension Perceived Responsibility was measured based on items derived from Stern et al.^[91]. This dimension examines consumers' perceived personal obligations and responsibilities towards environmental protection, their willingness to sacrifice personal interests for the environment, and their sense of duty in discouraging environmentally unfriendly fashion consumption behaviours. The dimension Attitude was adapted from the work of Park and Lin^[92]. It measures consumers' overall positive or negative evaluations towards recycled clothing, capturing their general attitude, specific attitude toward purchasing recycled clothing, and support for recycled clothing as an environmentally friendly alternative to traditional clothing. Finally, the dimension Purchase Intention was measured using items derived from Ajzen's^[70] Theory of Planned Behaviour. It assesses consumers' willingness and intention to purchase recycled clothing, identifying themselves as consumers of recycled clothing, and their inclination to introduce and recommend recycled clothing to family members and friends.

3.2. Sample and data collection

Initially, a pilot survey with a sample size of 60 was conducted to refine the questionnaire, incorporating participant feedback. All 17 measurement items achieved loading factors exceeding the threshold of 0.7, validating their retention for further investigation. For distribution, the professional online survey platform Wenjuanxing (<https://www.wjx.cn>) was utilized, targeting Chinese participants aged 18 and above to enhance data validity. A total of 638 responses were collected, with rigorous filtering to ensure data quality, resulting in 597 valid responses (detailed in Table 2). Responses were filtered for regularity, incompleteness, and unusually short completion times (less than 1 second per item).

Table 2 presents participant demographics: the male-to-female ratio was 56.6% to 43.4%, indicating a slight male predominance of 13.2%. The age distribution showed 40.5% of respondents aged 26-35, followed closely by the 36-45 age group at 40.0%. Educational attainment predominantly included bachelor's degrees (69.8%) and college diplomas (14.9%). In terms of occupation, office workers constituted 45.4%, followed by salespersons (18.9%) and professionals (14.8%). Monthly earnings were most frequently in the range of 5,001-8,000 RMB (39.9%), followed by 3,001-5,000 RMB (21.1%) and 8,001-10,000 RMB (14.4%).

Table 2. Demographic information of the sample of respondents.

Characteristic	Categories	N	%
Gender	Male	338	56.6
	Female	259	43.4
Age	18-25	22	3.7
	26-35	242	40.5
	36-45	239	40.0
	46-55	94	15.8
	>55	60	10.1
Income	<2000	13	2.1

Characteristic	Categories	N	%
Education Level	2000-3000	15	2.5
	3001-5000	126	21.1
	5001-8000	238	39.9
	8001-10000	86	14.4
	10001-15000	64	10.7
	15001-20000	20	3.4
	>20000	35	5.9
	Junior High School	17	2.9
	Senior High School	44	7.4
	College diploma	89	14.9
Occupation	Bachelor's degree	417	69.8
	Master's degree	30	5.0
	Government Employee	54	9.0
	Office Workers	271	45.4
	Professionals	88	14.8
	Factory Workers	9	1.5
	Salesperson	113	18.9
	Self Employed	56	9.4
	Agricultural Workers	6	1.0

Table 2. (Continued)

3.3. Analytics procedure

In this study, Smart PLS 4.0 software was employed for statistical analysis and structural equation modelling (SEM). Partial Least Squares Structural Equation Modelling (PLS-SEM) was chosen over Covariance-Based SEM (CB-SEM) based on several key considerations:

a) PLS-SEM, based on component-based extraction, is widely recognized for its strong predictive capabilities, which is especially beneficial for our research objective of predicting consumer behavioural intentions. b) PLS-SEM offers greater flexibility compared to CB-SEM, particularly in accommodating small sample sizes and non-normally distributed data. These features make it a more appropriate choice for the analytical needs of our study. c) While CB-SEM is typically favoured for validating well-established theories, PLS-SEM is more suited to exploratory theory development. Given our focus on innovating and validating a new theoretical framework, PLS-SEM is a better fit for our methodological approach^[93]. The choice of methodology is further supported by scholars such as Hair et al., who advocate for PLS-SEM in research contexts that prioritize theory development and validation^[94,95].

4. Results

4.1. Measurement model

This study performed a measurement model assessment following the guidelines of Hair et al., using several metrics to evaluate the effectiveness of the intervention. These metrics included reliability, convergent validity, and discriminant validity^[95]. Assessing composite reliability was essential, as it evaluates individual indicators based on their loadings and is the preferred reliability approach^[96].

Discriminant validity was measured using the Heterotrait-Monotrait Ratio of Correlations (HTMT) method, as recommended by Hinkemeyer et al.^{97]}.

Table 3 presents the results of the confirmatory factor analysis for the measurement model, including the standardized factor loadings for the items that make up each construct. To ensure convergent validity, this study followed the three criteria set: each item's factor loading must be at least 0.60, the Average Variance Extracted (AVE) for each construct should exceed 0.50, and the composite reliability should be greater than 0.70, as recommended by Memon et al. and Hair et al.^[93,95]. In the analysis, standardized factor loadings ranged from 0.680 to 0.918, all exceeding the recommended threshold. The AVE values for each construct were above 0.50, confirming sufficient convergent validity. Additionally, composite reliability scores ranged from 0.763 to 0.861, all surpassing the minimum threshold of 0.70, demonstrating good construct reliability. This thorough assessment confirms the robustness of our measurement model and reinforces the validity of our study's findings.

Table 3. Confirmatory factor analysis.

Item	Factor loadings	Composite Reliabilities	Average Variance Extracted
ATT1	0.777	0.786	0.55
ATT2	0.728		
ATT3	0.719		
EAK1	0.918	0.861	0.611
EAK2	0.717		
EAK3	0.735		
EAK4	0.739	0.763	0.519
PR1	0.68		
PR2	0.788		
PR3	0.687	0.811	0.518
PV1	0.688		
PV2	0.735		
PV3	0.735	0.79	0.556
PV4	0.719		
PI1	0.751		
PI2	0.775	0.709	
PI3	0.709		

Henseler et al. recommended the heterotrait–monotrait (HTMT) ratio as a more reliable method for detecting issues with discriminant validity, arguing that it offers a better balance between sensitivity and specificity compared to the Fornell–Larcker criterion^[98]. This study employed the HTMT ratio to assess discriminant validity. As shown in Table 4, all HTMT values were below the recommended threshold of 0.85, confirming that the constructs demonstrated adequate discriminant validity^[99].

Table 4. HTMT result.

ATT	EAK	PI	PR	PV
ATT				
EAK	0.677			

ATT	EAK	PI	PR	PV
PI	0.712	0.573		
PR	0.634	0.756	0.785	
PV	0.598	0.696	0.682	0.798

Table 4. (Continued)

4.2. Structural model

Following the assessment of the measurement model, the structural model in this study underwent evaluation within the framework of Structural Equation Modelling (SEM). The research hypotheses were tested using a bootstrapping technique with 5,000 subsamples at a 95% confidence level, following the approach outlined by Hasni et al.^[100]. The coefficient of determination (R²) and predictive relevance (Q²), following Wong's methodology, were computed^[101]. As recommended in prior research, R² values are interpreted as weak (0.25), moderate (0.50), and substantial (0.75)^[94]. Table 5 illustrates that the comprehensive model 55.3% in attitude, and 58.7% in purchase intention towards recycled clothing. These findings indicate robust model performance. Additionally, Q² values were assessed to determine predictive precision. According to Hair et al., a Q² value above zero indicates predictive relevance, with values exceeding 0.25 indicating moderate predictive relevance, and those surpassing 0.50 indicating high predictive relevance^[94]. The endogenous variable in this study as shows in **Table 5** demonstrated moderate predictive significance, indicating favourable predictive capability.

Table 5. The coefficient of determinants and predictive relevance.

Endogenous variables	Coefficient of determination(R ²)	Predictive relevance (Q ²)
ATT	0.553	0.298
PI	0.587	0.321

Table 6. Effect Sizes for Structural Model Relationships.

Endogenous variables	ATT	PI
ATT		0.018
EAK	0.172	0.185
PR	0.027	0.024
PV	0.040	0.016

The f^2 effect size analysis provides valuable insights into the relative influence of predictor variables on their respective dependent variables. According to Cohen's (1988) guidelines, an f^2 value of 0.02, 0.15, and 0.35 represents a small, medium, and large effect, respectively. The results indicate that Environmental Apparel Knowledge (EAK) exerts a moderate effect on both Attitude (ATT) ($f^2 = 0.172$) and Purchase Intention (PI) ($f^2 = 0.185$), suggesting that consumers with higher environmental knowledge are more likely to develop favourable attitudes toward recycled clothing and express stronger purchase intentions. Furthermore, Attitude (ATT) has a small effect on Purchase Intention (PI) ($f^2 = 0.018$), reinforcing the idea that while attitude is a key predictor of consumer behaviour, its relative influence in this study is modest. Similarly, Perceived Responsibility (PR) demonstrates a small effect on both Attitude ($f^2 = 0.027$) and Purchase Intention ($f^2 = 0.024$), suggesting that while responsibility shapes consumer attitudes and purchase behaviour, its impact is not as substantial as that of environmental knowledge. Additionally, Perceived Value (PV) exhibits a small effect on both Attitude ($f^2 = 0.040$) and Purchase Intention ($f^2 = 0.016$), indicating that

while consumers' perception of value influences their attitudes and purchase intentions, it plays a relatively minor role compared to other factors.

Table 6. Hypotheses test.

Path	Path coefficients	T statistics	P values	LLCI (5.00%)	ULCI (95.00%)	Result
EAK -> PI	0.489	11.155	<0.01	0.414	0.559	H1 Supported
EAK-> PV	0.747	40.349	<0.01	0.717	0.778	H2 Supported
PV -> PI	0.131	3.03	<0.01	0.06	0.203	H3 Supported
EAK -> PV - > PI	0.098	2.953	<0.01	0.045	0.155	H4 Supported
EAK -> PR	0.68	30.954	<0.01	0.645	0.716	H5 Supported
PR -> PI	0.142	3.554	<0.01	0.077	0.208	H6 Supported
EAK-> PR -> PI	0.097	3.479	<0.01	0.053	0.144	H7 Supported
EAK -> ATT	0.453	9.921	<0.01	0.376	0.526	H8 Supported
ATT -> PI	0.085	2.158	<0.01	0.021	0.15	H9 Supported
EAK-> ATT - > PI	0.039	2.057	<0.01	0.009	0.070	H10 Supported
PV -> ATT	0.21	4.84	<0.01	0.139	0.283	H11 Supported
PR -> ATT	0.155	3.989	<0.01	0.093	0.221	H12 Supported

5. Discussion and conclusions

The findings highlight the crucial role of environmental apparel knowledge in shaping consumer attitudes, perceived value, perceived responsibility, and the intention to purchase recycled clothing. This aligns with previous research, such as Okur and Saricam, Copeland and Bhaduri, and Sadiq et al., which emphasized the influence of knowledge on perceived value and responsibility within the context of sustainable consumption^[40,102,103]. Attitude was identified as a significant predictor of the intention to purchase recycled clothing, supporting the Theory of Planned Behaviour and the findings of Shimul et al.^[104]. This study extends this understanding by illustrating the mediating role of attitude in motivating sustainable consumption, consistent with the Knowledge-Attitude-Behaviour (KAB) model and research by Tewari et al.^[105]. Moreover, the results indicate that perceived responsibility strongly influences sustainable purchase intentions, confirming the findings of Duong et al.^[106]. Responsibility also plays a mediating role, underscoring its critical importance in shaping consumer behaviour toward sustainable fashion.

While many findings align with prior research, some unexpected results provide new insights. While many findings align with prior research, some unexpected results provide new insights. However, the study's reliance on a limited set of measurement items may have constrained the scope of variable conceptualization. Some items may have captured overlapping constructs, potentially influencing the interpretation of results. Despite this, rigorous reliability and validity tests were conducted to ensure the robustness of the findings. Future research should address this limitation by incorporating more diverse and comprehensive measures. First, perceived responsibility had a weaker-than-expected effect on purchase intention ($f^2 = 0.024$) compared to perceived value ($f^2 = 0.016$). This suggests that while consumers may recognize their environmental responsibility, this recognition alone does not strongly translate into actual purchasing behaviour. One possible explanation is that perceived responsibility primarily influences attitudes rather than direct purchase intentions, as indicated by its slightly stronger effect on attitude ($f^2 = 0.027$). This supports prior studies suggesting that moral or ethical considerations often require additional reinforcement—such as

social norms or incentives—before influencing actual behaviour. Future research should explore how responsibility can be leveraged more effectively to drive sustainable consumption, potentially through community-driven initiatives or policy interventions.

Second, perceived value emerged as the most influential mediator, surpassing the direct impact of knowledge on purchase intention. Perceived value emerged as a significant motivator of sustainable purchase intentions, consistent with the work of Arora and Manchanda^[107] Consumers who perceived high value in recycled clothing exhibited stronger purchase intentions, reinforcing the importance of value perception in sustainable consumption. However, the small effect size of perceived value on attitude ($f^2 = 0.040$) indicates that although consumers recognize the benefits of recycled clothing, this recognition alone may not always lead to a significantly positive attitude shift. This aligns with prior research suggesting that economic and practical concerns often outweigh environmental motivations in consumer decision-making. A potential reason for this is the lingering perception of inferior quality or higher costs associated with recycled clothing. Future studies should examine how marketing strategies, improved transparency, and quality assurance efforts can enhance the perceived value of recycled clothing and translate recognition into stronger attitudinal and behavioural shifts.

Another key insight from this study is that environmental apparel knowledge exerts its strongest effect indirectly through perceived value, responsibility, and attitude rather than through direct influence on purchase intention. This suggests that merely increasing consumer knowledge about sustainability is insufficient to drive behavioural change unless it also enhances perceived benefits or triggers emotional engagement. Previous research has emphasized the knowledge-action gap, where awareness does not always lead to behaviour change, and this study confirms that mediation mechanisms—particularly through perceived value—are crucial in closing this gap.

Moreover, the relatively small effect size of attitude on purchase intention ($f^2 = 0.018$) raises questions about the extent to which attitudinal shifts alone can drive sustainable fashion consumption. While attitude is often regarded as a key determinant of behaviour, its limited influence in this study suggests that external factors—such as price, convenience, and social norms—may play a more substantial role in shaping actual purchase decisions. This finding highlights the potential need for external interventions, such as financial incentives, peer influence, or regulatory measures, to reinforce the impact of attitude on consumer behaviour and bridge the gap between sustainable intentions and actual purchasing actions. Future research should explore how these external motivators interact with attitudinal factors to enhance sustainable consumption behaviours effectively.

6. Implications

6.1. Theoretical implications

This research makes significant theoretical contributions by expanding and deepening the traditional Knowledge-Attitude-Behaviour (KAB) framework, introducing new mediating variables, and contextualizing findings within an emerging market. Firstly, the study introduces "perceived value" and "perceived responsibility" as critical mediators in the relationship between environmental apparel knowledge and purchase intention, unveiling a more intricate and nuanced mechanism than previously understood. Among these, perceived value emerges as the most influential mediator, illustrating that consumers' evaluation of a product's value, particularly its environmental and social benefits, plays a pivotal role in translating knowledge into purchase behaviour. This insight broadens the traditional framework, emphasizing that consumer perceptions are not merely passive outcomes but active drivers in the decision-

making process. By identifying perceived value as a central link, the study underscores the importance of fostering consumer awareness and appreciation of the broader benefits of recycled clothing, which ultimately strengthens purchase intentions.

Secondly, the inclusion of "perceived responsibility" addresses a critical gap in the literature, which has historically emphasized corporate responsibility while largely neglecting the role of individual accountability. This research uniquely examines the impact of personal environmental responsibility on sustainable consumption from the consumer's perspective. The findings reveal that a consumer's sense of responsibility significantly influences both their attitude toward eco-friendly products and their purchasing behaviour. A heightened sense of accountability drives sustainable consumption by fostering a deeper emotional and ethical connection to environmentally friendly choices. This novel extension of the KAB framework introduces a consumer-centric perspective, offering fresh insights into how personal responsibility bridges the gap between knowledge and action in the context of sustainable fashion.

Lastly, the empirical research conducted in China contributes to addressing a regional gap in the understanding of sustainable consumption behaviours. As an emerging market with distinct cultural, social, and economic characteristics, China provides a unique context for exploring the dynamics of sustainable fashion adoption. The findings enrich the theoretical understanding of sustainable consumption in non-Western settings, shedding light on the specific factors that drive consumer behaviour in such contexts. This contribution not only advances academic discourse but also provides practical implications for businesses and policymakers seeking to promote recycled clothing and other sustainable practices in markets with similar characteristics.

Overall, the study's theoretical contributions lie in its holistic approach to integrating perceived value and responsibility into the KAB framework, its focus on personal accountability in sustainable consumption, and its contextual exploration of consumer behaviour in an emerging market, offering a comprehensive model that can inform both academic research and industry strategies.

6.2. Managerial implications

The findings of this study offer significant managerial implications for promoting sustainable fashion consumption in China. By identifying practical consumption barriers, such as limited availability and perceived risks associated with recycled clothing, industry stakeholders can implement targeted strategies to encourage consumer adoption.

A notable obstacle to adopting sustainable fashion is the lack of consumer awareness and knowledge. Many individuals do not fully understand how their fashion choices impact the environment, leading to a lack of concern about wearing unsustainable clothing. Companies should develop educational initiatives that inform consumers about the environmental and social benefits of recycled clothing. These campaigns can utilize compelling narratives and real-life examples to make the positive impact of sustainable choices more tangible and urgent. Collaborating with influencers and leveraging social media platforms can enhance the reach and effectiveness of these educational efforts.

Limited availability of recycled clothing hampers consumer adoption. To address this, fashion companies should expand distribution channels by partnering with various retailers, including online platforms, to make recycled clothing more accessible to a broader audience. Collaborating with designers and manufacturers to integrate recycled materials into mainstream fashion lines can increase the presence of sustainable options in the market. Utilizing popular e-commerce platforms can help reach consumers nationwide, especially in regions where sustainable fashion options are limited. By improving the availability of recycled clothing, companies can meet the growing consumer demand for sustainable products.

Consumers may have concerns about the quality, performance, and social acceptance of recycled clothing, which can deter purchase intentions. To mitigate these perceived risks, companies should focus on producing recycled clothing that meets high-quality standards and aligns with current fashion trends, dispelling notions that sustainable fashion compromises style or durability. Providing transparency about the sourcing and production processes of recycled clothing can build consumer trust and confidence. Highlighting endorsements from fashion influencers and showcasing customer testimonials can normalize and promote the acceptance of recycled clothing.

To support a circular economy and sustainable development, fashion companies should reevaluate production processes to adopt environmentally friendly manufacturing practices that minimize waste and reduce carbon emissions. Implementing sustainable supply chain management ensures that all stages, from sourcing raw materials to product distribution, adhere to sustainability principles. Developing comprehensive marketing strategies that communicate the company's commitment to sustainability can align with the values of environmentally conscious consumers. By embedding sustainability into their core operations, companies can enhance their brand reputation and appeal to a growing segment of eco-aware consumers.

In conclusion, by implementing targeted educational campaigns, enhancing product availability, addressing perceived risks, and integrating sustainability into core business practices, fashion companies can effectively promote recycled clothing consumption in China. These strategies not only contribute to environmental conservation but also align with evolving consumer preferences and regulatory trends toward sustainable consumption.

7. Limitations and further research

While this study contributes significantly to the existing literature, it is essential to acknowledge its limitations and suggest areas for improvement in future research. Firstly, this study relied on self-administered questionnaires, which may limit respondents' ability to accurately comprehend and interpret each item. Secondly, the selection of measurement items was constrained, which may have limited the ability to fully capture the conceptual breadth of the variables examined. In some cases, the items may have inadvertently measured aspects of other constructs, introducing potential measurement bias. Future research should refine the item selection process, incorporating a broader range of indicators to improve construct validity and ensure a more precise measurement of the theoretical framework. Future studies could benefit from using alternative measurement instruments to validate the findings. Additionally, the study employed online sampling via a digital platform, which may limit the generalizability of the results. Online surveys often attract respondents with higher digital literacy, potentially leading to sampling bias, while the lack of face-to-face interaction may introduce social desirability bias or incomplete responses. Future research could enhance representativeness by incorporating offline survey methods or utilizing hybrid data collection approaches that combine online and offline channels. Thirdly, the study was conducted exclusively in China, and to enhance the understanding of sustainable consumption, future research should consider expanding the study to include multiple countries with diverse national cultures. Additionally, expanding the selection of measurement items would enhance the robustness of construct measurement. Employing mixed-method approaches, such as qualitative interviews or expert panel reviews, could help refine item selection and ensure a more comprehensive representation of theoretical constructs. Validating the measurement model across different cultural contexts would further strengthen the generalizability of the findings. Fourthly, this study focused on specific variables within sustainable fashion consumption, and future research could explore additional theoretical frameworks or dimensions that encompass internal, external, and social aspects of sustainability. Lastly, exploring alternative categories of sustainable fashion products, such as luxury

goods and accessories, could further enrich the understanding of sustainability within the fashion industry. Given the evolving nature of sustainability in fashion, there remain numerous unexplored avenues for research, and addressing these constraints in future studies will contribute to a more comprehensive understanding of sustainable consumption practices in the global fashion industry.

Conflict of interest

The authors declare no conflict of interest.

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