

Article

Renting than Buying Apparel: U.S. Consumer Collaborative Consumption for Sustainability

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Abstract: Apparel rental service is a business model that is becoming increasingly popular in recent years as consumers become more conscious of their environmental impact and look for ways to reduce waste and save money. However, our knowledge on this changing consumer behavior is scant. To address the gap in the literature, this study aimed to identify the determinants driving U.S. consumers' intention to use apparel rental services. Building on the Theory of Planned Behavior (TPB), a research model was proposed. The primary data were gathered by an online survey of U.S. consumers through Qualtrics. A total of 338 eligible responses were obtained for data analysis and hypothesis testing. The results show that attitude, subjective norms, perceived consumer effectiveness, environmental knowledge, perceived personal relevance, and past environmental behavior significantly influence U.S. consumers' intention to adopt apparel rental services. In addition, attitude plays a partial mediating role in the effects of environmental knowledge and perceived personal relevance on U.S. consumers' intent to use apparel rental services. The demographic variables including age, gender, education level, and income level do not significantly influence U.S. consumer intention to rent apparel. The proposed research model exhibits a high explanatory power, collectively accounting for 74.7% of the variance in U.S. consumers' intention to adopt apparel rental services.

Keywords: sustainability; collaborative consumption; apparel rental; adoption; U.S. consumers



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1. Introduction

The culture of buy-use-throw away has been prevalent in the U.S. in recent years, causing massive environmental pollution. The effect of the frequent disposal culture cannot be curbed by manufacturers alone but becomes the responsibility of all stakeholders involved, including consumers. Apparel is one of the most consumed product categories in the U.S., with a market value of US 198 billion in 2021 [1]. The short time period between released trends by brands and retailers has a huge impact on the rate at which apparel products are used and disposed of [2]. According to the U.S. Environmental Protection Agency (EPA), approximately 15 million tons of apparel and textiles end up in the waste stream every year [3]. Secondary Materials and Recycled Textiles (SMART) estimated that 85% of used apparel and textiles went to landfills, even though 95% of them could be reused or recycled [4]. The Ellen MacArthur Foundation (2017) indicated that if the current trends continued, nonrenewable raw material usage in the textile and apparel sector would reach 300 million tons, and the amount of microplastic released into the aquatic ecosystem would reach 22 million tons by 2050 [5].

The worsening environmental problems have evoked wide concern among consumers [6]. There has been a surge in awareness levels with regard to the environmental issues regarding climate change, air pollution, water scarcity, the depletion of natural resources, waste generation and management, food safety, and population growth [1,7,8]. Consumers are making the conscious efforts to alleviate the growing damage that human activities have imposed on the environment [3].

Environmental issues posed by the consumption of apparel products may be addressed without denying consumers' desire to enjoy trendy and fashionable apparel [8,9]. Consumers may engage in collaborative consumption, which involves having access to use products at a price for a temporary period of time [2,10]. This is considered a more sustainable consumption pattern because it prevents indiscriminate disposal due to the urge to use trendy fashion and thereby extends the lifespan of the product and reduces the number of textiles that end up in landfills or that are incinerated at a high rate [2,9]. For apparel products, this means that consumers would have to trade off ownership for access to a variety of fashion items that might not be economically feasible to use within the permissible time period allowed through renting. For instance, a leading fashion rental company based in New York, known as Rent the Runway, offers trendy and quality fashion products including designer dresses and accessories for rent via an online platform. A collaborative consumption approach to fashion product usage in the form of renting could help reduce the effect as well as the environmental footprint from the textile and apparel industry. The apparel rental market was estimated at US 5.87 billion in 2022, and is projected to reach US 7.45 billion by 2026, with an average annual growth rate of 6.5%, which far surpasses the 3% annual growth rate in the aggregate apparel market [11].

Despite its popularity and great market potential in recent years, our knowledge on the motivations for U.S. consumers to use apparel rental services is still limited, and the topic requires more systematic investigations [2,9]. Apparel rental service as a business model needs to be closely examined for ways to attract consumers and monitored to address the needs of target customers [2,12]. Therefore, this study aimed to identify the determinants of U.S. consumers' intention to use apparel rental service. Specifically, the objectives of this study are fivefold: (1) to analyze the emerging apparel rental services in the context of collaborative consumption and sustainability; (2) to build on the theory of planned behavior (TPB), an enhanced TPB model for understanding consumers' intention to use apparel rental service was proposed. Attitude (AT), subjective norms (SN), perceived behavioral control (PBC), perceived consumer effectiveness (PCE), consumer knowledge (CK), environmental knowledge (EK), perceived personal relevance (PPR), and past environmental behavior (PEB) could significantly affect U.S. consumers' intention to use apparel rental services. In addition, attitude could play a mediating role between consumer knowledge (CK), environmental knowledge (EK), perceived personal relevance (PPR), and past environmental behavior (PEB) and U.S. consumers' intention to use apparel rental services; (3) the psychometric properties of the proposed model were examined using the primary data gathered through an online survey of U.S. consumers; (4) the determinants for the use of apparel rental service among U.S. consumers were statistically determined; and (5) to provide marketing strategies for retailers and brands to promote apparel rental services to consumers.

The remainder of the article is organized as follows. In Section 2, we discuss collaborative consumption and apparel rental services, introduce the theoretical framework, review the relevant literature, and propose hypotheses. The proposed research model and developed survey instrument can be found in Section 3. In Section 4 we present the data collection procedure, statistical analysis method, and hypothesis testing results and discussions. The conclusions and implications are provided in Section 5. Finally, Section 6 discusses the limitations of the study, in addition to proposed future studies.

2. Literature Review, Theoretical Framework and Hypotheses

2.1. Collaborative Consumption and Apparel Rental Services

Apparel production comes with a huge cost to the environment. Relevant stakeholders such as manufacturers, retailers, and consumers are taking a stand to reduce the impact of apparel production, consumption and disposal. These actions include the promotion of sustainable practices such as the use of natural fiber, recycling practices that redirect apparel wastes from landfills to be used in the production of new products, and upcycling that repurposes apparel waste for other uses [3]. Prior studies have examined the role that consumers

could play to make changes and reduce the textile and apparel industry's contribution to the environmental footprint, which range from the consumption of environmentally friendly apparel [2,13], used apparel donation [3,14], shopping for secondhand apparel [15], to the upcycling of apparel wastes [6]. While these sustainable measures have a positive environmental impact due to waste and pollution reduction, the consumption pattern of consumers, which mainly takes the form of acquisition, remains unaddressed [16].

Collaborative consumption is a concept that is newly practiced with regard to the consumption of fashion products [17]. This concept can be described as a sustainable means of fashion products' acquisition, where fashion products that have been gently used are subjected to further use by providing access to other consumers to either use or acquire them to enable the extension of the product's lifespan [2]. As one of main collaborative consumption modes, apparel rental services enable consumers to reduce their personal clothing waste. In the traditional model of fashion consumption, many people buy clothes, wear them a few times, and then discard them. This cycle of constant consumption has contributed to the significant environmental impact of the fashion industry, including greenhouse gas emissions, water pollution, and the generation of textile waste [3,18].

By renting clothes instead of buying them, consumers can avoid contributing to this cycle of waste. They can enjoy the latest fashion trends and experiment with different styles without having to make a long-term commitment to a particular piece of clothing. Instead of buying an item that they may only wear once or twice, they can rent it for a special occasion and then return it to the rental service, where it can be reused by other customers [8]. In addition to reducing personal clothing waste, fashion rental services also have the potential to reduce the overall environmental impact of the fashion industry. By promoting the reuse of clothing, rental services can help to reduce the demand for new clothing production, which can significantly reduce the industry's carbon footprint. They can also contribute to the reduction of textile waste by extending the lifespan of garments that might otherwise end up in a landfill or incineration [2,9].

Another benefit of apparel rental services is that they can promote more sustainable consumption habits. By providing consumers with access to a wider range of fashion styles and designer brands, rental services can encourage people to experiment with new looks and to think more critically about their consumption habits. In addition, renting clothes can be a more affordable and accessible option for consumers who may not have the financial means to buy new clothes regularly. They can also help to shift the focus from ownership to access, which can lead to a more circular and sustainable model of fashion consumption [8,17].

The rise of online rental services has also made it easier for consumers to rent apparel. Companies such as Rent the Runway and Le Tote offer subscription-based services that allow consumers to rent apparel for a set period. This model provides convenience and flexibility, as consumers can have new items delivered to their doorstep and can easily return them when they are finished [8].

2.2. Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) was proposed by Ajzen and Fishbein [19] to help understand the behavior of consumers by unveiling the inherent factors that could contribute to their behavior. TPB explains consumers' behavior as highly predictive by behavioral intention that is impacted by three key factors: attitude, subjective norms, and perceived behavioral control. The theory has been extensively applied, and has proven successful in understanding a range of intentions and behavior topics related to sustainable fashion issues such as second-hand clothing shopping behavior [15], willingness to buy eco-friendly apparel [6,13], slow fashion consumption [18], used apparel donation behavior [3], and fashion collaborative consumption [2,16]. The success applications of TPB in prior studies have proved its versatility and applicability in the present research.

2.2.1. Attitude

Attitude is defined as the degree of a person's favorable or unfavorable evaluation or appraisal of the behavior in question [19]. Attitude is influenced by a person's beliefs about the consequences of the behavior, their values, and past experiences with the behavior. Attitude towards a behavior has been used in many previous studies to predict whether consumers will participate in a specific sustainable behavior. Attitude was found to be critical for consumers to adapt to collaborative consumption [20]. Hamari et al. [21] reported that consumers who showed a positive attitude are more likely to accept the idea of collaborative consumption and are more willing to get involved in activities associated with collaborative consumption. Becker-Leifhold [17] found that a positive attitude toward apparel rental services is the strongest predictor of future behavior regarding apparel renting. This finding was further supported by McCoy et al. [2], who found that attitude is the most influential factor in forming an individual's willingness to use fashion rental services. This suggests that consumers who have positive attitudes about apparel renting will be more likely to use apparel rental services. Thus, Hypothesis 1 is proposed below.

H1: *There is a positive relationship between consumers' attitude towards apparel rental services and their intentions to use apparel rental services.*

2.2.2. Subjective Norm

Subjective norm (SN) is a measure of the perception that important people in one's life (e.g., families, friends or significant others) influences one's decision with regard to a behavior. The subjective norm can reveal how much individuals value others' perspectives in terms of sustainable shopping, and how crucial it is to keep a positive image outside of personal life [19]. The strength of the subjective norm is determined by the individual's motivation to comply with the perceived social pressure and their belief that important others would approve or disapprove of the behavior. If an individual perceives a strong subjective norm to engage in a particular behavior, it can have a significant impact on their intentions and subsequent behavior [13].

Subjective norm as a construct has been examined in prior studies on collaborative apparel consumption [2,17,20]. Becker-Leifhold [17] found that subjective norms played a critical role in forming consumers' intention to adopt apparel renting. Similarly, Lang and Armstrong [9] reported that there is a positive relationship between subjective norms and consumers' willingness to rent rather than buy apparel items. McCoy et al. [2] demonstrated that subjective norm is a significant factor influencing the U.S. Generation Z consumer intention to use fashion rental services, but accounted for less variance than attitude. Thus, the following hypothesis was proposed.

H2: *There is a positive relationship between subjective norm (SN) and U.S. consumers' intentions to use apparel rental services.*

2.2.3. Perceived Behavioral Control (PBC)

Perceived behavioral control (PBC) refers to an individual's belief in their ability to perform a particular behavior or achieve a specific goal. In other words, it is the evaluation of one's behavioral intention as either easy or difficult, depending on the available resource that is at one's disposal or within one's control. PBC has been examined in the previous studies as a predictive factor for consumers' participation in collaborative apparel consumption [2,16,20]. Roos and Hahn [20] found that PBC plays a predictive and significant role in consumers' apparel renting behaviors. Similarly, Becker-Leifhold [17] indicated that PBC strongly affects consumers' intention to rent clothes, and concluded that the easier consumers believed it would be to actually participate in apparel renting behavior, the greater their intention to rent apparel. McCoy et al. [2] stated that PBC can be effective in promoting behavior change. If individuals are provided with skills training or

support which helps increase their confidence in their ability to perform a behavior, they will be more likely to do so. Hence, the following hypothesis is proposed:

H3: *There is a positive relationship between perceived behavioral control (PBC) and U.S. consumers' intentions to use apparel rental services.*

2.3. The Enhanced TPB: Perceived Consumer Effectiveness

Perceived consumer effectiveness (PCE) is defined as the level to which consumers believe that their efforts that can improve or solve the social and environmental problems [22]. PCE was first introduced by Kinneer, Taylor, and Ahmed [23]. In their study, it was noted that those with a high perception of effectiveness with regard to environmental protection also had a high level of environmental concern. Consumers that perceive themselves as not being effective enough to affect change would be lagging in the ability to translate environmental knowledge and concerns to actual behavior towards sustainable product consumption [24]. Prior studies found that PCE can significantly affect consumers' purchase intentions towards environmentally friendly apparel [6,13]. McCoy et al. [2] demonstrated that consumers with higher PCE show a higher likelihood to try fashion rental services. Ganak et al. [3] reported that U.S. consumers who are confident about their positive impact on environmental protection are more willing to recycle their used apparel. Therefore, the following hypothesis was proposed.

H4: *There is a positive relationship between perceived consumer effectiveness (PCE) and U.S. consumers' intentions to use apparel rental services.*

2.4. The Enhanced TPB: Consumer Knowledge

Consumer knowledge (CK) is the evaluation of the consumers' awareness and knowledge about apparel rental services and use procedures. Consumer knowledge about a product or service is an important factor in building their cognitive capacity, which influences their decision-making process [24]. McEachern & Warnaby [25] found that consumer knowledge on eco-labelled products increased their intentions to purchase them. Similarly, Lundblad and Davies [26] reported that a higher level of consumer knowledge about sustainable products usually leads to a stronger intention to purchase them. Consumers who have previous use experience are more likely to make informed decisions while shopping. Furthermore, consumer knowledge of environmentally friendly apparel shows an indirect and significant effect on their purchase intention through their attitude [24]. Zheng and Chi [13] indicated that attitude plays a partial mediating role between consumer knowledge and their purchase intention towards environmentally friendly apparel. Thus, the following hypotheses were proposed.

H5: *There is a positive relationship between consumer knowledge (CK) and U.S. consumers' intentions to use apparel rental services.*

H6: *There is a positive relationship between consumer knowledge (CK) and U.S. consumers' attitudes towards apparel rental services.*

2.5. The Enhanced TPB: Environmental Knowledge

Environmental knowledge (EK) is the evaluation of the environmental issues and causes and effects by consumers. Consumers' level of education on the issue regarding the environment is highly important for effecting change, especially in the consumption and disposal of products. Consumers' knowledge of the environment was found to positively influence their intention to purchase environmentally friendly products [2,27]. Zheng and Chi [13] reported that consumers who show more environmental knowledge are more willing to purchase environmentally friendly apparel. Ganak et al. [3] indicated that there is a clear connection between consumer environmental knowledge and their level of concern about environmental protection. In addition, Wai Yee, Hassan, & Ramayah [28] revealed that environmental

knowledge has a significant influence on consumer's attitude, which consequently leads to sustainable behaviors. Chi et al. [6] stated that attitude plays a mediating role between environmental knowledge and consumers' intentions to buy sustainable products. Therefore, the following hypotheses were proposed.

H7: *There is a positive relationship between environmental knowledge (EK) and U.S. consumers' intentions to use apparel rental services.*

H8: *There is a positive relationship between environmental knowledge (EK) and U.S. consumers' attitudes towards apparel rental services.*

2.6. The Enhanced TPB: Perceived Personal Relevance

Perceived personal relevance (PPR) describes the degree to which an individual perceives a stimulus or piece of information as personally relevant or applicable to their own goals, interests, values, or experiences [29]. Consumers that have the belief that the issue of environmental degradation is largely the result of his or her consumption patterns and lifestyle would be more likely to change their consumption behavior compared to consumers who believe that his or her contribution to environmental pollution is insignificant. Kang et al. [24] indicated that consumers' sustainable consumption behavior can be impacted through making connections with their lifestyles, values, self-image, and identity. PPR was found to have a significant influence on behavioral intention towards the consumption of environmentally sustainable textiles and apparel through consumer attitudes [24]. In other words, attitude plays a partial mediating role between PPR and consumers' intention to shop sustainable products. Chi et al. [6] stated that consumers who perceive sustainable apparel consumption to be highly relevant to their personal values and beliefs are more likely to engage in sustainable shopping behaviors. For example, consumers are willing to purchase slow fashion items that prioritize quality and longevity. Conversely, consumers who do not view sustainability as personally relevant may be less likely to engage in sustainable shopping behaviors. Thus, the following hypotheses were proposed.

H9: *There is a positive relationship between perceived personal relevance (PPR) and U.S. consumers' intentions to use apparel rental services.*

H10: *There is a positive relationship between perceived personal relevance (PPR) and U.S. consumers' attitudes towards apparel rental services.*

2.7. The Enhanced TPB: Past Environmental Behavior

Past environmental behavior (PEB) refers to a consumer's previous environmental actions, including those related to sustainable apparel shopping. PEB is an important factor that can influence a consumer's future behavior, including their likelihood to engage in sustainable apparel shopping [2]. Consumers who have engaged in sustainable shopping behaviors in the past are more likely to continue to do so in the future, while those who have not may be less likely to adopt sustainable shopping practices [3,13,30].

Van der Werff, Steg, and Keizer [30] found that individuals who have engaged in past environmental behaviors, such as recycling or using public transportation, are more likely to have positive attitudes towards environmental sustainability and may be more likely to engage in future environmentally friendly behaviors. Chi and Zheng [22] indicated that past environmental behavior can be an important factor in shaping a consumer's willingness to use apparel rental services. In the context of apparel rental services, PEB can play an important role in shaping individuals' attitudes and behaviors towards sustainable fashion. Individuals who have engaged in past environmental behaviors may be more receptive to sustainable alternatives and may have a higher willingness to pay for environmentally friendly options. This is because PEB can influence the perceived value of apparel rental services [8,9]. Thus, the following hypotheses were proposed.

H11: *There is a positive relationship between past environmental behavior (PEB) and U.S. consumers' intentions to use apparel rental services.*

H12: *There is a positive relationship between past environmental behavior (PEB) and U.S. consumers' attitudes towards apparel rental services.*

3. Proposed Research Model and Developed Survey Instrument

Based on the literature review above, we proposed a research model including all the investigated relationships (12 hypotheses). The model is illustrated in Figure 1. Attitude (AT), subjective norms (SN), perceived behavioral control (PBC), perceived consumer effectiveness (PCE), consumer knowledge (CK), environmental knowledge (EK), perceived personal relevance (PPR), and past environmental behavior (PEB) were proposed to significantly affect U.S. consumers' intentions to use apparel rental services. In addition, attitude could play a mediating role between consumer knowledge (CK), environmental knowledge (EK), perceived personal relevance (PPR), and past environmental behavior (PEB), and U.S. consumers' intention to use apparel rental services. We included the demographic variables (i.e., age, gender, income level and education level) as control factors.

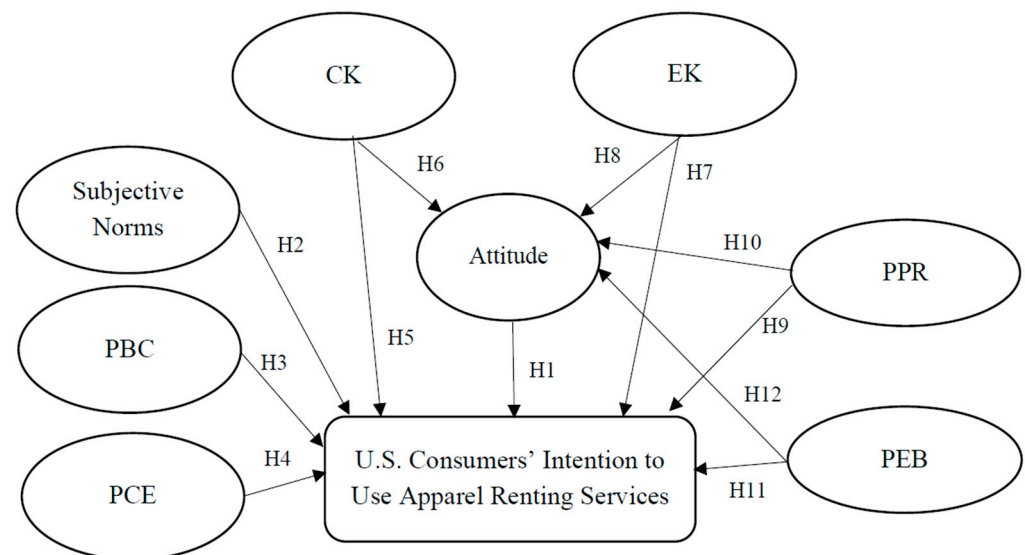


Figure 1. Proposed Model for U.S. Consumers' Intention to rent apparel.

The developed survey instrument consists of three sections: the first section measures participants' apparel shopping behavior and their experience with apparel rental services. The second section measures the following constructs: attitude (AT), subjective norms (SN), perceived behavioral control (PBC), perceived consumer effectiveness (PCE), consumer knowledge on apparel renting services (CK), personal relevance (PPR), environmental knowledge (EK), past environmental behavior (PEB) and use intention (UI). The scales for attitude (AT), subjective norms (SN), perceived behavioral control (PBC), perceived consumer effectiveness (PCE), and use intention (UI) were adapted from Zheng and Chi [13]. The scales for consumer knowledge on apparel renting services (CK) and personal relevance (PPR) were adapted from Kang et al. [24]. The scale for environmental knowledge (EK) was adapted from Barbarossa and Pelsmacker [31]. The scale for past environmental behavior (PEB) was adapted from Fraj and Martinez [32]. A five-point Likert scale (with 1 as "strongly disagree" and 5 as "strongly agree") was applied for all adapted scales. Table 1 lists all the constructs and their corresponding measurement scales (i.e., the questions in Section 2 of the survey instrument). The third section collects the general demographic information including age, gender, ethnicity, income level, and education level.

Table 1. Constructs and corresponding measurement scales.

Construct	Measurement Items	Source
Attitude (AT)	AT1: I like the idea of renting apparel. (0.897) AT2: Renting apparel is a good idea. (0.857) AT3: I have a favorable attitude towards apparel rental services. (0.912)	Zheng and Chi [13]
Subjective Norm (SN)	SN1: Close friends and family think it is a good idea for me to use apparel rental services. (0.859) SN2: The people who I listen to could influence me to use apparel rental services. (0.828) SN3: Important people in my life want me to use apparel rental services. (0.850) SN4: People who are important to me agree with my concern for the environment when renting apparel. (0.814)	Zheng and Chi [13]
Perceived Behavioral Control (PBC)	PBC1: Using apparel rental services is entirely within my control. (0.793) PBC2: I had the resources and ability to use apparel rental services. (0.772) PBC3: I have complete control over how often to use apparel rental services. (0.804)	Zheng and Chi [13].
Perceived Consumer Effectiveness (PCE)	PCE1: By renting apparel, every consumer can have a positive effect on the environment. (0.880) PCE2: Every person has the power to influence environmental problems by renting apparel. (0.878) PCE3: It does not matter for protecting the environment whether I rent apparel or not since one person's act cannot make a difference. * (Dropped due to low factor loading)	Zheng and Chi [13]
Consumer Knowledge (CK)	CK1: I am familiar with apparel rental services. (0.742) CK2: I have often rented apparel. (0.812) CK3: I know quite a lot about apparel rental services. (0.885) CK4: I have often read articles or news about fashion rental services. (0.867)	Kang et al. [24]
Environmental Knowledge (EK)	EK1: I think of myself as someone who has environmental knowledge. (0.765) EK2: I know renting apparel is good for the environment. (0.900) EK3: I have taken a class or have been informed on apparel sustainability issues. (0.898)	Barbarossa and Pelsmacker [31]
Perceived Personal Relevance (PPR)	PPL1: The use of rental services for fashion apparel products helps me to attain the type of life I strive for. (0.852) PPL2: I can make connections or associations between the use of rental services for apparel and other experiences and/or behaviors in my life. (0.812) PPL3: The use of rental services for apparel products is of personal importance to me. (0.865) PPL4: The use of rental services for apparel products helps me express who I am. (0.866)	Kang et al. [24]
Past Environmental Behavior (PEB)	PEB1: I alter/tailor my old clothing to create a new one when I am tired of it. (0.782) PEB2: I have bought clothing made from recycled material. (0.786) PEB3: I seek out information about different ways to wear the items I already own. (0.707) PEB4: I swap my clothing with other people. (0.802) PEB5: I bring glass bottles to the recycling bin. (Dropped due to low factor loading) PEB6: I turn off electrical appliances (to save energy). (Dropped due to cross factor loading) PEB7: I separate paper from my waste. (0.706) PEB8: I turn off the heater when I leave my room. (Dropped due to low factor loading) PEB9: I use energy-efficient light bulbs. (0.806)	Fraj and Martinez [32]
Use Intention (UI)	UI1: I intend to use apparel rental services. (0.904) UI2: I will try to rent apparel instead of buying apparel. (0.908) UI3: I will make an effort to reduce apparel consumption in the future. (0.904)	Zheng and Chi [13]

Note: Five-point Likert scale from "Strongly disagree = 1" to "Strongly agree = 5". *: Reversed measures. Numbers in the parentheses are the factor loadings to respective constructs.

4. Methodology

4.1. Data Collection

The primary data were collected by an online survey of U.S. consumers through Qualtrics. The professional survey website used was Amazon Mechanical Turk (<https://www.mturk.com>; 1 April 2020), which enabled reach to a wide range of eligible consumers [33]. Compared to conventional survey methods, the online survey method has its advantages, such as cost efficiency, short response time, ease and convenience for respondents to complete surveys, representative samples, and smaller margin-of-error [34]. A total of 338 eligible responses were received. The profile of survey respondents is presented in Table 2.

A total of 338 eligible responses were received and used for data analysis. Of the 338 respondents, 40% were female and 60% were male. The ages of the respondents varied from 18 years old to over 60 years old, mainly concentrated (74%) in the range of 18 to 40 years old. Most of the respondents had some college education or a Bachelor's degree (75%), followed by a Master's degree (12%), high school (10%), and a Ph. D (3%). In terms of ethnicity, a majority of the respondents were Caucasian (75%), followed by African American/Black (13%), Asian and Pacific Islander (7%), Hispanic and Latino (4%), and others (1%). The respondents' reported personal pre-tax annual income at less than \$10,000 (3%), to \$150,000 and more (2%). The remaining reported incomes were as follows: \$10,000 to \$24,999 (18%), \$25,000 to \$49,999 (30%), \$50,000 to \$74,999 (28%), \$75,000 to \$99,999 (13%), \$100,000 to \$124,999 (4%), and \$125,000 to \$149,999 (2%).

With regard to annual total expenditure on apparel, 37% of the respondents indicated that they spent less than \$200, followed by 24% at \$200–499, 14% at \$500–\$699, 9% at \$700–\$899, 9% at \$900–\$1499 and 5% at \$1500 or more. Of the total respondents, 64% said that they have not rented apparel before, while 36% had tried apparel rental services previously.

Table 2. Profile of the Survey Respondents.

	Percentage		Percentage
<i>Gender</i>		<i>Education level</i>	
Male	60%	High school	10%
Female	40%	Some college	18%
<i>Age</i>		Bachelor's degree	57%
18–25	12%	Master's degree	12%
26–30	29%	Doctorate degree	3%
31–35	21%	<i>Annual household income</i>	
36–40	12%	Less than \$10,000	3%
41–45	8%	\$10,000 to \$24,999	18%
46–50	7%	\$25,000 to \$49,999	30%
51–55	3%	\$50,000 to \$74,999	28%
56–60	6%	\$75,000 to \$99,999	13%
61 and older	3%	\$100,000 to \$124,999	4%
<i>Ethnicity</i>		\$125,000 to \$149,999	2%
White, Caucasian	75%	\$150,000 and more	2%
African American, Black	13%	<i>Annual expenditure on apparel</i>	
Asian, Pacific islanders	7%	\$0–199	37%
Hispanic/Latino	4%	\$200–499	24%
Others	1%	\$500–699	14%
<i>Have you ever rented apparel?</i>		\$700–899	9%
Yes	36%	\$900–1499	9%
No	64%	\$1500 and more	5%

Note: 338 eligible responses.

4.2. Statistical Analysis

Common method bias was checked by performing Harman's one-factor test using SPSS 29 software. The results show that the one-factor solution only explained 31.2% of the variation, falling far short of the 50% threshold [35].

The results of correlations and psychometric properties of all the constructs are presented in Table 3. The skewness and kurtosis scores of all investigated constructs fell into the range of +3.0 and −3.0, which showed no violations of the normality assumption [36]. All VIF values were smaller than 5.0, which indicated no multicollinearity issues among the investigated constructs [37]. A multivariate regression model with collinear predictors may not give valid results about any individual predictor, or about which predictors are redundant with respect to others.

The unidimensionality, reliability, discriminate validity and convergent validity of the investigated constructs were all examined [38,39]. Unidimensionality refers to the quality of measuring a single construct [38]. Reliability reveals the degree to which the measure of a construct is consistent [38]. Construct validity shows that a test designed to measure a particular construct is actually measuring that construct [39]. Conversely, discriminant validity shows that two measures that are not supposed to be related are, in fact, unrelated. Both types of validity are a requirement for satisfactory construct validity [38,39].

After an exploratory factor analysis, the measurement items PCE3, PEB6 and PEB8 were dropped due to their low factor loadings (see Table 2). All of the factor loadings of the remaining measurement items to their respective constructs were above 0.7 and statistically significant, while their loadings to other constructs were below 0.3 (see Table 2) [37,40]. These also support the unidimensionality of the constructs. In addition, the χ^2 test's *p* values of all the constructs were insignificant, suggesting unidimensionality [37]. Cronbach's alphas of all the constructs were above 0.7, while construct reliability scores were greater than 0.8, which demonstrated satisfactory reliability [41]. The average variance extracted (AVE) scores for all the constructs were above the desired threshold of 0.5, proving convergent validity. All AVE scores were greater than the squared corresponding correlations, which showed that discriminant validity was met [42].

Table 3. Correlations and Psychometric Properties of All Constructs.

	AT	SN	PBC	PCE	CK	EK	PPR	PEB	UI
AT	1	0.740 **	0.304 **	0.593 **	0.556 **	0.506 **	0.646 **	0.467 **	0.721 **
SN	<i>0.548</i>	1	0.204 **	0.577 **	0.666 **	0.610 **	0.740 **	0.559 **	0.758 **
PBC	<i>0.092</i>	<i>0.042</i>	1	0.348 **	0.065	0.087	0.127 *	0.079	0.159 **
PCE	<i>0.352</i>	<i>0.333</i>	<i>0.121</i>	1	0.429 **	0.381 **	0.563 **	0.394 **	0.553 **
CK	<i>0.309</i>	<i>0.444</i>	<i>0.004</i>	<i>0.184</i>	1	0.652 **	0.688 **	0.647 **	0.641 **
EK	<i>0.256</i>	<i>0.372</i>	<i>0.008</i>	<i>0.145</i>	<i>0.425</i>	1	0.686 **	0.578 **	0.648 **
PPR	<i>0.417</i>	<i>0.548</i>	<i>0.016</i>	<i>0.317</i>	<i>0.473</i>	<i>0.471</i>	1	0.630 **	0.704 **
PEB	<i>0.218</i>	<i>0.312</i>	<i>0.006</i>	<i>0.155</i>	<i>0.419</i>	<i>0.334</i>	<i>0.397</i>	1	0.604 **
UI	<i>0.520</i>	<i>0.575</i>	<i>0.025</i>	<i>0.306</i>	<i>0.411</i>	<i>0.420</i>	<i>0.496</i>	<i>0.365</i>	1
Mean	3.3	3.2	3.8	3.7	2.9	2.9	3.0	2.8	3.0
S.D.	1.1	1.1	0.9	1.0	1.1	1.0	1.2	1.3	1.2
VIF	2.590	3.278	1.215	1.871	2.357	2.266	3.308	1.962	-
Cronbach's alpha	0.867	0.857	0.796	0.713	0.846	0.721	0.871	0.706	0.890
Construct reliability	0.919	0.904	0.833	0.872	0.897	0.892	0.912	0.871	0.932
AVE	0.790	0.702	0.624	0.773	0.686	0.734	0.721	0.574	0.820
χ^2 test <i>p</i> value	0.187	0.169	0.084	0.133	0.106	0.172	0.095	0.147	0.208

Note: the italicized numbers are the squared corresponding correlations. *: correlation is significant at the 0.05 level (2-tailed). **: correlation is significant at the 0.01 level (2-tailed). UI = Apparel renting use intention, AT = Attitude, SN = Subjective norms, PBC = Perceived behavioral control; PCE = Perceived consumer effectiveness; CK = consumer knowledge on apparel renting; EK = environmental knowledge; PPR = Perceived personal relevance; PEB = Past environmental behavior.

4.3. Hypothesis Testing Results and Discussion

The proposed hypotheses were tested using multiple regression techniques. A mean score was calculated for each construct since their unidimensionality was met [37,43–45]. Table 4 presents the results of hypothesis testing. Among 12 hypotheses, eight of them (H1, 2, 4, 6, 7, 8, 9, and 10) are statistically significant at the $p < 0.05$ level, and H3, 5, 6, and 12 are insignificant. There were no significant differences by demographic variables including

age, gender, education level, and income level on U.S. consumers' attitude toward and intention to use apparel rental services, with all being insignificant at a $p < 0.05$ level.

Specifically, attitude (AT) positively affects U.S. consumers' intention to rent apparel ($\beta = 0.246, t = 5.453$), supporting H1. This indicates that U.S. consumers who exhibit positive attitudes toward renting apparel are more likely to use the service. This is aligned with the previous findings [6,9]. Subjective norms (SN) are found to positively influence U.S. consumers' intention to use apparel rental services ($\beta = 0.178, t = 3.504$), supporting H2. This reveals that significant others such as family members, close friends, and social influencers play a crucial role in motivating U.S. consumers to use apparel rental services. Perceived behavioral control (PBC) does not significantly affect U.S. consumers' intention to use apparel rental services ($\beta = 0.027, t = 0.862$), not supporting H3. This shows that the perception of the ease or difficulty in using apparel rental services is not a major concern for U.S. consumers. In other words, renting apparel is not something particularly challenging for U.S. consumers. Perceived consumer effectiveness (PCE) significantly affects U.S. consumers' intent to rent apparel ($\beta = 0.249, t = 5.649$), supporting H4. This shows that a higher level of consumers' confidence in their positive impact on environmental protection is likely to result in a greater likelihood for them to use apparel rental services. This finding corroborates the previous studies that reported PCE as one of the most influential predictors for consumers' sustainable shopping behaviors [13,24,46,47].

Consumer knowledge on apparel rental services doesn't significantly affect either U.S. consumers' attitudes toward or intention to use apparel rental services ($\beta = 0.116, t = 1.865$; $\beta = 0.004, t = 0.081$). Therefore, H5 and H6 are not supported. These findings are not aligned with prior studies [24]. However, the U.S. apparel rental market has been growing rapidly in the past few years. Many major fashion retailers and brands have started their rental business in recent years, including Nordstrom, Levi's, Bloomingdale's, Banana Republic, etc. U.S. consumers have become quite familiar with this new business model. Knowledge about the ability to rent apparel is no longer an obstacle to using the service [48].

Environmental knowledge (EK) significantly affects both U.S. consumers' attitudes toward and their intention to use apparel renting services ($\beta = 0.167, t = 2.079$; $\beta = 0.101, t = 2.398$). Therefore, both H7 and H8 are supported. This indicates that knowing the positive environmental impact of renting apparel instead of owning apparel influences U.S. consumers' attitudes and consequently their intention to use apparel renting services. The findings mesh with the prior argument that environmental knowledge (EK) can change consumers' willingness to switch to green consumption behaviors [2,9,13].

Perceived personal relevance (PPR) significantly affects both U.S. consumers' attitudes toward and their intention to use apparel renting services ($\beta = 0.492, t = 7.554$; $\beta = 0.379, t = 7.429$). Therefore, both H9 and H10 are supported. This indicates that U.S. consumers who perceive renting apparel to be self-related or in some way instrumental to achieving their personal goals and values are more likely to form positive attitudes toward apparel rental businesses and to use the services. The findings are aligned with prior studies on consumer sustainable textile and apparel consumption [24].

Past environmental behavior (PEB) has a direct significant impact on U.S. consumers' intention to use apparel rental services ($\beta = 0.091, t = 2.326$), while its impact on attitude is insignificant ($\beta = 0.043, t = 0.730$). Thus, H11 is supported, but H12 is not supported. The finding on the direct impact of past environmental behavior on consumer green consumption behavior meshes with previous studies [6,13,49].

Table 4. Results of Hypothesis Testing.

Hyp.	DV	IDV	Std. Coef. (β)	t-Value	Sig. at p < 0.05	Control Variable	Std. Coef. (β)	t-Value	Sig. at p < 0.05	Total R ²	Sig. at p < 0.05		
H1	Y	UI	Constant	-0.194	0.846	Age	-0.007	-0.245	0.807	0.747	<0.000 F = 78.96 (12/321)		
H2	Y	AT	0.246	5.453	0.000	Gender	0.025	0.885	0.377				
H3	N	SN	0.178	3.504	0.001	Education	0.042	1.344	0.180				
H4	Y	PBC	0.027	0.862	0.389	Income	0.022	0.742	0.459				
H5	N	PCE	0.249	5.649	0.000								
H7	Y	CK	0.004	0.081	0.935								
H9	Y	EK	0.101	2.398	0.017								
H11	Y	PPR	0.379	7.429	0.000								
		PEB	0.091	2.326	0.021								
H6	N	AT	Constant	4.593	0.000	Age	-0.046	-1.077	0.282			0.434	<0.000 F = 31.20 (8/325)
H8	Y	CK	0.116	1.865	0.063	Gender	0.007	0.160	0.873				
H10	Y	EK	0.167	2.079	0.012	Education	0.028	0.605	0.545				
H12	N	PPR	0.492	7.554	0.000	Income	0.005	0.102	0.919				
		PEB	0.043	0.730	0.466								

Note: Hyp.: Hypothesis; Y: Hypothesis Supported; N: Hypothesis Not Supported; Std. Coef.: Standardized Coefficients, DV: Dependent variable. IDV: Independent variable; UI = Intention to use rental services, AT = Attitude, SN = Subjective norms, PBC = Perceived behavioral control; PCE = Perceived consumer effectiveness; PEB = Past environmental behavior; EK = Environmental knowledge, PPR = Perceived personal relevance.

Figure 2 illustrates the identified relationships in the proposed research model. Attitude (AT), subjective norms (SN), perceived consumer effectiveness (PCE), environmental knowledge (EK), perceived personal relevance (PPR), and past environmental behavior (PEB) significantly affect U.S. consumers’ intention to use apparel rental services. There are no significant differences between ages, genders, education levels, and income levels in regards to their intention to rent apparel. Environmental knowledge (EK) and perceived personal relevance (PPR) positively affect U.S. consumers’ attitudes toward apparel rental services. The demographic variables do not significantly affect U.S. consumers’ attitudes toward renting apparel.

The proposed research model exhibits a high explanatory power, accounting for 74.7% of variance in U.S. consumers’ intention to use apparel rental services. U.S. consumers’ attitudes toward apparel rental services are also well predicted by the investigated constructs, collectively accounting for 43.4% of variance.

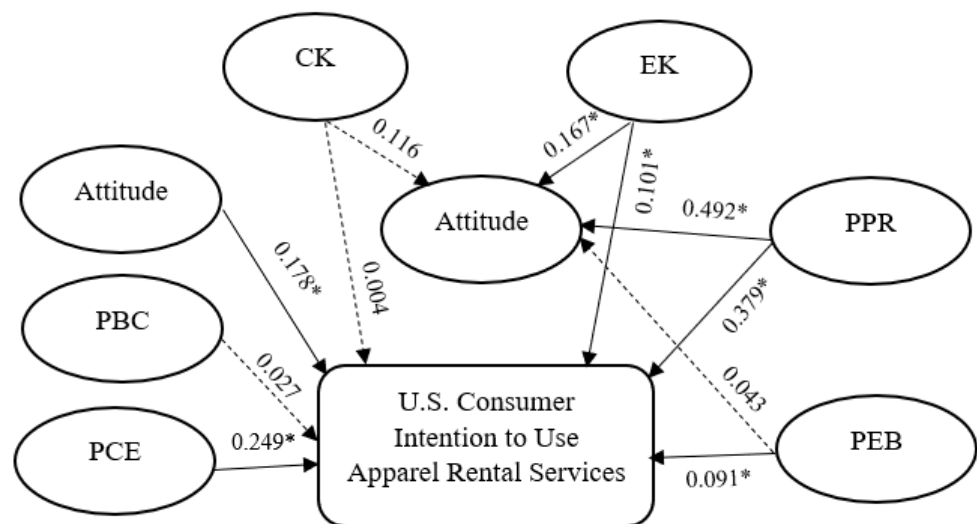


Figure 2. Identified relationships in the proposed model. Note: *: statistically significant at $p < 0.05$.

5. Conclusions and Implications

The fashion industry is strongly linked with the notion of environmental pollution, and in recent years, every living breath of apparel and fashion companies has been dedicated to promoting and improving their sustainability efforts and practices. These sustainable practices include the use of sustainable materials such as natural fibers, recycled fibers, the development of environmentally sustainable products, and the introduction of sustainable

consumption methods such as collaborative consumption methods. Collaborative consumption in the form of renting entails sharing the access to goods and services without ownership transfer [21]. Apparel rental services have become increasingly popular in recent years as consumers become more conscious of the environmental impact of fast fashion and the financial burden of constantly buying new clothes.

This study contributes to the existing literature in four ways. First, the study extends the theory of planned behavior through additional antecedents (i.e., perceived consumer effectiveness (PCE), consumer knowledge (CK), environmental knowledge (EK), past environmental behavior (PEB), and perceived personal relevance (PPR)), and provides an improved explanatory power of the proposed model for U.S. consumers' intention to rent apparel. The proposed model collectively accounts for 74.7% of variance in U.S. consumers' intention to use apparel rental services. Second, the study reveals the partial mediating role that attitude plays between environmental knowledge (EK), perceived personal relevance (PPR), and U.S. consumers' intention to rent apparel. Consumers with a positive attitude towards apparel rental services are more likely to view them as a convenient, cost-effective, and sustainable alternative to traditional apparel consumption. Third, the psychometric properties of the proposed research model met all statistical standards. Therefore, the model could be used in the examination of other products and in other countries to produce useful results. Finally, in addition to the significance of the traditional TPB measures to the findings regarding U.S. consumers' intention to rent apparel, the enhanced model provided new insights to help understand the motivations of U.S. consumers' adoption of collaborative apparel consumption. Consumers who perceive sustainable consumption to be highly relevant to their personal values and beliefs are more likely to engage in using apparel rental services. Many people feel pressure to constantly update their wardrobe to keep up with the latest fashion trends. This can be expensive and unsustainable. By renting apparel, consumers can experiment with different styles without having to commit to purchasing an entire outfit.

This study also provides some managerial implications for brands and retailers offering rental services and other sustainable practices in the apparel and fashion industries. Empirical findings showed that consumers' attitudes towards the use of apparel rental services significantly influenced their intentions, and companies offering apparel products for rent should devise ways to adequately address their marketing promotions to engage and educate consumers on the favorable impacts that the consumption of apparel products through renting has on the environment and its sustainability.

Consumers are increasingly turning to apparel rental services as a way to reduce their environmental impact. However, the success of these services is not only determined by the sustainability benefits they offer, but also by how consumers perceive their own effectiveness in using them. One factor that can influence perceived consumer effectiveness in the context of apparel rental services is the complexity of the service. If the process of selecting and renting clothing is perceived as difficult or time-consuming, consumers may feel less confident in their ability to use the service effectively. Conversely, if the service is perceived as simple and user-friendly, consumers may feel more confident in their use of it. Rental services that offer clear and concise instructions, as well as a user-friendly website or app, may be more effective in increasing consumers' perceived effectiveness.

Furthermore, since perceived personal relevance (PPR) has a positive and significant influence on consumers' intention to use apparel rental services, in order to increase PPR in sustainable apparel shopping, brands and retailers can focus on marketing sustainable clothing in a way that highlights the personal benefits of sustainability, such as improved health or environmental impact, rather than solely focusing on the social and environmental benefits. Additionally, brands and retailers can provide information to consumers about the sustainability of the apparel they sell, such as the materials used and the manufacturing process, in order to help consumers make more informed purchasing decisions.

Brands and retailers can leverage past environmental behavior (PEB) in their marketing efforts by highlighting the sustainable shopping behaviors that their customers have already engaged in, such as purchasing sustainable apparel. Brands and retailers can also provide

incentives to customers who have engaged in renting apparel, such as discounts or rewards, to encourage continued behavior. Another way to increase PEB in apparel rental services is through social influence. For example, consumers may be more likely to engage in apparel rental services if they see their peers doing so or if they feel that renting apparel is socially expected of them. Brands and retailers can encourage social influence by creating a community around apparel rental services, such as through social media groups or in-store events, where consumers can share their experiences and support each other in using apparel rental services.

Finally, this empirical study revealed that PBC did not significantly impact U.S. consumers' intention to use apparel rental services. This is particularly interesting and suggests that the consumers do not consider the use of rental services as difficult or beyond their control. This further implies that the apparel brands and retailers that offer apparel products for sale could keep up with the business interface for the offer of rental services to their customers.

6. Limitations and Future Studies

Although this study has provided a significant contribution to the understanding of the motivations for U.S. consumers' intention to use apparel rental services, there are some limitations that may be addressed in future studies. First, this study has made conclusions and implications based on the findings from the extended TPB model developed towards U.S. consumers' intention to use apparel rental services. Therefore, the generalization of this study towards other product categories or to other types of collaborative consumption requires further validation. Second, this study did not delineate a specific apparel product type within apparel rental services, so the survey instrument may be adapted for specificity when considering specific product types such as wedding dress, business dress, etc. Finally, the study used a quantitative approach to identify the determinants for U.S. consumers' apparel rental intentions. While the quantitative research method was useful for the examination of the causal relationships between the independent factors and the U.S. consumers' renting intention for apparel products, it is considered a weak approach in revealing the underlying reasons for the phenomenon. Future studies may consider the use of qualitative methods to provide a more detailed deduction with regard to the relationships established by the quantitative analysis.

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