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RESEARCH ARTICLE

Consumer-centered sustainability: A study on Gen Z's motivation to engage in transformable garment co-design

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ABSTRACT

Employing a Transformable Garment Co-Design (TGCD) represents a sustainable design strategy that provides a solution for balancing resource conservation with consumer demands for enhanced lifestyle quality. However, the willingness to accept this innovative approach remains underexplored, and the key factors influencing their readiness have yet to be identified. Drawing on the theory of planned behaviour (TPB), this study aims to investigate the roles of appreciation for aesthetics and functionality (from a positive attitude) and perceived prior experience (from perceived behavioral control) as significant variables impacting the willingness of the young consumer, particularly Gen Z, to engage with TGCD. A quantitative research method was used, utilizing random sampling and collecting data through a survey of Gen Z university students in Zhejiang Province, China. A total of 375 respondents participated in the survey. Hotelling's T-squared test in SPSS was employed to evaluate the significance of the proposed factors. The findings indicated that appreciation for aesthetics and functionality, as well as a positive attitude and perceived prior experience with TGCD, significantly influence Gen Z's willingness to adopt this design approach. This research extends the Theory of Planned Behavior (TPB). It contributes to the broader field of sustainable design, particularly within the context of Total Green Circular Design (TGCD) in China, by offering insights into the market potential of this innovative strategy in garment design.

Keywords: aesthetic attributes; attitudes; function properties; experience; co-design; transformable garment design; perceived behavioral control; Gen Z

1. Introduction

Sustainable development has been highlighted as a central concept for this era [1]. The fashion industry, often cited as the second most polluting worldwide, significantly contributes to textile and clothing waste, making sustainable development an urgent issue in this field[2]. While public awareness of environmental problems is growing, fast fashion consumption continues to soar, exacerbating ecological challenges[3].

The sustainability challenge in the garment industry extends beyond environmental concerns and reshapes consumer lifestyles and behaviors[4]. To mitigate these impacts, sustainable design strategies aim to reduce the ethical, social, and ecological costs associated with production, use, and disposal[5]. While these

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strategies initially emerged in industrial design, fashion designers have increasingly incorporated them over the past decade [3]. This gap between awareness and action presents a challenge in promoting sustainability within the fashion industry. As one of the major emerging markets, China has a vast geographical area and a huge, diverse consumer population. Furthermore, the unbalanced development of modernisation in various regions[6] and ethnic and cultural diversity lead to an imbalance in low-carbon awareness among the population and differences in consumer preferences across different areas[7]. Previous research has shown that Consumer spending varies widely by region[8], and consumers in other areas exhibit significant variations in terms of purchasing power, attitudes, lifestyles, and consumption patterns[9]. As a key player in the global textile industry, Zhejiang Province is not only at the forefront of China's garment sector[10] but also boasts a well-developed economy and a leading position in terms of income and consumption levels[11]. China's Gen Z comprises approximately 260 million people, accounting for 19% of the population and contributing to 40% of the total consumption scale[12]. Chinese people have relatively high levels of participation in low-carbon consumption, varying in degree in their daily lives. Zhejiang Province boasts the nation's most environmentally friendly youth group, conservatively estimated to number more than 12 million.

The Transformable Garment Co-Design (TGCD) approach offers a potential solution to address sustainability challenges while catering to the evolving fashion preferences of Gen Z. TGCD aims to balance economic, social, and environmental sustainability by enabling garments to be used for multiple purposes. Its adaptability could align with the increasing demand for sustainable apparel in China. Nevertheless, TGCD remains untested, despite its potential, particularly in practical applications within the garment industry. Industry leaders remain cautious, as producing transformable garments may present higher costs and greater technical complexity than conventional designs. Most of the prior research on transformable garment design has focused on theoretical aspects, design method concepts, and the practical exploration process of design cases[13]. However, consumer acceptance of this approach is poorly understood, and the key factors influencing their willingness to engage with transformable garments remain unidentified, especially when the target population is Generation Z in China, where there are significant differences in geographic backgrounds. Given these uncertainties, there is a pressing need to empirically examine the viability of TGCD in the Chinese fashion market.

This research examines the key elements that affect Gen Z university students' readiness to embrace TGCD based on the theory of planned behavior[14] and the FEB model[15], emphasizing their valuation of aesthetics and functionality stemming from a favorable attitude. At the same time, perceived prior experience is derived from perceived behavioral control. By identifying the critical elements of this innovative design strategy, the study seeks to provide valuable insights for Chinese garment designers and manufacturers interested in sustainable fashion. The research employs a quantitative methodology to achieve its objectives, surveying 375 university students in Zhejiang Province, China. The following sections present a literature review of relevant concepts, variables, and hypotheses, followed by a detailed description of the survey methodology and analysis of the findings.

2. Literature review

Transformable garment design–can be implemented using various manipulative techniques, such as wrapping, twisting, folding, or gathering, as demonstrated in contemporary fashion collections like Hussein Chalayan's shape-shifting dresses and Issey Miyake's origami-inspired designs. This allows garments to evolve, transform, rejuvenate, reconfigure, reform, or restructure. These techniques provide multiple functional and aesthetic alternatives [13, 16, 17]. The versatility and flexibility of transformable garments help

meet consumers' evolving needs and preferences, delaying psychological obsolescence and extending garment lifespans. This, in turn, reduces consumers' desire to purchase new clothing items, thereby promoting sustainability. As a result, both industry and academia have recognized transformable garment design as a sustainable strategy for reducing excessive garment consumption [16, 17]. In China, the accessibility of affordable new clothing items in the market may render repair designs less attractive to Gen Z consumers. TGCD directly combines the advantages of multifunctional apparel and user involvement in design and/or production, and it has the potential to integrate additional strategies such as service-oriented fashion systems and design focused on repair. In the realm of sustainable fashion and garments, various studies have shown that consumer attitudes are positively correlated, either directly or indirectly, with sustainable fashion practices [18]. Prior research has demonstrated that adopting the theory of planned behavior, as proposed by Icek Ajzen[14], is crucial in shaping individuals' intentions regarding sustainable clothing design. Attitude and perceived behavioral control emerged as the most significant predictors of adopting sustainable fashion behaviors among Generation Z.

2.1. Aesthetics and functionality from FEA consumer needs

The extent to which functionality and aesthetics are collaboratively developed has a positive impact on an individual's inclination to purchase [19]. The Functional, Expressive, and Aesthetic (FEA) Consumer Needs Model, introduced by Lamb and Kallal[15], provides a detailed framework for clothing design[20]. In China, aesthetic values and social norms significantly influence attitudes and intentions to purchase sustainable clothing, which, in turn, affect purchasing decisions[18]. According to the FEA Model, aesthetic considerations relate to the human desire for beauty. Aesthetic requirements for apparel products involve incorporating elements such as line, form, color, texture, and pattern to create visually pleasing designs [15]. It is well known that the color and pattern of garments significantly affect the impression they make on people's willingness to engage[21]. Additionally, shape and silhouette are critical visual elements that significantly impact people's perception of products[22]. Beyond traditional aesthetic considerations[15], transformable garments possess distinctive features such as changeable designs and multiple styling options. Aesthetic appeal is crucial in garment assessment and purchase decisions, significantly influencing consumers' willingness to select and buy garments[23]. Product aesthetics generate positive attitudes and inspire curiosity, encouraging consumers to explore new and unfamiliar products. Positive attitudes towards aesthetic values of sustainable clothing, such as design, color, and uniqueness, contribute to closing the gap between consumer attitudes and behavioural intentions.

Functionality is another essential criterion in garment design, encompassing comfort, ease of movement, and durability [23-24]. Functional requirements include protection, thermal comfort, fit, ease of movement, care, durability, and simplicity in donning and doffing[15]. Comfort (in terms of fit and health-friendly fabric) and convenience (including ease of dressing and undressing, easy movement, and easy care) are important factors influencing user-centered garment design strategies[25]. Numerous studies have demonstrated that functional aspects (fit, comfort) are typically the deciding factors for the longevity of garments[26]. Aakko and Niinimäki[27] noted that the durability of garments is one of the key factors affecting their useful life. Durability is fundamental to sustainable development, contrasting with the planned obsolescence model of fast fashion[28]. Prior research supporting garment durability encompasses physical, psychological, and instrumental aspects[29]. The Ellen MacArthur Foundation[30] emphasized the importance of durability-focused design for sustainability, further dividing durability into physical and emotional dimensions. Some studies on the physical durability of garments primarily focus on high-performance clothing[31], while others also examine emotional durability. Koo[32] highlights additional functional characteristics of transformable garments, including ease of matching, layering, and transformation. Previous studies have emphasized that

functional versatility is a primary attraction in transformable garment design [13]. Moreover, research indicates that young female consumers are particularly drawn to functional and sustainable products[33]. Research has shown that if the functionality of sustainable clothing does not meet the individual's needs and desires, it directly affects their willingness to purchase sustainable clothing[34]. Hence, the following hypotheses are proposed:

H_1: Appreciation for aesthetics, stemming from a positive attitude towards transformable clothing, positively affects Gen Z's readiness to participate in TGCD.

H_2: Appreciation for the functionality of transformable clothing, stemming from a positive attitude, affects Gen Z's readiness to participate in TGCD.

2.2. Perceived prior experience from perceived behavioral control

It's proposed that behavioural control is the most influential determinant of customers' intentions to sustainable clothing behaviour[35]. Designing an engaging shopping experience is increasingly crucial for fashion retailers, especially as emerging trends such as virtual try-ons, AI-driven personalization, and immersive retail environments redefine consumer expectations and enhance brand engagement[36]. The hyper-personalized shopping experience enabled by digital technology has a significant impact on individuals' willingness to engage[37]. Designers are no longer confined to improving the product experience; they are also focused on creating a unique and memorable user experience[38]. Furthermore, a unique and enjoyable shopping experience enhances consumer satisfaction and contributes to a product's popularity in the fashion market[37]. The innovation of experience can enhance the intangible satisfaction of individuals and foster strong customer relationships[39]. Additionally, positive emotional experiences and psychological needs during consumption are valuable sources that can positively influence participants' willingness to engage. Positive emotional experiences during consumption influence consumers' willingness to adopt new fashion innovations[19]. In the co-design approach, the roles of designers and users undergo a significant shift, with designers transitioning from product creators to facilitators of the experience. Some scholars have even increased user willingness to purchase sustainable products by designing experiential models that enhance users' emotional experiences and address their psychological needs[40]. The 2024 China Sustainable Consumption Report[41] reveals that almost 80% of those surveyed are open to trying low-carbon products after observing others share their experiences. This suggests that personal experience has a significant influence on consumers' decisions to purchase sustainable products. Ajzen[42] noted that previous experiences are crucial in shaping perceived behavioral control. When individuals have successfully engaged in a behavior before, they are likely to feel more confident in their ability to do so again, thereby enhancing their perceived behavioral control; conversely, the opposite is also true. Consequently, the following hypothesis is suggested:

H_3: Perceived prior experience directly influences Gen Z's willingness to engage in TGCD through the co-design approach. Thus, a research framework is suggested, as illustrated in **Figure 1**.

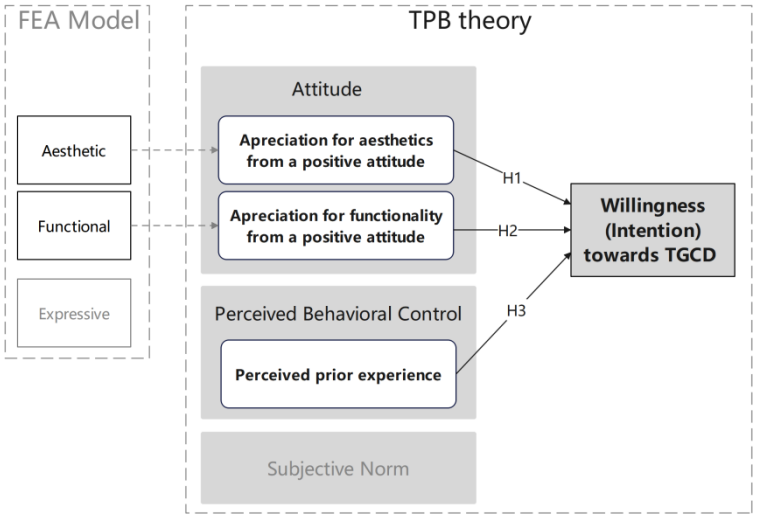

Figure 1. Proposed framework.

3. Materials and methods

This study employed a quantitative research design through a questionnaire survey targeting university students in Zhejiang Province, China. Participants were recruited using random sampling to ensure broad representation. Data was collected via the Wenjuanxing questionnaire platform, an online tool widely used in China. To maximize reach and accessibility, WeChat served as the primary dissemination channel, with invitations shared in university WeChat groups and among online student volunteers. The recruitment process took place in February 2024, and data collection was completed in one month. Despite the numerous benefits of online electronic questionnaires, the risk of inattentive responding among participants is considerably high. According to Zhong et al.[43], to prevent and detect insufficient effort answers, the data collection process for this questionnaire included not only pre-control and post-identification, but also a simple arithmetic question was added to the questionnaire items to determine whether the respondent had carefully reviewed the question. Thus, a total of 375 students participated in the survey, of which 191 responses were deemed valid for analysis. The study utilized previously validated scales from existing research [32] to measure the key variables: appreciation for aesthetics and functionality, which stems from positive attitudes and prior experience, and is influenced by perceived behavioral control. The impact of these variables on students' willingness to engage in Transformable Garment Co-Design (TGCD) was assessed using a 5-point Likert scale questionnaire. Appreciation for aesthetics, stemming from a positive attitude, was measured using 9 items adapted from Lamb and Kallal[15] and Koo[32], which reflect the unique aesthetic characteristics of transformable garments. Appreciation for functionality from a positive attitude was assessed using 7 items derived from Lamb and Kallal[15] and Koo[32], focusing on the functional adaptability of transformable garments. The experience was evaluated using 6 items adapted from Pietri[39], which captured participants' prior involvement in co-design activities. A pilot test was conducted with 28 respondents to refine the wording, structure, and reliability of the scale in the questionnaire before its full deployment. The survey was developed in both English and Chinese, with the Chinese version used for data collection to ensure clarity and comprehension among Chinese university students.

4. Analysis and results

Data analysis consisted of descriptive analysis, factor analysis, reliability, and Hotelling's T-squared test. The sample consisted of 73.8% female respondents and 26.2% male respondents. Students from colleges and

universities in more than 8 cities were recruited. In the valid responses, the most significant percentage (38.7%) was university students studying in Jinhua city, followed (30.9%) was in Shaoxing city. Then, 9.4% of respondents were from Hangzhou City, 8.4% from Jiaxing City, 3.7% from Ningbo City, 1.6% from Wenzhou City, 1% from Huzhou City, and 5.2% from unknown cities, as they didn't provide the name of their university. 8.4% of respondents were unaware of transformable garments that allow for partial change. 24.1% of respondents were unaware of transformable garments with overall changes, while 45.5% did not understand what co-design transformable garments entail. Moreover, none of the respondents have experience with co-design products. O'Rourke[44] suggests a 1:5 item-to-subject ratio with at least 100 subjects. With 22 items and 191 responses, this sample size is appropriate for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure was 0.932, and Bartlett's Test of Sphericity was significant ($p<0.001$), confirming the suitability of the dataset for factor analysis (**Table 1**). The principal component analysis extracted three common factors with eigenvalues greater than 1, confirming their validity. The reliability analysis used Cronbach's Alpha, with values ranging from 0.876 to 0.924, indicating strong internal consistency across all variables (see **Table 2**). Generally, factor loadings above 0.5 are considered strong[45], and all items met this criterion. Factor loading over 0.5 is typically classified as a "strong" item loading[45].

Table 1. KMO and bartlett's test, $p<0.001$.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.932
Bartlett's Test of Sphericity	Approx. Chi-Square	2924.660
	df	231
	Sig.	.000

As shown in **Table 2**, the rotated structure matrix indicates that 3 common factors can be supported, and all factor loadings exceed 0.5. The results revealed a distinct appreciation for functionality, which is associated with a positive attitude, and prior experience is influenced by perceived behavioral control. Internal consistency was examined for reliability using Cronbach's Alpha, the most widely used objective measure of reliability. In general, reliable values of α range from 0.70 to 0.95 [46]. For all three variables, Cronbach's alpha coefficients ranged from 0.876 to 0.924, indicating good reliabilities in the multi-measurement scales.

An analysis using Hotelling's T-Squared. The test was conducted based on respondents' appreciation for functionality, which stems from a positive attitude and prior experience, and is influenced by perceived behavioral control in TGCD, affecting subjects' willingness, as shown in **Table 3**. According to Hotelling's T-squared test, the results regarding the appreciation for aesthetics associated with a positive attitude are presented in **Table 3**. The p-value is 0.004 ($p < 0.01$*). A p-value less than 0.01 is typically considered statistically significant, indicating that an appreciation for aesthetics, stemming from a positive attitude in TGCD, affects university students' willingness. It is statistically significant. Therefore, hypothesis 1 is supported.

Table 2. Factor loadings and reliability.

Constructs	**Cronbach's Alpha**	**Factor loading**
Appreciation for aesthetics from a positive attitude In my opinion....	0.924	
The good look of garments would increase my willingness to TGCD.		0.635
The uniqueness and novelty would increase my willingness to TGCD.		0.625
The type and style of garments would increase my willingness to TGCD.		0.682
The fabric's texture would increase my willingness to TGCD.		0.779

Constructs	Cronbach's Alpha	Factor loading
Entertaining attributes would arouse my interest in TGCD.		0.703
Ease in changing styles would arouse my interest in TGCD.		0.521
Multiple design options would arouse my interest in TGCD.		0.680
Multiple styles and occasions would arouse my interest in TGCD.		0.662
A changeable design would arouse my interest in TGCD.		0.691
Appreciation for functionality from a positive attitude. In my opinion.....	0.901	
The comfort would arouse my interest in TGCD.		0.660
The ease of donning and doffing would arouse my interest in TGCD.		0.746
The ease of action would arouse my interest in TGCD.		0.735
The easy care would arouse my interest in TGCD.		0.775
The durability would arouse my interest in TGCD.		0.761
The ease of matching and layering would arouse my interest in TGCD.		0.643
Easy to convert would arouse my interest in TGCD.		0.691
Perceived prior experience comes from perceived behavioral control	0.876	
Whether or not I've had experiences with co-designing products affects my decision to TGCD.		0.785
I could create something new in TGCD, which may affect my decision to have it.		0.655
Meeting individual needs in TGCD may affect my decision to have it.		0.602
Meeting emotional needs in TGCD may affect my decision to have it.		0.647
Communicating with designers in TGCD may influence my decision to proceed.		0.636
Forms of experiences in CTGD may affect my decision to have it.		0.599

Table 2. (*Continued*)

Table 3. Results of Hotelling's T-Squared Test, p<0.01*,p<0.001**.

	Hotelling's T-Squared	F	df1	df2	Sig	Cronbach's Alpha
Appreciation for aesthetics from a positive attitude	24.864	2.993	8	183	0.004*	0.924
Appreciation for functionality from a positive attitude	32.115	5.212	6	185	<0.001**	0.901
Perceived prior experience comes from perceived behavioral control	87.581	17.147	5	186	<0.001**	0.876

***Notes**: * Significant at 0.01; ** Significant at 0.001*

The results confirm the following:

- H_1 Appreciation for aesthetics from a positive attitude on transformable clothing affects Gen Z's readiness to participate in TGCD: Supported ($p = 0.004$), indicating statistical significance.
- H_2 Appreciation for functionality from a positive attitude on transformable clothing affects Gen Z's readiness to participate in TGCD: Supported ($p < 0.001$), indicating high statistical significance.
- H_3: Perceived prior experience directly influences Gen Z's willingness to engage in TGCD through the co-design approach: Supported ($p < 0.001$), indicating high statistical significance.

The findings suggest that perceived prior experience ($p < 0.001$, $t = 17.147$) has the most decisive influence on willingness to engage in TGCD, followed by appreciation for functionality resulting from a

positive attitude ($p < 0.001$, $t = 5.212$). Although appreciation for aesthetics, stemming from a positive attitude, is also significant ($p = 0.004$, $t = 2.993$), its effect is weaker than that of the other two factors. Perceived prior experience, which is the most critical factor, students with previous experience with co-designed products are significantly more willing to engage in TGCD. In addition, functional appeal is a key motivator, and ease of use, durability, and adaptability significantly contribute to students' willingness to adopt TGCD. Finally, aesthetic interest plays a role but is less influential. While aesthetic appeal matters, it is not as strong a determinant as functionality or perceived prior experience. These findings highlight the importance of engaging users in the design process to enhance familiarity and adoption of transformable garment design. The results also provide valuable insights for designers and brands looking to promote sustainable fashion practices through TGCD.

5. Discussion

Previous literature has separately examined the sustainability benefits of transformable design and co-design in the garment industry. However, limited research has explored the strategy that combines these two concepts despite their potential to enhance sustainability by reducing material waste and increasing user engagement in garment design. Although Karell[47] proposed a concept of co-design modular garments, a restricted form of TGCD, an in-depth investigation of this strategy concerning people's willingness has been overlooked. Jess[48] also highlighted that while individuals across cultures hold a positive attitude toward transformable fashion, limited research directly examines their interest in this concept. This study identified significant factors in TGCD, namely appreciation for functionality stemming from a positive attitude and prior experience, which directly impact Chinese university students' willingness to adopt this design strategy. The results demonstrated that perceived prior experience was the most influential factor, aligning with previous studies that emphasize the importance of experiences in shaping consumer behavior [19, 36-37]. Similarly, Yang et al.[19] found that a positive experience can significantly impact participants' willingness, supporting the findings of this study. Digital technology has become an essential tool for driving sustainable growth in the fashion industry[49], introducing a new dimension of experience that has powerfully attracted Gen Z, who are characterized as digital natives. This finding is also in line with the significant effect of perceived prior experience on Gen Z's willingness, as observed in this study. The results also indicated that appreciation for functionality, stemming from a positive attitude, ranked second in significance, after perceived prior experience, reinforcing the appeal of functionality in transformable garments[13]. Interestingly, the appreciation for aesthetics from a positive attitude had a less significant impact on students' willingness than expected. This contrasts with prior research, which has traditionally emphasized aesthetics as a dominant factor in garment selection[15,24]. One possible explanation for this deviation is that the interactive and functional attributes of transformable garments may overshadow their aesthetic appeal in consumer decision-making. Additionally, as previous studies suggest, experiential satisfaction in product interaction can sometimes reduce the emphasis on visual attractiveness[37]. These findings highlight a shift in consumer priorities, where adaptability and usability may play a more substantial role in TGCD adoption than mere aesthetic appeal. Traditionally, aesthetics have been considered a critical factor influencing consumers' willingness to try garments [15]. However, the findings suggest that the experiential value of TGCD may shift consumers' focus away from aesthetic considerations. A possible explanation for this unexpected result is that when engaging with transformable garments, users derive immaterial satisfaction from the experience itself, which may diminish their emphasis on aesthetics[37]. This finding empirically validates the sustainability benefits of TGCD by demonstrating that experiential engagement can reduce excessive consumption driven by aesthetic preferences. This research has practical implications for the sustainable transformation of the garment industry. For instance, fashion brands could incorporate TGCD principles into

their product lines by offering modular designs that allow consumers to adapt their garments over time. Additionally, manufacturers can use digital customization tools to engage consumers in co-design, fostering a deeper connection with sustainable fashion. These findings suggest that integrating experiential workshops or interactive retail experiences could help increase consumer adoption of TGCD-based products.

By identifying the essential design elements of TGCD, this study provides preliminary empirical evidence for both industry and academia. These findings can serve as a valuable reference for garment designers and manufacturers who may hesitate to adopt new sustainable strategies due to market uncertainty. Furthermore, this research contributes to expanding the theoretical framework of sustainable design strategies in the fashion industry by building on the Functional, Expressive, and Aesthetic (FEA) Consumer Needs Model [15] and incorporating elements of participatory design theory[39]. This integration offers a more holistic approach to sustainable fashion by emphasizing user engagement and product adaptability. The hesitancy of decision-makers to adopt transformable design stems from the difficulty of addressing diverse consumer needs with a single approach[48]. Integrating multiple design strategies, such as co-design, can help overcome these challenges and create more effective, sustainable solutions. This study also advances the empirical exploration of co-design implications in the garment industry. Recognizing the significant influence of perceived prior experience in TGCD strategies may encourage further research into how co-design methods can enhance sustainability benefits. Future research could explore how co-design can be integrated with other innovative approaches, such as artificial intelligence-driven personalization, circular fashion models, or digital fashion platforms, to create more adaptive and consumer-driven sustainable fashion solutions.

6. Conclusion

To address the gap in empirical research on TGCD within the context of sustainable development in the Chinese garment industry, this study identified key variables influencing university students' willingness to engage in TGCD. The findings demonstrate that appreciation for functionality, stemming from a positive attitude and prior experience, is influenced by perceived behavioral control, which plays a significant role in determining willingness. Notably, expertise in the TGCD process emerges as the most influential factor. Additionally, while appreciation for functionality, stemming from a positive attitude and aesthetics, significantly impacts willingness, appreciation for functionality from a positive attitude exerts a more decisive influence than aesthetics. This research expands the cross-validation between the FEA model and TPB theory, thereby enhancing the theoretical understanding of transformable design and co-design in the garment industry. Meanwhile, this research provides an initial design framework for incorporating a co-design approach into TGCD, which offers a practical reference for designers and manufacturers seeking sustainable strategies. By recognizing the role of experiential engagement in consumer willingness, it highlights the potential for enhancing sustainable design management frameworks in the fashion industry. It is recommended to emphasize participatory experiences through fashion branding strategies, such as creating participatory experiences on online platforms. Future research should refine this design framework by further exploring the essential variables for optimizing this design strategy, such as cultural influences, technological advancements, and evolving consumer sustainability preferences. Furthermore, an understanding of sustainable consumption behavior can be enriched by introducing additional psychological and value-oriented variables. In particular, factors such as shared value, consumers' construal level, and considering the mechanism of interaction between 'value-psychology-behaviour' more systematically, increase the theoretical depth and practical explanatory power of the model. Additionally, integrating this approach within supply chain management can optimize material efficiency, reduce production waste, and create

adaptive inventory models that respond dynamically to consumer demand. It may help bridge the gap between environmental sustainability and consumers' desire for innovative and adaptable fashion. This approach could drive the sustainable transformation of the garment industry by aligning economic, social, and environmental goals.

Further studies could expand the research scope by targeting participants from different regions in China, particularly those with significant economic disparities, to explore how varying levels of income and access to resources influence willingness to engage in TGCD. This could also be extended to other countries for cross-cultural comparisons. Different target groups may exhibit varied needs and preferences, and different garment categories may present unique design challenges, making in-depth analyses across diverse contexts valuable for advancing sustainable fashion solutions. At the policy level, future research should also pay more attention to the practical implications of environmental policies and regulatory mechanisms. Follow-up research could further explore how government initiatives and institutional design fit with consumer psychology and values to promote sustainable consumption behaviour at a broader level.

Author contributions

Conceptualization, Zhen Zeng and Marzie Hatef Jalil; methodology, Zhen Zeng; software, Zhen Zeng; validation, Marzie Hatef Jalil; investigation, Zhen Zeng; data curation, Zhen Zeng; writing—original draft preparation, Zhen Zeng; writing—review and editing, Marzie Hatef Jalil; visualization, Zhen Zeng and Marzie Hatef Jalil; supervision, Marzie Hatef Jalil. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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