

*Original Research*

# Generation Z's Intentions Towards Sustainable Clothing Disposal: Extending the Theory of Planned Behavior

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## Abstract

The objective of the study is to propose and empirically examine a model of the determinants of Generation Z apparel consumers' intentions to dispose of their used clothing in a sustainable way, via clothing collection and recycling boxes established in fashion retail stores. The study builds upon the acknowledged model for human behavior predictions, the Theory of Planned Behavior, and enhances it by the inclusion of green consumption values. A survey performed in Serbia by means of self-administered questionnaire resulted in 386 responses. Structural equation modeling (SEM) indicated perceived behavioral control as the most influential determinant of customers' intentions to dispose of used clothing via clothing collection boxes. Subjective norms, in spite of insignificant direct impact on intentions, emerged as the second most relevant determinant of customer disposal intentions, in terms of total effect, followed by green consumption values and attitudes. Implications of the study are discussed and limitations and future research directions are noted.

**Keywords:** sustainable clothing disposal, Generation Z, the Theory of Planned Behavior, green consumption values, structural equation modeling

## Introduction

Clothing plays an important role in contemporary living, it possesses important economic value, a significant social function [1] and strong emotional meaning [2]. The symbolic function of clothes related to self-identity has led to the growing production and offering of fashion clothing at the global level. Today, the textile industry takes place among the most polluting

industries due to tremendous usage of water and energy, usage of harmful chemicals and non-biodegradable materials, creating large quantities of waste and huge consumption of fuel for global transportation [3, 4]. Actually, textiles industry is the third sector in Europe regarding the use of water and land and the fifth regarding the usage of raw materials and emission of greenhouse gases, while textiles consumption makes the fourth highest influence on the environment and climate change, following food, housing and mobility. On average, 11kg of textiles is thrown away annually per European citizen [5]. However, the greatest impacts of clothing and textiles products consumption in Europe

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happens in other regions, where the production mostly takes place (85% of raw materials use, 93% of the land and 92% of the water use and 76% of greenhouse gasses emissions [6]).

Clothing consumption brings negative environmental change which is associated with the consumption-generated pollution and waste. The overconsumption of clothing accompanied with unsustainable consumption patterns represent a serious global phenomenon taking into account that large quantities of textile waste end up in landfills [7-9]. This issue has been recognized as alarming at the global level, and certain international and national regulations are developed in order to reduce the negative consequences and fight this problem in the future. The accent is placed on the strengthening of environmental and social sustainability of the textile production and market [10] and understanding of consumers' knowledge, motives and intentions regarding sustainable clothing [11]. The European Commission identified textiles as a product category which is especially relevant for the circular economy. The Circular Economy Action Plan [12] (the first adopted in 2015, and a new one in 2020) tangles several domains of the textile supply chain. EU Strategy for Sustainable and Circular Textiles, which was published in March 2022 [13], proposes actions related to all phases of textiles products lifecycle, and supports green transitions in this industry, as well as inclusion of all relevant stakeholders (producers, designers, retailers, advertisers and consumers).

Consumers are, in general, becoming more aware of sustainability and express greater environmental concerns. However, current awareness level of sustainable clothing consumption practices is still not powerful enough to become the most significant driver of consumers' behavior [14]. Actually, consumers are still not entirely aware of the environmental impacts associated with their clothing purchases, especially when it comes to disposal [9]. Behavioral changes are not efficient enough due to the lack of clear information and necessary logistics for consumers to behave in a more environmentally friendly manner [15].

In order to bring changes in clothing industry, besides adopting circular business models and sustainable business practices, it is necessary to educate and stimulate consumers to make behavioral changes related to clothing consumption – from acquisition to disposal of clothes. The attention should be especially put on consumers belonging to Generation Z taking into account that young people are most common consumers of fast fashion and likely to follow rapidly changing fashion trends. With this regard, there is still a lack of evidence of young consumers' clothing disposal behavior and its determinants, especially in developing countries which lag behind developed ones when it comes to practices such as recycling and reuse. Aiming to fill this gap, this paper contributes to the better understanding of the clothing disposal behavioral intentions of consumers belonging to

Generation Z, taking into consideration their green consumption values, attitudes, perceived behavioral control, subjective norm, and receptivity to green communication.

The remainder of the paper is structured in the following way: After the introductory part, the review of the literature and conceptual framework is given in the Section 2. It contains the literature review on the following topics: clothing disposal, the Theory of Planned Behavior, green consumption values and receptivity to green communication. The Section 3 is dedicated to research methodology and it includes presentation of research sample and data collection, questionnaire items and method of analysis. Afterwards, the presentation of the obtained results is given in the Section 4, and the discussion of the study's findings is given in the Section 5. Finally, concluding remarks containing research contributions and limitations are to be found at the end of the paper.

## **Review of Literature and Conceptual Framework**

### **Clothing Disposal**

Environmentally sustainable clothing consumption contains the following activities: acquisition, storing, using, maintaining and discarding of clothes which are conducted in a manner which is environmentally preferable in relation to conventional clothing consumption [16]. Besides acquisition and use, important phase of environmentally responsible clothing consumption is its disposal at the end of the lifespan [17]. Lack of awareness regarding the post-consumption waste related to clothing and other textile products may cause the unsustainable disposal practices [18]. In order to encourage more environmental-friendly practices, which could reduce environmental impacts in close future, it is necessary to understand reasons for and ways of clothing disposition [19]. First, it is necessary to determine current state, which can differ among different generation groups, and to determine antecedents of such behavior. The research interest in the topic of motivational factors for clothing disposal behavior has increased over the past several decades, along with growth of the problem with textile waste (e.g. [18-22]).

At the end of the lifespan of a clothing item, consumer may decide to give it away, donate it to charity, resell it, dispose for recycling, reuse it (e.g. as kitchen rug), continue keeping it at residence or throw it away as waste. Consumers' decisions in this phase influence sustainability of clothing consumption significantly, since they determine clothing lifespan and potential for reusing and recycling [23]. There are different motivational factors for the disposal of unwanted clothing. Concerns related to economic benefits might lead to reselling or reusing of still wearable clothes,

altruistic concerns stimulate donating clothes to charity or recycling organizations. Convenience concerns and lack of environmental awareness mainly lead to the least sustainable practice of throwing away of undesired clothes [22]. Harris, Roby and Dibb [24] indicated that consumers' behavior will not easily change if the focus is solely on sustainability due to diversity of consumers ethical concerns. These authors proposed interventions in various areas, including the design of sustainable clothing, changing washing norms for clothes and increasing recycling and repair.

In general, there is a tendency of using clothes for a shorter period of time, and disposing of some items even they are still not worn out, which is instigated by growth of fast fashion and overconsumption [21, 25]. Cheaper items are more easily thrown away, especially when they are of lower quality or attached to current fashion trends. On the other hand, consumers often decide to hoard some clothes they do not use anymore, especially expensive items, which creates a substantial amount of potential waste [24]. Laitala [26] summarized empirical findings related to consumers' clothing disposal behavior and concluded that the most common reasons for clothing disposal were: worn out, poor fit, out of fashion or boredom, and lack of storage space. Since throwing away of still usable item represents the worst disposal option, it is essential to prevent consumers to use trash for apparel disposal [18]. The study of Goworek et al. [27] conducted in UK, showed that consumers commonly chose to throw away apparel perceived to be inexpensive and poorly constructed instead of donating or reusing it, mainly due to a limited awareness on the topic of clothing sustainability. Similarly, the research conducted in China indicated that, despite several available recycling alternatives, consumers most often chose to throw clothes away or continue keeping them [22].

Laitala [26] pointed out that many consumers prefer to find reuse for their clothes than to simply dispose of them, however, convenience is a key factor with this regard. Respondents in the study of Degenstein, McQueen and Krogman [19] expressed their willingness to implement actions which were not seen as most convenient options (e.g. donation, repairing, disposing at recycling bins), which indicates that municipalities should build proper infrastructure for different, more sustainable disposal options. One research conducted in Ecuador, explored gifting to family and friends as clothing disposal option and found out that this system of giving is based on social exchange, it reinforces the relations of givers and recipients by enabling a circulation of clothes for a longer period of time [28].

Consumers are nowadays rarely opting for repairing and modification of clothes which do not fit them well anymore but are still wearable. Due to massive availability of fast fashion clothing, consumers see replacing the old with new clothes as more convenient option than repairing or modifying them [24]. Also, practices of reselling or exchanging of undesired

clothes is still not common, but, with growth of digital platforms which offer possibilities for exchange of undesired clothes among members of online groups [29], those are expected to increase.

Norum [30] conducted a research on a sample of female consumers in U.S., and found out that disposal modes, in relation to frequency of choosing were: donation to charity, donation to secondhand stores and throwing to trash. Donation to charities is explored as one of the most preferred options of clothing reuse. Ha-Brookshire and Hodges [31] focused on better understanding of consumers' motivations to donate clothes and found out the need to create space for new items was the primary motivation and that consumers observed both hedonic and utilitarian values of their donation behavior. Findings of the research conducted on samples of female consumers in Scotland and Australia, indicated that recycling behavior was the greatest predictor of donating in relation to reselling and giving away to family members and friends [32]. Other research of the same authors, conducted on samples of female consumers in Australia and Chile, confirmed that positive attitudes towards recycling more strongly and directly predicted intention to give clothing as donations to charity than to pass it on to family and friends [21].

There are studies which targeted young consumers in particular and examined their disposal habits and intentions towards sustainable clothing consumption. Diddi et al. [8] found out that young consumers are likely to engage in sustainable clothing consumption for the following reasons: perceived value, dedication to sustainability, uniqueness and change of lifestyle; while, on the other hand, they noted following constraints: perceived lack of variety/style, financial constraints, lack of knowledge, skepticism, consumption related emotions, perceived insufficient availability and self-indulgent behavior. Young Lee et al. [33] conducted a study aiming to investigate disposition behavior of young consumers', and the findings indicated that they engaged in several disposition behaviors, such as donation, selling, repurposing and swapping. The decision of the disposal option was led by items' fashionability, physical condition and individual's social responsibility. They reported to experience primarily positive emotions related to clothes disposal and expressed positive intentions in the future. A study conducted in US on three different generational cohorts showed that female consumers, belonging to younger age groups, and those who are more fashion trends sensitive and more frequent shoppers, disposed of their clothes more frequently [34].

One study conducted in UK, on a sample of young female consumers, showed the lack of awareness of recycling options and, so, in addition to donating wearable items to charity shops, the rest of their old clothes ended up at landfill [35]. Another study which included female students and in the US, showed that their environmental and charity concerns motivated

reselling and donations, economic concerns motivated reusing and reselling, while convenience motivated discarding behavior. The findings indicated that, even if they were aware of the availability of recycling options, they might still decide to discard old and undesired items [20]. Park et al. [36] examined stimulating factors for young consumers' apparel donation behavior and found out that, both self-oriented reasons and other-oriented reasons affected their attitudes related to donations of apparel.

Even though the topic of clothing disposal gets attention worldwide, there is a lack of academic studies conducted in Serbia. One survey on a sample of Serbian consumers showed that younger respondents expressed greater probability to hoard clothes they do not wear, while older respondent preferred giving away or donating clothing [37]. However, there are no academic studies and empirical evidence of the predictors of choosing certain disposal option. Therefore, the understanding of predictors of clothing disposal intentions of Serbian consumers is definitely needed.

### The Theory of Planned Behavior

The Theory of Planned Behavior (TPB) [38] represents one of the mostly applied models in the field of environmentally friendly consumer behavior which can explain and predict consumers' behavioral intentions. According to TPB, behavior is directly determined by behavioral intentions, whereas intention is predicted by attitude towards behavior, subjective norms and perceived behavioral control. In the field of green consumption and behavior, TPB was used in many research areas (e.g. [39-43]). This theory provides solid theoretical basis for exploring factors that influence various clothing disposal intentions/behaviors [22, 44, 45].

Attitudes (ATT) represent person's subjective assessment on a particular behavior [38]. In this context, attitude is determined by beliefs of an individual regarding the likelihood of the consequences of certain behavior [45]. Despite the phenomenon of attitude-behavior gap, which is also detected in the context of sustainable clothing [46, 47], attitudes are considered to significantly affect behavior and represent major predictor of behavioral intentions [22, 39, 48, 49]. Behavioral intention (BI) represents "an individual's willingness towards conducting a specific behavior" [22]. It is considered that behavioral intention represents the most immediate predictor of behavior, and it is determined by attitudes and subjective norms [45].

Attitudes are found to be significant predictor of behavioral intentions in previous studies related to various forms of pro-environmental behavior, such as: energy savings and carbon reduction [50], recycling [51], green product purchasing [40, 43, 52-55], organic product purchasing [42, 56], green housing [57, 58], visiting green hotels [59, 60], paying for green transportation [61], pro-environmental behavior in

general [62, 63], etc. In some cases, attitudes were noted to have the highest influence on consumers' behavioral intentions among all TPB constructs (e.g. [52, 53, 64]). Attitudes were also found to be the major predictor of students' behavior intention related to organic food purchasing [39, 65] and green products purchasing [66], as well as predictor of high-school students' pro-environmental behavioral intentions [67].

There is certain empirical evidence that attitudes are significant predictors of behavior intentions closely related to clothing disposal. The findings of Koch and Domina [68], showed that environmental attitude influenced textile disposal method in a positive way. In the research conducted by Bianchi and Birtwistle [21], positive attitudes of consumers towards recycling were found to be main predictors of donating clothing to charity. Also, Koszewska [69] found out that consumers' attitudes towards apparel purchasing significantly and positively influenced consumers' willingness to pay for sustainable products and actual intentions to purchase sustainable clothing. Park [70] found out that attitudes for recycling of waste and environmental protection were predictors of clothing recycling behavior. By investigating perceptions of consumption behavior of young Millennials in US and China, Su et al. [71] found out that knowledge on apparel sustainability and personal values positively influenced attitudes towards sustainable clothing, which, further, strongly and positively impacted purchase intentions.

In this research, consumers were intended to imagine that clothing collection and recycling boxes were placed in the facility where they shop most often or near the place where they go shopping most often, or on the way to faculty, work, gym. So, respondents needed to express their intentions of clothing disposal in clothing collection and recycling boxes in case they were available at more places. In this case, attitudes reflect how respondents feel about disposal of used clothes in clothing collection and recycling boxes placed in retail facilities. On this ground, the following hypothesis is set:

**H1:** Attitudes (ATT) towards disposal of used clothes in clothing collection and recycling boxes have a positive impact on behavioral intentions (BI).

Subjective norms (SN) represent a perceived social influence to conduct or not to conduct certain behavior. It is the perceived social pressure coming from individual's influential people [38]. Subjective norms, which represent normative beliefs, could prevent favorable attitudes towards a behavior to translate into actual behavior, or vice versa [45]. Subjective norms were found to affect intentions to: purchase green products [41, 52-54, 58, 64, 72], purchase organic products [42, 56], recycle [22, 51, 73], engage in energy savings [50], visit green hotels [60, 74], pay for green transportation [61]. Social norms are found to be significant predictors of young people's intentions to behave in a pro-environmental manner [63, 66, 67]. As regarding clothing, the findings of one research showed



that personal norms and environmental awareness, as well as social norms, represent main factors which influence sustainable consumption of fashion products [75]. Also, subjective norms are found to be predictors of behavioral intentions towards disposal practices of textile products [20, 44]. Similarly, the results of research conducted in China indicated a significant and positive impact of social capital and peer influence on behavioral intentions regarding sustainable consumption of clothing items [76].

In this research, subjective norms relate to the influence of significant people (whose opinion respondents appreciate), on respondents' behavioral intentions to use collection and recycling boxes as a disposal method. With this regard, the following hypothesis is set:

**H2:** Subjective norms (SN) have a positive impact on behavioral intentions (BI) to dispose used clothes in clothing collection and recycling boxes.

Perceived behavioral control (PBC) is explained as an individual perception of the ability to conduct certain behavior. It represents the person's feeling of control when conducting specific behavior [38]. The role of PBC reflects in the notion that sometimes, even though consumers may demonstrate positive attitudes towards the pro-environmental behavior and receive social confirmation, but have limited resources and ability to perform on the other hand, this indicates that it may not translate into behavioral intentions. PBC was found to influence behavioral intentions regarding: green product purchasing/green purchase behavior [40, 43, 52, 54, 55, 57, 58], organic product purchase [42], visiting green hotels [59, 60], recycling [22, 73], etc. PBC was also found to be important predictor of high-school students' pro-environmental behavioral intentions [67] and green and organic purchasing intentions of young consumers [65, 66]. In this research, we propose that if respondents had the proper information and resources to use collection and recycling boxes, they would demonstrate behavioral intentions to sort and dispose of their used clothes. In accordance with this assumption, we develop the following hypothesis:

**H3:** Perceived behavioral control (PBC) has a positive impact on behavioral intentions (BI) to dispose of used clothes in clothing collection and recycling boxes.

While the influence of subjective norms on intentions to behave in an environmentally conscious manner is significantly explored in literature, the evidence on the relationship between subjective norms and attitudes is rather scarce. In one earlier study, it was found that attitudes towards purchasing organic food were predicted by subjective norms, therefore, subjective norms influenced behavioral intentions indirectly, through formation of attitudes [77]. Recent research has provided evidence of significant impact of subjective norms on attitudes towards green products and young consumers' attitudes related to green behavior in general [63, 64]. Even though no empirical

evidence of such relationship was found in literature on clothing disposal, it is reasonable to assume that the influence of significant people can shape respondents' attitudes regarding using disposal and recycling boxes as disposal method. In accordance with that, authors propose the following hypothesis:

**H4:** Subjective norms (SN) have a positive impact on attitudes (ATT) towards disposal of used clothes in clothing collection and recycling boxes.

To our knowledge, the relationship between SN and PBC was not confirmed in the area of environmentally friendly behavior and, therefore, also in the area of sustainable clothing disposal. Obviously, there is a space to investigate such relationship, so, in this research, we assume that perceived behavioral control, reflected in the available information and resources to deploy used clothes, might be affected by consumers' significant others. With this regard, we assume that:

**H5:** Subjective norms (SN) have a positive impact on perceived behavioral control (PBC).

### Green Consumption Values

The green consumption values (GCV) represent the tendency of consumers to express the concern regarding environmental protection through purchasing decisions and consumption. Consumers whose green consumption values are stronger are, in general, more concerned regarding environmental protection and responsible consumption [78]. Research findings have confirmed that possession of green consumption values was a solid predictor of consumers' preferences for products which are produced in environmentally friendly way [79].

Bailey, Mishra and Tiamiyu [80] measured consumers' tendency to express environmental concern and found out that green consumption values were positively related to consumer attitudes and intentions. In the study of Cheung and To [81], it was shown that consumers' environmental consciousness (environmental value) had a strong impact on their attitudes towards environmental issues, which, consequently, positively influenced consumers' green purchase behavior. In a study of Ramayah, Lee and Mohamad [82], conservation value was found to be positively linked to attitudes on environmental consequences related to green purchasing intention. In accordance with those findings, the following can be assumed:

**H6:** Green consumption values (GCV) have a positive impact on attitudes (ATT) towards disposal of used clothes in disposal and recycling boxes.

It was found out that customers showing high levels of environmental concern had more positive attitudes, high positive SN and PBC, which further motivated them to develop stronger intentions to behave in an environmentally focused way [54]. In general, there is a lack of empirical evidence of the relationship between green consumption values and perceived behavioral control and subjective norms. Despite the

fact that such relationships are under-researched so far, there are well-founded reasons why it is reasonable to believe that GCV can affect PBC and that GCV might be influenced by SN. Those consumers who think of themselves as environmentally responsible and who are willing to put their convenience aside to take actions that are environmentally responsible are expected to be in control of discarding their used clothes in an environmentally and socially responsible way. It is also reasonable to believe that significant others' concern for environment will reinforce consumers' adoption of green values when it comes to making consumption decisions. Accordingly, we propose the following:

**H7:** Green consumption values (GCV) have a positive impact on perceived behavioral control (PBC).

**H8:** Green consumption values (GCV) are positively influenced by subjective norms (SN)

There is a number of research studies which suggest that consumers' green consumption values demonstrated a positive influence on green purchasing behavior [78, 83]. The findings of Wang, Wang and Gao [84] indicated that green consumption values had a positive impact on pro-environmental consumption intention. The positive relationship between green consumption values and purchase intention for organic clothing, partially mediated by attitudes, was found by Varshneya, Pandey, and Das [85]. Also, Pinto et al. [86] found out that consumers' personal values made an impact on responsible consumption and that environmental awareness and green values could predict behavior. Gonçalves, Lourenço and Silva [83] investigated whether consumption values can be predictors of green purchasing behavior and found out that emotional, conditional and social values individually combined with the functional value were predictors of green behavior. In additional research on the similar topic, social value appeared to have the greatest impact on consumers'

environmental concern expressed in green purchasing, while epistemic and functional value were ranked as less influential [87]. Amin and Tarun [88] found out that emotional value, of the three consumption values (functional, emotional and social) had a major influence on purchasing intention of green products. Among four constructs of green perceived value (functional, social, conditional and emotional), it was found that consumers were instigated by emotional and social values in the context of the green energy adoption [89]. De Groot and Steg [90] concluded that, among environmental values, altruistic and biospheric values were stronger predictors of intentions of pro-environmental behavior. Wang et al. [91] found out that personal biospheric values represented predictors of pro-environmental behaviour. Biospheric and altruistic values were also found to stimulate sustainable clothing purchases [47]. Based on those previous empirical findings, the following can be assumed:

**H9:** Green consumption values (GCV) have a positive impact on behavioral intentions (BI) to dispose of used clothing via collection and recycling boxes.

Fig. 1 displays hypothesized relationships.

### Methodology

#### Sample and Data Collection

The study has been performed on a convenience sample of Generation Z clothing customers, i.e. young consumers who are at least 18 years old and who were born in or after 1996 [92]. Data collection has been performed by means of an online self-administered questionnaire. By sharing a link to an online questionnaire form, researchers recruited students attending a large state faculty in Serbia as respondents.

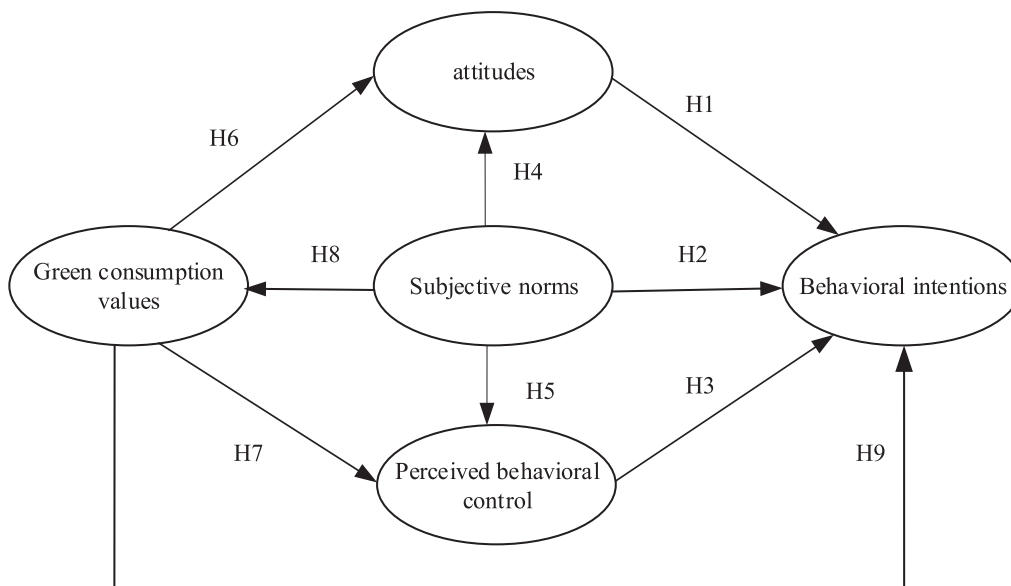


Fig. 1. Conceptual framework.

Students who agreed to assist with data collection were also asked to share the link to the questionnaire to their friends and acquaintances who might have been interested into the topic of the study and who have been aged between 18 and 27 years. Data collection took place from November 2021 until June 2022. In total, data collection resulted in 454 responses. However, as the primary focus of the study was on Generation Z respondents, the exclusion of responses from study participants beyond the aforementioned generation yielded 386 responses which were included in data processing.

### Questionnaire Items

The questionnaire included three parts. Respondents were presented with the aim of the study at the beginning of the questionnaire and their voluntary and anonymous participation was sought out. The concept of clothing disposal was explained to respondents as decisions and resulting acts that they are most likely to undertake once they decide to stop wearing some clothing items any longer. Green consumption values were measured with 6 items which were adapted from the study of Do Paço et al. [78]. Respondents were asked to indicate on a 7-point Likert scale the extent to which environmental impact was important to them and how likely they were to take into account products' harmfulness to the environment when making purchase decisions. The second part of the questionnaire included a scenario related to sustainable disposal of used clothes. Respondents were presented with a hypothetical scenario of fashion retail stores with clearly marked boxes for collection of discarded clothing items. Though certain fashion retailers already offer in-store collection boxes, this is still not a widespread practice on Serbian fashion market. In these boxes customers could deposit pieces of their worn clothes that they are ready to discard, regardless of the brand and the condition of those used garments. Clothing items that are still in good condition and reusable would be distributed to humanitarian organizations, resold in second-hand or vintage shops or upcycled into new clothing items or accessories. Worn-out clothes would be further distributed to facilities for recycling and production of insulation materials, whereas non-reusable textiles would end up in incineration plants. Sales revenue of such clothing would be used to support socially responsible initiatives. Respondents were asked to respond to a set of statements, imagining a situation of widespread availability of aforementioned collection boxes at places where they usually shop.

Taking into account numerous criticisms of the Theory of Planned Behavior for addressing only cognitive aspect of attitudes, and in line with previous research [93], we decided to include both affective and cognitive components of attitudes. Respondents' attitudes related to the disposal of used clothes in drop-off and collection boxes placed in retail stores were

measured by 8 items which were adapted from the work of Voss et al. [94]. Seven-point semantic-differential scale was used to measure consumer attitudes (e.g. bad/good, ineffective/effective). Subjective norms were measured by 3 items which were applied in the study of Lang and Armstrong [95] and adapted to the context of this research. Respondents were asked to indicate on a 7-point Likert-type scale the extent to which opinions and behavior of their significant others related to environmental preservation were important to them when deciding how to dispose of their used clothes. Perceived behavioral control was measured with 3 items which were adapted from the study of Paul et al. [40]. Respondents were asked to indicate the extent to which they agreed that they could easily dispose of their used clothes into collection boxes placed in fashion retail stores if they had more information about this concept and to indicate their willingness to invest required time and energy to perform these actions. Behavioral intentions, i.e. respondents' willingness to dispose of their used clothes into collection boxes, had these boxes been placed into retail stores or other convenient places on their way to work or school, were measured by 4 items which were adapted from the studies of Seegebarth et al. [96] and Rausch and Kopplin [45]. Items related to respondents' behavioral intentions were measured on a 7-point Likert-type scale. Respondents were also asked about their clothing disposal behavior, i.e. in what situations they decide to stop wearing a clothing item for its initial purpose, their most probable disposal pattern when they stop wearing still usable clothing item for its initial purpose and their most probable disposal choice when an item loses its aesthetic characteristics.

The questionnaire was developed in English, taking into account previously validated measurement scales, and translated into Serbian. To achieve translation equivalence, we followed Mullen's [97] suggestion to translate the items back into the original (English) language, to detect and eliminate any translation inconsistency. Prior to conducting large scale data collection, authors performed a pilot study, on the basis of which minor modifications were made to questionnaire items to improve comprehensibility of the measurement instrument.

### Analysis

Structural equation modeling (SEM), with Maximum Likelihood as a method of parameter estimation, was applied to test hypothesized relationships. Following Anderson and Gerbing's [98] two-step procedure, confirmatory factor analysis (CFA) was performed first, to estimate measurement model and reliability and validity of the constructs, which is followed by the estimation of structural relationships. SPSS 17 and Amos 16 were used for data analyses. To examine total effects of latent predictors on consumer disposal intentions we applied Maximum Likelihood bootstrapping procedure,

with 1000 bootstrap samples and 95% bias-corrected confidence intervals, in accordance with Cheung and Lau's [99] recommendations.

## Results

### Profile of Respondents

The sample consisted of 21.1% male respondents and 78.8% female respondents. Average age of respondents was 21.8 years (Std. Deviation = 1.668). Majority of respondents were students without employment (74.1%), followed by students who were also employed (19.7%). In terms of household type, majority of respondents reported living with parents and/or siblings (73.6%), followed by sharing a household with a roommate (15.5%). Living in a single-member household was reported by 7.5% of respondents, whereas 3.4% of respondents reported being married or living with a partner. Asked to estimate how much money, on average, they spend on clothing items per season (spring/summer or fall/winter), the majority of respondents (37%) reported spending 101-200 EUR, followed by those who spend up to 100 EUR (22.3%). A range from 201 to 300 EUR was chosen by 16.6% of respondents, followed by 301-400 EUR chosen by 5.7% of respondents and more than 400 EUR chosen by 5.4% of respondents, whereas 13% of respondents were not able to estimate the average amount they spend on clothes per season.

A decision to stop wearing a clothing item for its initial purpose, which is still usable, but they got bored of it, was indicated by 55.4% of respondents. Going out of fashion, although still wearable, was important reason for 26.2% of respondents to stop wearing that clothes. When they decide to stop wearing a clothing item that is still usable for its initial purpose (apparel for school, work, going out), respondents' most probable choice would be to wear it at home (43.8%) and give it to a friend or a family member (28.5%). An unsustainable

disposal option, such as to stop wearing still usable and fitting clothing item and keep it in a wardrobe, was indicated by 8.8% of respondents. Donation of still usable clothing item to a charity or a someone who needs it was chosen by 11.4% of respondents. To sell clothing that they do not intend to use any longer as their most preferred choice was indicated by 1.8% of respondents, whereas 1.3% of respondents indicated that their most probable disposal choice would be clothing collection boxes in retail objects and other locations. Swapping used clothing was indicated by 1% of respondents. Vast majority of respondents indicated that they would keep wearing at home those clothing items which have lost their aesthetic characteristics and which do not fit their initial purpose any longer (53.4%). To upcycle used clothing or use it as a cleaning cloth at home was indicated by 22% of respondents. Far less respondents would decide to throw away used clothing into garbage (3.9%) or keep worn out clothing items in a wardrobe (3.4%). Disposal of worn out clothes by taking them to clothing retailers that offer clothing collection boxes was a preferred choice of 4.9% of respondents.

### Measurement Analysis

Confirmatory factor analysis (CFA) resulted in acceptable fit of the model to the data, as presented in Table 1. Although GFI was slightly below the recommended threshold, all other fit indices were satisfactory. Internal consistency of the constructs was indicated by Cronbach's alpha values which were above the recommended lower threshold of 0.70 [100]. Composite reliability (CR) values, which exceeded the recommended value of 0.60, indicated reliability of the constructs [101, 102]. Evidence in support of convergent validity of the constructs was provided by significant factor loadings which were above 0.50 (Table 1) and average variance extracted estimates (AVEs) which were greater than 0.50 [102], as displayed in Table 2.

Table 1. Measurement model properties.

Constructs and items	St. estimates	t-values	Item reliability	Cronbach's alpha	CR
Green consumption values				0.880	0.879
GCV1	.703	12.314	0.494		
GCV2	.867	14.653	0.752		
GCV3	.869	14.667	0.755		
GCV4	.608	10.821	0.369		
GCV5	.705	12.353	0.497		
GCV6	.669	-	0.447		
Attitudes				0.910	0.912
Att1	.723	-	0.523		
Att2	.843	16.048	0.711		



Table 1. Continued.

Att3	.812	15.458	0.659		
Att4	.685	13.002	0.469		
Att5	.715	13.589	0.511		
Att6	.700	13.287	0.49		
Att7	.777	14.771	0.604		
Att8	.750	14.234	0.563		
Subjective norms				0.872	0.875
SN1	.807	16.863	0.651		
SN2	.911	18.229	0.829		
SN3	.790	-	0.624		
Perceived behavioral control				0.862	0.868
PBC1	.696	15.745	0.484		
PBC2	.900	23.191	0.81		
PBC3	.882		0.778		
Behavioral Intentions				0.916	0.918
BI1	.757	18.382	0.573		
BI2	.865	23.264	0.748		
BI3	.933	26.922	0.870		
BI4	.875	-	0.766		
Model fit summary	$\chi^2/df = 2.395$ ; GFI = 0.888, CFI = 0.946, NFI = 0.911, NNFI = 0.938, RMSEA = 0.06				
Recommended values	$\chi^2/df \leq 5$ ; GFI $\geq 0.90$ , CFI $\geq 0.90$ , NFI $\geq 0.90$ , NNFI $\geq 0.90$ , RMSEA $\leq 0.08$ [100, 103]				

AVE estimates of each construct which were greater than the square correlation of that construct with any other construct [101] provided evidence in support of discriminant validity of the constructs included in the study, as shown in Table 2.

Acceptable fit of the measurement model and supported reliability and validity of the constructs allowed us to proceed to the examination of structural relationships.

### Structural Analysis

Structural equation modeling was applied to examine hypothesized relationships. Overall, structural analysis resulted in acceptable fit indices ( $\chi^2(df = 241) = 577.102$ ,  $p < 0.001$ ,  $\chi^2/df = 2.395$ , GFI = 0.888, CFI = 0.946, NFI = 0.911, NNFI = 0.938, RMSEA = 0.06), indicating good fit of the model to the data. Results of the analysis indicate significant direct impact of attitudes and PBC on Generation Z customers' intentions to dispose of their used clothes into boxes

Table 2. Discriminant validity.

	GCV	Att	SN	PBC	BI
GCV	0.552				
Att	0.074	<b>0.566</b>			
SN	0.226	0.063	<b>0.701</b>		
PBC	0.141	0.394	0.129	<b>0.690</b>	
BI	0.100	0.334	0.103	0.597	<b>0.739</b>

Note: Values on the diagonal are AVEs, vales below the diagonal are square correlations between constructs

Table 3. Results of structural analysis.

Hypotheses		St. parameter estimate	t-value	Sign.	Results
H1:	Att → BI	0.150	2.824	p<.01	Supported
H2:	SN → BI	0.042	0.908	p>.05	Not supported
H3:	PBC → BI	0.66	9.154	p<.01	Supported
H4:	SN → Att	0.157	2.449	p<.05	Supported
H5:	SN → PBC	0.234	3.711	p<.01	Supported
H6:	GCV → Att	0.198	3.06	p<.01	Supported
H7:	GCV → PBC	0.265	4.11	p<.01	Supported
H8:	SN → GCV	0.475	7.828	p<.01	Supported
H9:	GCV → BI	0.007	0.158	p>.05	Not supported

for collection and recycling located at convenience places on young consumers' way to school, work or in nearby retailing shops. Therefore, support was provided to H1 and H3. Results of the study indicate significant impact of subjective norms on attitudes (H4). According to the study's findings attitudes are also significantly influenced by customer green consumption values (H6). Subjective norms emerged as a significant predictor of PBC (H5). Direct influence of green consumption values on PBC was also significant (H7). Subjective norms directly affect green consumption values (H8). Green consumption values did not emerge as a significant direct predictor of customers' intentions to dispose of their used clothes in a sustainable way (H9), nor was the direct impact of subjective norms on customers' intentions significant (H2), as shown in Table 3.

However, taking into account their indirect effect on customer intentions, mediated via other variables, it can be concluded that both green consumption values and subjective norms, in terms of total effect, significantly influence customer intentions to dispose of their used clothing into collection and recycling boxes. Standardized indirect and total effects on customer disposal intentions are presented in Table 4. The proposed model explained 61.3% of variance in customer intentions to dispose of their used clothing via collection and recycling boxes, which indicates good explanatory power of the model.

## Discussion

This study's findings indicate that young consumers generally behave in a sustainable way, when it comes to the disposal of their clothes. Although more than half respondents indicated that they decide to stop wearing clothes which were bought for some occasion or a purpose (clothing for school, work, going out) when they get bored of them, despite that those items are still good looking and fit them, vast majority of young respondents (83.7%) dispose of used and still functional clothes in a sustainable way, wearing them at home, giving them to friends and family members or donating clothes to other people who need them. A rather negligible percent of respondents indicated clothing collection and recycling boxes established in retail stores and other convenient locations as their first choice, when it comes to the disposal of still useful and worn out clothes. The majority of respondents (75.4%) would still behave in a sustainable way, when it comes to the disposal of worn out and clothes which are not any longer suitable for their initial purpose, as they would wear those clothes at home, upcycle them or make cleaning mops for household use out of them. However, as revealed during group discussions with young clothing consumers, giving away still usable, but unwanted clothing does not necessarily mean the extension of useful life of that clothing. What happens further with granted clothing and whether friends and family members will use those garments is beyond control of our respondents, whereas collection of used clothing by fashion

Table 4. Indirect and total effects on behavioral intentions.

Indirect effects		Total effects			
SN	GCV	Att	SN	PBC	GCV
0.279	0.205	0.150	0.321	0.66	0.212
95% CI	95% CI	95% CI	95% CI	95% CI	95% CI
[0.182,0.392]	[0.100,0.308]	[0.108,0.290]	[0.212,0.434]	[0.537,0.796]	[0.084,0.327]

Note: Effects are statistically significant at p<.05

retailers or organized by municipalities would provide opportunities for unwanted apparel to get a second life or be a valuable resource in upcycling or downcycling activities.

Findings of this study indicate significant direct impact of attitudes and PBC on customers' intentions to dispose of their used clothes in a sustainable way. The finding of PBC as a more influential among the two direct predictors of customer disposal intentions is in contrast with Henzen and Pabian's [44] research on textile disposal intentions of the Dutch and Belgian textile consumers, which indicated PBC as an insignificant determinant of customer intentions related to the disposal of unwanted textile products. Accordingly, the aforementioned authors suggested the elimination of PBC from TPB framework in studies on textile disposal behavior. In terms of total effect, PBC in the present study emerged as the most significant predictor of customer disposal intentions, followed by subjective norms, green consumption values and attitudes. Research of Weber et al. [104] which indicated attitudes and convenience among primary factors which determine consumers' decisions related to unwanted clothes lends support to these findings. In terms of direct predictors of customer behavioral intentions results uncovered in this research are consistent with the findings of Zhang et al.'s [22] research performed in China in the context implying the usage of online clothing recycling platform. However, contrary to the aforementioned study which revealed PBC as the least influential determinant of customer intentions, this research revealed PBC as the most influential direct predictor of customer intentions, most probably due to limited infrastructure for sustainable clothing disposal. In terms of total effect, attitudes emerged as the least influential determinant of customer behavioral intentions, which is consistent with prior research on Chinese young customers' intentions to take pro-environmental actions [105]. In contrast with the findings of Zhang et al. [22], opinions and behavior of significant others did not emerge as a significant direct determinant of customer intentions to dispose of used clothing via clothing collection boxes. According to Krettenauer and Lefebvre [106], subjective norms may be prescriptive (significant others behave in a certain way) or injunctive (significant others want me to behave in a certain way) and both perspectives have been addressed in this study. Therefore, an underlying cause of insignificant direct impact of subjective norms on customer disposal intentions is the fact that clothing collection boxes are rarely present in fashion retail shops in Serbia. As this is still not a widespread practice, young consumers have rarely had an opportunity to observe this sustainable disposal behavior of their significant others. However, the potency of reference groups' attitudes and behavior related to sustainable clothing disposal should not be neglected by fashion companies and policy-makers as subjective norms emerged as significant indirect determinant of customer

intentions, which impact was mediated via attitudes and PBC. Green consumption values also emerged as an indirect determinant of customer intentions to hand down their used clothing to collection boxes. Taking this into consideration, one of the inferences of this study is in compliance with Degenstein et al.'s [19] research conclusion, stemming from a survey of young Canadian female clothing customers, according to which it is necessary to educate customers about the environmental impact of mass production and consumption of clothes and resulting post-consumer apparel waste and increase their knowledge of clothing reuse and recycling options. Therewith policy-makers and environmental organizations may encourage more sustainable clothing disposal patterns among Generation Z consumers.

## Conclusions

This study aimed to deepen our understanding of the drivers of young consumers' willingness to divest their used clothing possessions in a socially and environmentally responsible way and contribute to the debate on sustainable product disposal. To the best of our knowledge there has been no prior quantitative research performed in a developing European economy applying an extended TPB framework to uncover the determinants of sustainable clothing disposal among Generation Z customers. Results of the study indicate the importance of making it feasible for consumers to discard their used clothing in a sustainable way, by instituting appropriate infrastructure for environmentally harmless disposal of clothing items and informing customers about this possibility. As highlighted by Norum [18], educating consumers about usable life of clothing and that almost all clothing items can be recycled is essential for diverting used clothing from post-consumer waste streams.

This study contributes to the literature by providing further insights into the drivers of sustainable clothing disposal and particularly by indicating the importance of perceived behavioral control, i.e. making it possible for young customers to behave in a pro-environmental manner. In addition to significant direct impact of perceived behavioral control and attitudes on customer intentions, this study indicates indirect influence of behavior and expectations of significant others on customer intentions to dispose of their used clothes in a sustainable way. While the direct influence of green consumption values on consumer green buying behavior has already been supported [78] this research indicated the indirect influence of green consumption values on customer green disposal intentions. If conducted in practice by fashion companies and other stakeholders, proposed scenario would enable diverting used clothes from incineration plants and landfilling. In that manner environmental footprint of clothing would be lowered, as reuse would extend active life

of clothes and collected clothing items could be used in upcycling and as raw material in clothing and other industries.

Findings of this study bear relevance for policy-makers in the EU, where separate collection of textile waste is expected to become mandatory from the beginning of 2025 [107]. Similar to Extended Producer Responsibility (EPR) initiative to eliminate packaging waste [108], a well-designed fee-based EPR scheme for clothing industry would enable that fashion brands and retailers, who place new apparel on the market, take responsibility for used and not any longer wanted apparel. By paying for collection, sorting and processing of used clothing, fashion retailers would prevent clothing waste and environmental pollution. According to OECD findings, the adoption of EPR initiatives has resulted in the decrease of waste disposal and improved recycling rates [109]. Making apparel producers responsible for clothing items in post-consumer phase of their lifespan may positively affect their motivation to deliver more durable and not only fashionable items, which would further enable more options for upcycling and recycling of used clothes.

Recent research has suggested that customers are not necessarily aware of the environmental impact of clothing consumption [110], whereas environmental awareness and environmental concern significantly affect young consumers' environmental behavior [111]. Educating consumers about the effects of clothing consumption and disposal on the environment, in schools and through social and other media, could extend active life of clothing and divert used clothing from waste streams into resource streams. Young people, had they have more information about collection boxes and if those boxes were provided on convenient places, would be willing to dispose of their used clothes in this way. To facilitate this behavior, fashion retailers could institute take-back schemes and offer customers a voucher or a discount coupon in exchange for used clothes. However, as remarked by Henzen and Pabian [44], to increase consumer participation in the disposal of unwanted textiles in an exchange for an incentive, the incentive itself should be large enough to motivate consumers to take necessary effort to dispose of used clothes via clothing collection boxes. Otherwise, the incentive would work against its purpose. By offering clothing collection boxes fashion companies could differentiate themselves from competitors, as socially and environmentally responsible businesses. Moreover, the application of proposed scenario in practice, which would require sorting and further handling of collected apparel, would enable new job opportunities for long-term unemployed and socially disadvantaged groups of population.

As it is the case with any research undertaking, this study is also not free of limitations. As the study has been performed on a convenience sample of young clothing customers, one should be cautious in generalizing this study's findings to overall Generation Z population. Future research would also benefit from

a probabilistic sampling of respondents. One should be aware that common method bias might have affected the study's findings, as responses to all latent variables were collected from the same source. As the focus of this research was on young customers' attitudes, norms and intentions of clothing disposal in a sustainable way, interviewing of respondents was deemed appropriate. To circumvent this limitation, future research should address actual consumer behavior related to clothing disposal, instead of intentions. A fruitful area for future research would be investigating whether young consumers' attitudes, norms and intentions related to clothing disposal differ from other age groups. Future research would also benefit from examining the extent to which young consumers are aware of the impact of their clothing consumption on environment and the well-being of other humans and ecosystems. Recent research has suggested that consumers are not aware of the continued value of textile products after their primary usage [112]. In line with the aforementioned contention, another area worthy of future examination would be the moderating effect of consumer awareness of used clothing residual value on the formation of consumer disposal intentions.

### Conflict of Interest

The authors declare no conflict of interest.

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