Scientific African 21 (2023) e01887

Contents lists available at ScienceDirect

Scientific African

journal homepage: www.elsevier.com/locate/sciaf

Consumer attitude and disposal behaviour to second-hand clothing in Ghana

Richard Acquaye [a], Raphael Kanyire Seidu [b,*], Benjamin Eghan [c,1], George Kwame Fobiri [d,1]

[a] Department of Textile Design and Technology, Takoradi Technical University, Takoradi, Ghana
[b] School of Fashion and Textiles, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China
[c] Department of Industrial Art, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[d] Department of Fashion Design and Textiles Studies, Kumasi Technical University, Kumasi, Ghana

ARTICLE INFO

Editor Acknowledgement Position: DR B Gyampoh.

Keywords:
Consumer attitude
Disposal behaviour
Second-hand clothing
New technologies
Consumption intention
Ghana

ABSTRACT

The issue of second-hand clothing which is exported from Europe and America into the African market remains a critical problem that poses threats to the eco-system. These clothing are sometimes unusable and have a limited life span which is eventually disposed of into landfills and water bodies. Thus, producing smells and toxic chemicals that pollute the air and environment when burnt or left to decompose. These indiscriminate disposals have been a major concern to citizens, stakeholders, and Governments. With the recurring threats posed by this practice, new technological innovations have been proposed and developed by leading brands and new start-ups in the industry to limit such negative impacts. Several studies on second-hand clothing are from the Global South, with limited research conducted by researchers within developing countries to understand the influence of behaviours and attitudes of consumers on the purchase of this clothing. Hence, this paper presents the first attempt to understand consumer attitudes towards the purchase and disposal of second-hand clothing in the environment of Ghana. Furthermore, the initial sections of the paper highlight new technologies and approaches developed by global brands and start-ups in Africa to curb second-hand clothing waste. A structured online questionnaire was developed and used to collect empirical data from 135 consumers in the Ashanti and Greater Accra regions of Ghana, a context that few studies have focused on. The regression analysis revealed that both attitude and disposal behaviour have a significantly positive influence on the consumption intention of consumers. Lastly, attitude had a positive and no significant impact on the relationship between disposal behaviour and consumption intention. Findings contribute to appropriate policy and regulation formation, the need for education, and environmental perspectives on the effects of these clothing for the implementation of circular initiatives. Hence, the study recommends the provision of waste bins, the establishment of recycling plants, and the enforcement of strict regulations to limit the importation of second-hand clothing into the Ghanaian markets.

* Corresponding author.
E-mail address: seiduraphael@gmail.com (R.K. Seidu).
[1] Equal contribution.

https://doi.org/10.1016/j.sciaf.2023.e01887

Available online 3 September 2023

Introduction

Fashion moves quickly and becomes unfashionable in a short period. This leads to consumers purchasing new clothes to feel fashionable [15], a concept that explains the short lives of clothes that prepare a fertile ground for the influx of new products to the market as quickly as possible. The rapid implementation of this concept has resulted in a significant increase in the volume of clothing consumed globally, particularly in developed countries. Global textile consumption is almost 100 million tons per year, with clothes accounting for approximately 60% of all textiles, and manufacturing has more than doubled in the last 15 years [38,43,45]. The ever-increasing production rate of the clothes, as well as their short lifespans, have highlighted the failures of the fast fashion brand model to reduce waste, resulting in used clothes ending up in landfills, water bodies, and open fires, with serious consequences posing a survival challenge to biological habitats and the planet.

Regarding cotton waste, Baden and Barber [7] opine that concerns have been affirmed about second-hand clothing (SHC) in West Africa. The latter is recognized as a SHC dumpsite, with bad consequences for livelihood, the economy, and the ecosystem as a whole. While these old clothing are shipped, nearly half of them are reported to wind up in dumpsites, and rivers, or are burnt in the open because they have little market value in the imported countries due to unfitting sizes, filthy, broken, or poor quality. However, no official data exists to quantify how much of the exported SHC is discarded [14]. Furthermore, the top net exporters of worn clothing in 2020 were the United States ($585 M net trade value), China ($366 M), the United Kingdom ($272 M), Germany ($258 M), and South Korea ($256 M). Ghana ($181 M), Ukraine ($154 M), Nigeria ($123 M), Kenya ($122 M), and Tanzania ($102 M) were the top net importers [14]. Despite its negative environmental impact due to this practice, it could be assumed that the SHC trade employed in receiving countries by restyling, transporting, repairing, and cleaning of these clothes [7]. Another positive indicator is that they become cheap clothing to low-middle-high income earners in developing countries, or in many instances, SHCs are metaphorically presented as gifts to charity homes or deprived communities in both developed and developing countries [14]. If not, they are baled, exported, and dumped in the Global South, an unsustainable method of avoiding the responsibility and costs associated with dealing with the problem of disposable clothing [14]. Consumer behaviour and preferences for low-cost clothing are important factors that have inspired and attracted international fashion brands to dump their products in numerous African locations to avoid clean-up obligations.

Cobbing et al. [14] assert that the fashion industry is responsible for up to 10% of global greenhouse gas emissions and is a major cause of environmental pollution worldwide. But this is not even the only serious consequence of the fast fashion industry on developing countries, vast quantities of polluting textile waste from the fast fashion industry are increasing by the day in Global South countries, especially on the African continent. To try to clean up the waste generated, “circularity” is being encouraged amongst global fashion brands, however, this is a myth on the premise that virtually the fashion industry solemnly recycles 1% of apparel into new clothing while annually, the growth of garment production increase in volume by 2.7%. The global trade in SHC increased tenfold between 1990 and 2004 [7]. Every year, around One million tons of discarded clothing are collected in Germany alone [14]. Since the mid-1990s, the volume of clothes collected each year has increased by 20% and continues to grow at the same rate as fast fashion. Cobbing et al. [14] further revealed that more than 70% of all UK reused apparel is sent to overseas nations, contributing to worldwide second-hand commerce. In Ghana, for example, over fifteen million used garments arrive in the capital Accra every week from the Global North, flooding the city’s growing apparel market [14]. Cuc and Tripa [15] argue that today’s fashion system is implicated in the current ecological crisis, jeopardizing both environmental and human well-being. Ghana is the second largest importer of second-hand clothing according to a 2011 report by the Tony Blair Institute of Climate Change [1]. This has created a market for second-hand clothing for the citizens to purchase at varying prices depending on the nature, size, and quality.

Therefore, this paper identifies the environmental impacts of waste from second-hand clothing on the environment; reviews new technologies and approaches developed by global brands in the World and start-ups in Africa to curb such pollution, and; understands consumer’s attitude towards the purchase and disposal behaviour of these second-hand clothing in the environment in Ghana. The

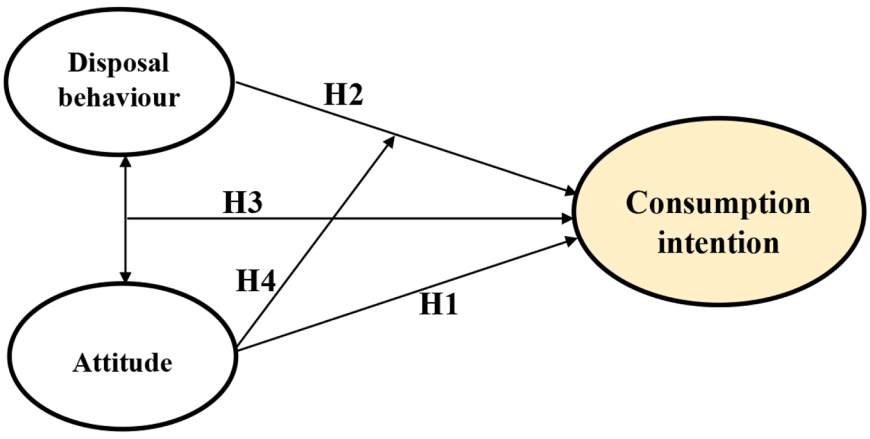

Fig. 1. Conceptual model of the study.

novelty of this research draws on the fact that it provides relevant insights into the consumption intention of consumers on second-hand clothing within the Ghanaian context since most studies originate from the Global South. Findings will contribute to appropriate policy and regulation formation, and provide an environmental perspective on the effects of these clothing for implementation of circular initiatives. Fig. 1 shows a conceptual framework that was developed on the following formulated hypotheses:

H1. There is a significant positive influence of attitude on the consumption intention of consumers for second-hand clothing.

H2. There is a significant positive influence of disposal behaviour on the consumption intention of consumers for second-hand clothing.

H3. There is a significant positive influence of attitude and disposal behaviour on the consumption intention of consumers for second-hand clothing.

H4. Attitude functions as a moderator of the significantly positive influence of disposal behaviour on the consumption intention of consumers for second-hand clothing.

Environmental impacts of waste from second-hand clothing

The first step in the global textile supply chain is the manufacturing phase, which involves the creation of both natural and synthetic fibres, the most common of which are cotton and polyester. The majority of clothing sold in the United States, according to Bick, Halsey and Ekenga [11], is made of cotton or polyester, the two fibres that have received the most attention in the history of textiles and clothing and are both linked to serious negative effects on human health and the environment during the manufacturing and production processes. Hydrocarbons from crude oil are used to manufacture polyester, a synthetic fabric that requires a lot of energy to extract. While cotton (which according to the 2015 ECAP report accounts for more than 43% of all fibres used for clothing) requires significant amounts of land, water, fertilizer, and pesticides to grow, polyester (which according to the European Clothing Action Plan (ECAP) accounted for 16% of fibres used in clothes), emits acid gases (hydrogen chloride), volatile monomers, and solvents into the atmosphere, thus tempering the quality of the ecosystem. This behaviour has a significant impact on the quality of the ecosystem. Furthermore, textiles are beautifully decorated by dyeing or printing, posing additional risks because untreated wastewater from dyes is frequently discharged into local water systems, releasing heavy metals and other toxicants that can negatively impact health as clothing is produced and consumed on an uncontrollable scale [11,52]. The environmental implications of textiles and garment usage are difficult to evaluate due to their diversity and global distribution. According to the Global Fashion Agenda (GFA) and the Boston Consulting Group's 2017 Pulse of the Fashion Industry (PFI) study, the global textiles and clothing industry consumed 79 billion cubic meters of water, produced 1.715 million tons of CO_2 emissions, and 92 million tons of waste in 2015. It was also predicted that by 2030, these figures will have increased by at least 50% [52].

Considering the business scenario, the rate of raw material production has burdened the natural world, and the damages created by succeeding stages in the product life cycle are unsustainable [21]. Polyester is non-biodegradable, but it offers some advantages over cotton, including a lower water footprint, lower temperature washing, quick drying, and less ironing, as well as the ability to be recycled into virgin fibres. However, there are more than 700,000 microfibers released in a single washing process from 6 kg of acrylic fabrics [44]. These microplastic fibres according to Cobbing et al. [14] are also released into the air when textile waste is burnt or decomposed, which contributes to the harsh climate that is currently being experienced. Microplastics have been discovered in human gastrointestinal tracts, blood, and lungs in recent investigations [22,30,37]. The massive amounts of textile waste that nations such as Tanzania and Kenya face daily have serious negative effects on people and the environment (such as threats to life in water, on land, and in the air i.e., carbon emissions). In 2019, Kenya received 185,000 tons of second-hand clothing, and according to local sources, 30–40% of such clothing is of such poor quality that it cannot be resold. This suggests that between 55,500 and 74,000 tons of it were textile waste [12,14] which could pose serious environmental impact.

New technologies and approaches for second-hand clothing waste

The fast taste and preferences of customers for garments have increased its utilization in the World over. This has given rise to fast fashion which is produced to meet current fashion trends of customers in the market. A practice that has produced the bulk of used clothes that are either disposed of, donated, or sold out to the markets of developing countries. According to Bick, Halsey and Ekenga [11], fast fashion is "a term used to describe the readily available, inexpensively made fashion of today". The majority of these clothes end up or are imported into the African continent. Aside from this, the UK also faces the issue of disposal of used clothing. According to a report by Waste and Resources Action Programme -WRAP [63] as cited by Hur [27], it is estimated that wearable clothes worth about £140 million are disposed of in the landfills in UK. Such unutilization of used clothing has re-orientated efforts to either upcycle, recycle, or reuse this clothing. This is extremely important to limit the bulk of waste generated, disposed into landfills, or burnt (release of harmful gases or contributes to CO_2 emissions). New technologies have been developed for recycling second-hand clothing.

A hydrothermal processing technology developed by a United States start-up company Circ (https://circ.earth/circ-technology/) recycles used clothing or blended textiles [47]. This technology adopts eco-friendly solvents, hot water, and pressure to significantly separate the cotton and polyester fibres without damaging any. Similar technology was developed by the Hong Kong Research Institute of Textiles and Apparel (HKRITA) with support from H&M Foundation. This technology adopts a chemical hydrothermal treatment to recycle polyester-cotton blends using a significant amount of green chemicals, temperature, and time [20]. The cotton fibres are decomposed into cellulose powders that are subsequently used for re-spinning.

A Swiss-based company Worn Again technologies (https://wornagain.co.uk) developed its polymer recycling technology that decomposes and extracts cotton and polyester from used blended clothing [64]. The extracted materials are subsequently spun into

fibres for use in producing high-quality products or clothing. Barrera [9] in an online publication cited NuCycl technology developed by Evrnu (https://www.evrnu.com/nucycl) which effectively converts used clothing into strong yarns that can be used several times. As a fibre regenerative technology (NuCycl), it adopts a repolymerization approach to convert the molecules of original fibres into renewable fibres with high performance. This according to Evrnu presents regenerative fibres of good performance and quality. Using a low-energy technology, a German-based company Kleiderly (https://www.kleiderly.com) recycles used clothing into plastic alternative materials that can be used for other applications such as clothing hangers to eyewear. Still in Germany, a company called Flip (https://letsflip.de/sneaker-projekt/) in partnership with African Collect Textiles in Kenya, recycles used sneakers for modern sneakers with high quality and good wear comfort [57]. In a related development, the German company Eeden developed a sustainable recycling process to process used cotton or other cellulosic textiles into pulp [48]. This serves as a vital source of revenue for producing new fibre types like lyocell, and viscose amongst others. In a similar approach, a Swedish company Renewcell developed a recycling technology that converts only second-hand or used clothing made of cellulose-rich cotton fibres into high-quality biodegradable *Circulose* pulp [49]. Such great success according to Ho [25] has influenced fashion giant H&M group to extend partnership with Renewcell for the supply of their *Circulose* fibres to be used in producing sustainable garments.

In the African continent, however, company start-ups have been established to help limit the effects of the bulk of second-hand waste generated and disposed into landfills or burnt. One such start-up is Rewoven, a South African company engaged actively in recycling. In this process, clothing is sorted out into different colour types, cut into strips, and processed into fibres, which are subsequently blended with recycled plastic waste [50]. These blends are processed into yarns for knitted and woven fabrics. Rewoven also makes available cut-out fabrics for upcycling projects in redesigning new fashion products. These fabrics were used by Lara Klawikowski in the upcycled collections at the 2021 South African Fashion Week [34,40].

Methodology

Questionnaire design

A quantitative online survey was conducted to collect data from respondents to test the set hypothesis in the study. Survey questionnaires were first piloted to ascertain the reliability, clarity, and consistency of the questions asked. The refined questions were coded in Google Forms and distributed to respondents to answer questions on their attitude, consumption intention, and disposal behaviour towards second-hand clothing. The questionnaire was structured under five sections with Section 1 being the cover letter. This section highlights the confidentiality and anonymity of responses from respondents given to the questions asked. It further indicates the focus of the survey for academic purposes before the respondents begin answering the questions. Section 2 captured the background information of the respondents, Sections 3, 4 and 5 captured relevant questions on consumption intention, attitude, and disposal behaviour respectively. Questions on consumption intention were adopted from Iran, Geiger and Schrader [28], questions on attitude were adopted from Soyer and Dittrich [56], and disposal behaviour questions from Jalil and Shaharuddin [29] and Soyer and Dittrich [56]. Respondents were asked to rate their responses based on a five-point Likert scale ranging from 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree).

Data collection

Respondents voluntarily participated in the survey where the confidentiality and anonymity of their responses to the questions asked was highlighted before they started. The Google Form link was distributed to 200 respondents' residents in the Ashanti and Greater Accra regions of Ghana for a month period (February to March 2023). Responses from respondents to the questions took approximately 5–10 mins to complete the online survey. A total of 135 responses were received during that period, representing a 67.5% response rate. These results were then analysed to answer the set hypotheses of the study.

Data analysis

The IBM SPSS Statistics 27 was used in analysing the data gathered from the respondents. Descriptive analysis was used to measure the central tendency (mean scores), dispersion and variability of the variables. This provided the average responses to the questions on their consumption intentions, attitude, and disposal behaviour. The Cronbach Alpha Coefficient frequently employed for measuring data reliability [26,41,53,58] was investigated to determine the reliability of the data collected for the necessary analysis. Additionally, a linear regression analysis was conducted to investigate the influences of attitude on consumption intention, and disposal behaviour on consumption intention, which will provide insights into Hypothesis 1 and 2. Multiple linear regression determines the relative contribution of the predictors to the total variance and the overall fit of the model [3,8,10]. This was used to determine Hypothesis 3. Using the Durbin-Watson (DW) statistic, the independence of observations was measured on a continuous interval scale. The moderation analysis was conducted using Process Macro v4.2 developed by Andrew F. Hayes [24] via SPSS, and was adopted to investigate the effects of attitude as a moderator on the significant influence of disposal behaviour on consumption intention (Hypothesis 4).

Results and discussion

Background information of respondents

Results from the study indicated that the majority of the respondents were females constituting 65.2% (with *f*=88) and the remaining 34.8% (with *f*=47) were males. Regarding age, the majority of the respondents were aged between 23–40years (representing 52.6% with *f*=71), followed by 39.3% (*f*=53) being respondents aged 18–22years, with 5.2% (*f*=7) falling >40years and the least being respondents falling below <18years (*f*=4). It is evident that most of the respondents are young and mature and consume a lot of clothing. These are active consumers who spend more on buying outfits or apparel [4,32]. As such, their buying behaviour coupled with their disposal behaviour of second-hand clothing could pose a serious threat to the environment. Out of these numbers, the majority of the respondents (*f*=128 representing 94.8%) had attained tertiary education with the remaining 1.5% having attained Senior High School (SHS) education. This further shows that the majority of the respondents were knowledgeable about the various causes of disposal and consumption behaviour of second-hand clothes. The majority of the respondents (*f*=79, 58.5%) were students, 40% (*f*=54) were workers and 1.5% (*f*=2) were retired workers, with varying purchasing frequency of monthly (*f*=31, 23%), once or twice a year (*f*=57, 42.2%), quarterly (*f*=35, 25.9%) and weekly (*f*=12, 8.9%). These varying patterns could be attributed to the difference in incomes of the respondents with most of them earning between GH¢0-GH¢500 (*f*=68, 50.4%), followed by GH¢1501 and above (*f*=32, 23.7%), GH¢501-GH¢1000 (*f*=26, 19.3%) and GH¢1001-GH¢1500 (*f*=68, 6.7%). This result shows that, collectively, most of the respondents earned below GH¢1501 and above, a situation that could affect their purchasing behaviour of second-hand clothing. According to a report by Rougier et al. [51], "the monetary middle-class accounts for 43.5% of households with 210 to 827 Ghana cedis per capita per month". This puts majority of the respondents with earnings of GH¢0-GH¢500 (f=68, 50.4%), in the middle class, putting them above the poverty line. Khurana and Tadesse [33] and Chekol et al. [13] observe in their study amongst Ethiopians that price discount and durability are major determinants of consumers' purchasing decisions on second hand clothing. Tong and Su [59] also report that price has been a decisive factor in apparel purchasing, hence low-income earnings are perceived to have a great effect on second-hand clothing purchasing decisions in the present study.

Reliability and validity of constructs

A reliability test as stated by Huck (2007) is conducted to assess the consistency across the parts of a measuring instrument. To achieve such a test, the Cronbach Alpha Coefficient is commonly used and identified as most appropriate when measuring reliability with a Likert scale. The results of the reliability analysis using the Cronbach Alpha are deemed to be excellent when the value is greater than 0.9, good and acceptable when the value is between 0.7 and 0.8, and is regarded as questionable with a value less than 6, and poor or unacceptable when value is less than 0.5 [16]. As such, results revealed a Cronbach Alpha value of 0.705 for consumption intention, 0.736 for attitude, 0.774 for disposal behaviour, meaning these values are greater than seven (> 0.7) hence the data set is reliable and acceptable.

Respondents' consumption intention

The mean scores and standard deviation were used to evaluate the consumption intention of the respondents, as shown in Table 1. The overall average of the mean scores is 2.64 (SD=1.333), which indicates that respondents showed a low level of agreement with the responses given to the questions, hence have a low consumption intention towards second-hand clothing. For example, the mean score of statements 3 to 5 was far below the mean average (which is 3), hence responses from respondents revealed they had a low level of agreement towards their intention of buying second-hand clothes online, receiving second-hand clothes from friends or relatives and they are spending a lot on second-hand clothing. The low level of agreement to online purchasing could be attributed to Kursan Milaković and Miocevic [35] findings that most people prefer exploring the tactile behaviour of clothes in their purchasing decision. This means respondents would like to visit these second-hand outlets to have a tactile feel of the clothes before they purchase them. Further results, however, showed that the mean scores from statements 1 and 2 are above the mean average with 3.13 and 3.17 respectively. This indicates that responses from respondents showed a slightly higher level of agreement with the questions asked. They revealed that they have the intention of buying second-hand clothes from shops as opposed to online and intent to lend out their clothes to relatives and friends. This is consistent with Morgan and Birtwistle [42] and Shrivastava et al. [54] findings that people prefer giving out their clothes to their relatives and friends when they no longer need such clothes in their wardrobes.

Table 1
Response from respondents on their consumption intention.

	Statements	N	Min.	Max.	Mean	Std. Dev.
1	I intend to buy clothes from second-hand shops	135	1	5	3.13	1.301
2	I intend to lend out my second-hand clothes to friends or relatives	135	1	5	3.17	1.417
3	I intend to buy second-hand clothing online	135	1	5	2.00	1.304
4	I intend to receive second-hand clothes from friends or relatives	135	1	5	2.10	1.289
5	I intend to spend a lot on second-hand clothes in the short to long term	135	1	5	2.80	1.354
	Overall Average				2.64	1.333

Respondents' attitude

The mean scores and standard deviation were used to evaluate the attitude of the respondents towards the purchase and disposal of second-hand clothing, as shown in Table 2. The findings indicate that respondents had a low level of agreement (with an overall mean of 2.8, SD=1.3676) towards their attitude to purchase and disposal of second-hand clothes in the environment. For example, respondents disagreed that they often repair and reuse their second-hand clothes (mean of 2.52), hence a situation that may have been influenced by the fact that respondents disagreed with buying second-hand clothing due to their longevity (mean of 2.76). Results showed that respondents disagreed with their preference to wearing second-hand clothes and buying a lot of these clothes even though they agreed earlier of buying such clothes. These responses may be attributed to the fact that respondents may be concerned with the quality (longevity), hygiene, and eventual disposal of these clothes. In fact, the latter is confirmed by the responses for statement 3, where respondents agreed to regularly disposing of their second-hand clothes in the environment. This coupled with the quality could be the influential factor to respondents not buying a lot of these clothes, nor prefer to wear, repair or reuse them, but rather intent to lend out their second-hand clothes to friends and relatives [42].

Respondents' disposal behaviour of second-hand clothing

Results as shown in Table 3 revealed that the overall average of the mean scores is 2.808 (SD=1.3824), which indicates that respondents had a low level of agreement with the questions asked. For example, their responses to statements 2 and 5 have low mean scores of 2.89 and 1.64 respectively, hence respondents disagreed they always put their worn-out clothes in recycling bins and return them to stores for recycling purposes. This practice could be influenced by the non-availability of these recycling bins provided by the right authorities to encourage respondents to recycle their old clothes as Kanhai, Agyei-Mensah and Mudu [31], Ugwu et al. [61] and Awafo, Amankwah and Agbalekpor [5] have observed to be a common challenge in developing countries. Alternatively, stores do not accept old second-hand clothes to be recycled into new materials due to the lack of clothing recycling plants in the country. This has influenced the disposal of a bulk of second hand clothes into landfill and water bodies as confirmed by studies from Amanor [2] and Manieson and Ferrero-Regis [39]. Further results confirm (with a similar mean score of 3.17) that respondents agreed to donate to charity, burning away in the open and throwing away their second-hand clothes in the landfill. This practice would result in serious health and environmental threats to the lives on land and in water [6,18,36,46,55,62]. In a 2011 report by Tony Blair Institute of Climate Change, it revealed that, Ghana is the second largest importer of second hand clothing with a bulk of these clothes ending up in the landfills, which causes serious choking of drains (leads to floods) and air pollution (when the clothes are burnt in the open) [1].

Hypothesis analysis

The regression analysis was conducted to examine the influences of attitude and disposal behaviour (independent variable) on consumption intention (dependant variable). Results from the model summary of the regression analysis are illustrated in Table 4. From the regression model, an R^2 of 0.640 reveals that a variation of the consumption intention of 64.0% is caused by the variation in attitudes of the respondents towards second-hand clothing. The Attitude coefficient of 0.757 is positive and a *p-value* less than 0.05 means that at every change in attitude of respondents, their consumption intention also increases towards second-hand clothing. Subsequently, an R^2 of 0.421 reveals that a variation of the consumption intention of 42.1% is caused by the variation in disposal behaviour of the respondents towards second-hand clothing. The disposal behaviour coefficient of 0.585 is positive and a *p-value* less than 0.05 means that at every change in disposal behaviour of respondents, their consumption intention also increases towards second-hand clothing. This implies that, due to the quality of these second-hand clothing, an increase in their disposal and burning in the environment further increases their intentions to purchase more of these second-hand clothing to meet their needs.

Table 5 details the regression analysis examining the influence or impact of attitude and disposal behaviour on the consumption intentions of consumers or respondents. Here, multiple linear regression was used to predict the value of a dependant variable (consumption intention) based on the value of an independent variable(s) (attitude and disposal behaviour) for the study. It was shown that the overall *p-value* of the model is <0.001 which is less than 0.05, hence the model is significant. The analysis results of the multiple regression revealed that the multiple correlation coefficient is 0.837 (*R-value*) hence showing that, the relationship between attitude and disposal behaviour of consumers or respondents on their consumption intentions was positively high. These variables (attitude and disposal behaviour) accounted for 70.1% of the variance of consumers or respondents' consumption intention for second-hand clothing. This implies that about 29.9% of the variance in consumer's second-hand clothing activities is attributed to other factors

Table 2
Responses from respondents on their attitude.

	Statements	N	Min.	Max.	Mean	Std. Dev.
1	I buy a lot of clothes from second-hand shops.	135	1	5	2.75	1.375
2	I prefer to wear second-hand clothes.	135	1	5	2.80	1.354
3	I regularly dispose of my second-hand clothes.	135	1	5	3.17	1.417
4	I often buy second-hand clothes because they last long.	135	1	5	2.76	1.300
5	I often repair and reuse my second-hand clothes	135	1	5	2.52	1.392
	Overall Average				2.8	1.3676

Table 3
Responses from respondents on their disposal behaviour.

	Statements	N	Min.	Max.	Mean	Std. Dev.
1	I give away or donate unwanted clothes to relatives or friends or charity homes	135	1	5	3.17	1.417
2	I always make an effort to put worn-out second-hand clothes in recycling bins	135	1	5	2.89	1.534
3	I burn away worn-out second-hand clothes in the open	135	1	5	3.17	1.447
4	I always throw away worn-out second-hand clothes in the landfill	135	1	5	3.17	1.417
5	I take second-hand clothes back to the store to be recycled without receiving an incentive or a purchase voucher	135	1	5	1.64	1.097
	Overall Average				2.808	1.3824

Table 4
Regression model summary for attitude, and disposal behaviour.

Variable	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.	Hypothesis Decision
	B	Std. Error	Beta			
(Constant)	0.519	0.146		3.562	<0.001	
Attitude	0.757	0.049	0.800	15.362	<0.001	H1
R	= 0.800		F test value	= 235.979		Supported
R^2	= 0.640					
adjR^2	= 0.637					
Note: dependant Variable: Consumption intention						
Variable	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.	Hypothesis Decision
	B	Std. Error	Beta			
(Constant)	0.998	0.177		5.638	<0.001	
Disposal behaviour	0.585	0.059	0.649	9.840	<0.001	H2
R	= 0.649		F test value	= 96.823		Supported
R^2	= 0.421					
adjR^2	= 0.417					
Note: dependant Variable: Consumption intention						

Table 5
Regression model summary for the influence of attitude and disposal behaviour on consumption intention.

Variable	Unstandardized Coefficients	Standardized Coefficients	*t*	Sig.	Hypothesis Decision	
	B	Std. Error	Beta			
(Constant)	0.205	0.146		1.396	0.165	
Attitude	0.601	0.054	0.635	11.101	<0.001	
Disposal behaviour	0.268	0.052	0.297	5.194	<0.001	H3
R	= 0.837		F test value	= 154.525		Supported
R^2	= 0.701		DW test	= 2.083		
adjR^2	= 0.696		*P* value	<0.001		
Note: dependant Variable: Consumption intention						

which in this study are not considered.

From the regression model in Table 5, the coefficient of attitude was B=0.601; SE=0.054; t=11.101, and p=<0.001. This result represents a major effect of consumer's or respondents' attitudes on consumption intention when the other independent variable is held constant. Thus, the effect was positive, and the consumption intention value increased by 60.1% for every unit increase in consumer's or respondent's attitude. This implies that, when respondents are educated on the effects of second-hand clothing on the environment, their attitudes and consumption intention towards second-hand clothing could reduce or decrease. This assertion corroborates with Zahid, Khan and Tao [66] finding that the purchasing intention of individuals who have a more understanding and concern for environmental sustainability are always guided and shaped when purchasing second-hand clothing. Subsequently, the coefficient of disposal behaviour was B=0.268; SE=0.052; t=5.194 and p= <0.001. This result represents a partial effect of consumer's or respondents' disposal behaviour on consumption intention when the other independent variable is held constant. The effect was positive, and the consumption intention value increases by 26.8% for every unit increase in consumer's or respondent's disposal behaviour. Thus, when consumers or respondents are educated on the effects of indiscriminate disposal of second-hand clothing on the environment, their consumption intention would also decrease [17,19,23,60,65]. It is evident from the results that, both variables (attitude and disposal behaviour) account for a positive and significant contribution to the regression model. However, the attitude of the consumers or respondents is the highest factor or variable having a statistically significant effect on consumption intention.

The process macro by Andrew F. Hayes was used to determine the moderating effects of a moderator (attitude) on the relationship between disposal behaviour and consumption intention of second-hand clothing. Results from Table 6 show the interaction is insignificant with a *p-value* of 0.2145, which is greater than the *p-value* of 0.05. It revealed positive and insignificant moderating effects of attitude on the relationship between disposal behaviour and consumption intention of second-hand clothing (b=0.0569, t=1.2474, p=0.2145), hence not supporting H4. This implies that the attitude of consumers does not play a significant role in influencing the relationship between consumption intention and disposal behaviour for second-hand clothing

Implications of the study

The findings of the present study highlight important information on consumer attitude and disposal behaviour on their consumption intention for second-hand clothing. These provide insights for governments and industry stakeholders on relevant policies and approaches to reduce the importation, continuous purchase, and disposal of second-hand clothing in landfills or water bodies. In fact, the findings revealed a strong relationship between consumer attitude, disposal behaviour, and consumption intention. Here, strict regulations should be enforced on limiting the importation of this clothing, provision of waste bins, establishment of recycling plants, and development of recycling routes to encourage consumers to return their clothing for recycling. This would effectively help city developers manage clothing waste, and limit the pollution from the burning of these clothing in landfills that pose serious threats to the health of the people. Subsequently, with attitude not a moderator for the relationship between disposal behaviour and consumption intention, other factors may be responsible for such a relationship, hence further studies should be conducted on this path. This would provide a detailed understanding of the factors that drive consumers to purchase and dispose of these second-hand clothing which has greatly affected the air quality and water bodies within the communities these clothing are burnt or disposed of indiscriminately. Additionally, the imposition of high taxes on these imported second-hand clothing into the Ghana markets would help to deter importers of these products.

Lastly, policies should be developed to promote circular fashion models for businesses and implement strict regulations for recycling measures and textile waste prevention. Targeted policies on the importation of these second-hand clothing into the country should be developed to help reduce the large numbers of these products. Further measures should be developed to track these products in the market from retailers or sellers in the supply chain to ensure that they do not end up in landfills. Moreover, motivation plays a crucial role in encouraging individuals to embrace circularity. Therefore, it is imperative to implement a directive that identifies and collaborates with local fashion houses committed to practicing sustainable fashion. To facilitate this transition, the government should establish a dedicated funding hub that offers financial assistance such as grants, low-interest loans, and subsidies to fashion organizations that adopt circular practices. This initiative would not only support these organizations but also attract talented individuals who can contribute to their training programs. By investing in their skills development, particularly in upcycling and recycling, this endeavour would enable them to showcase their creativity within the context of circularity. Ultimately, this approach would foster innovation, create a distinct market segment, and introduce healthy competition by transforming waste into valuable resources once again.

In summary, based on the findings of the study, four (4) critical solutions (Fig. 2) are proposed for both local and African contexts. Firstly, the relevant institutions should educate the consuming public on the harmful effects of indiscriminate disposal of their second-hand clothing. This should follow with promoting circular economy initiatives to reduce and reuse textile and clothing waste for further use. Hence, governments should support start-ups within this field for effective circular technological solutions. Secondly, local textile and fashion industries should be well-resourced to meet the clothing demands of the country and the regional body (African market). This coupled with improved investment in the training and development of technical and vocational skills for individuals, would promote production capacities to meet market demands. Lastly, all these efforts will be realized with strict regulations for clothing standards, imposing tariffs, and trade barriers on secondhand importation locally and within the African markets. These four solutions if well-coordinated will contribute to the African Union Agenda 2063 towards goals 2 (educated citizens and skill innovation), 4 (transformed economies), and 7(environmentally sustainable and climate resilient economies and communities). This will collectively drive towards supporting regional trade integration in Africa. Alternatively, findings from the study draw on global discourse in achieving clean water and sanitation (Goal 6) and, responsible consumption and production (Goal 12) of the Sustainable Development Goals (SDGs) towards the negative impact from the second-hand trade market. This study further raises the need for Governments in developing countries to adopt strict and workable policies aimed at limiting the recurring harm these imported second-hand clothing have on their environment and related water bodies.

Table 6
Results of moderating effects of attitude on the relationship between disposal behaviour and consumption.

	Coefficient	SE	*T*	*p*	LLCI	ULCI	Hypothesis Decision
constant	2.6100	.0491	53.2018	.0000	2.5130	2.7071	H4 not supported
Disposal	.2850	.0533	5.3502	.0000	.1796	.3903	
Attitude	.5954	.0543	10.9710	.0000	.4881	.7028	
Int_1	.0569	.0456	1.2474	.2145	-0.0333	.1471	

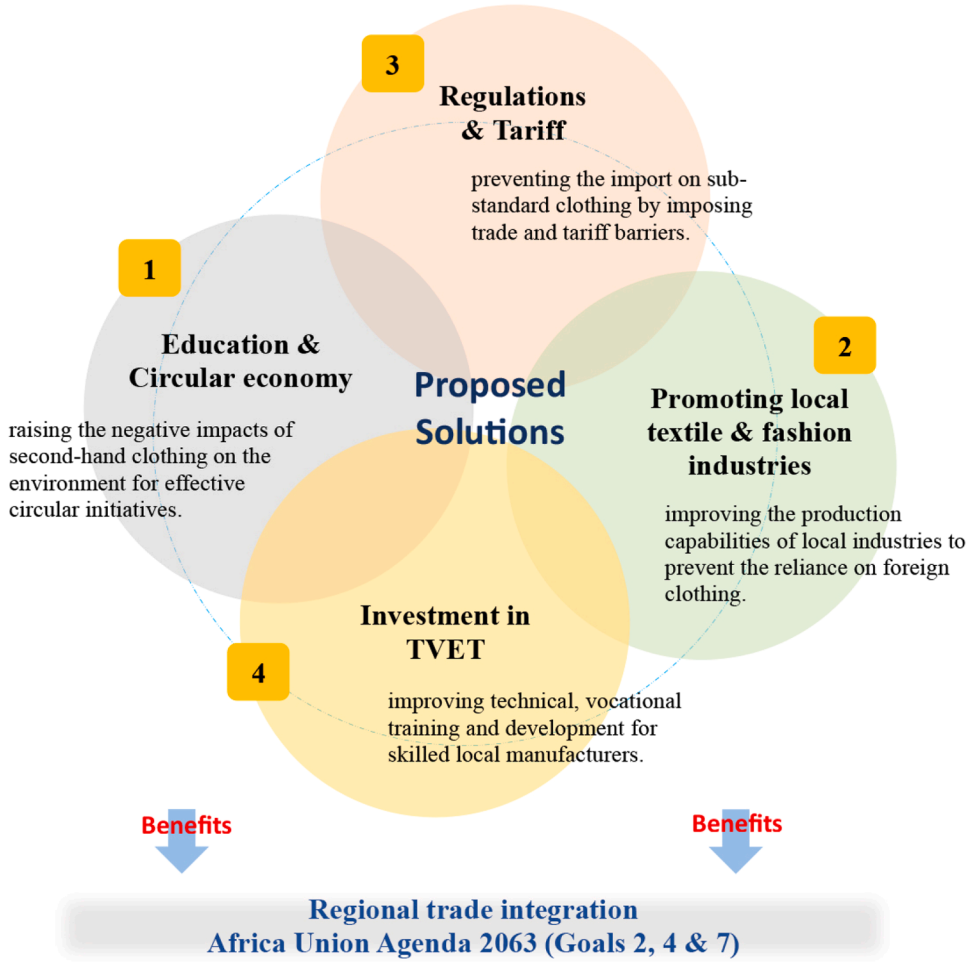

Fig. 2. Proposed solutions from the study.

Limitations of the study

The present study acknowledges its limitation of using only two factors such as attitude and disposal behaviour to investigate towards consumption intention of consumers. Further studies can understand the consumption intention of consumers towards second-hand clothing by identifying other factors, hence providing an overall perspective on the issue. Additionally, the online survey (via Google Forms) used affected the data collection process, as some respondents were reluctant to answer the questions after receiving the message. A more mixed approach to data collection should be used for future studies to obtain large numbers.

Conclusion

This study highlighted the influences of two factors, disposal behaviour and consumer attitude on their consumption intention for second-hand clothing in Ghana. Findings using the overall mean values revealed that consumers or respondents showed a low level of agreement to the questions about their consumption intention, disposal behaviour and attitudes towards second-hand clothing. Further results to test the study's hypothesis revealed that attitude influenced consumption intention, disposal behaviour influenced consumption intention, attitude and disposal behaviour influenced consumption intention and, with attitude having no significant moderating effects on the relationship between disposal behaviour and consumption intention. This reveals that with an increase in consumer attitude toward second-hand clothing, their interest would also increase towards their consumption intention. Hence, the purchase of more clothing could end up in landfill and further encourage importers to bring more clothing into the Ghanaian markets. Since more of these products are thrown away or burnt after a short usage, the Ghanaian consumer would want to purchase more from the market. This practice by consumers would further lead to more indiscriminate disposal of second-hand clothing, which poses serious threats to the environment and water bodies. However, when these Ghanaian consumers are educated on the effects of second-hand clothing on the environment, their attitudes and consumption intentions could be reduced or decreased. This corroborates with the findings of Zahid, Khan and Tao [66] that the purchasing intention of individuals who have a greater understanding and concern

for environmental sustainability are always guided and shaped when purchasing second-hand clothing. This, therefore, calls for effective initiatives and strict import measures by the Government of Ghana to help establish recycling plants and support circular practices.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Funding statement

There is no funding for this study.

Ethics approval statement

Respondents were informed about the purpose of the study; hence their consent was taken before they proceeded to answer the online questionnaire on their phones.

CRediT authorship contribution statement

Richard Acquaye: Conceptualization, Investigation, Validation, Writing – original draft, Writing – review & editing. **Raphael Kanyire Seidu:** Conceptualization, Investigation, Validation, Writing – original draft, Writing – review & editing. **Benjamin Eghan:** Conceptualization, Investigation, Validation, Writing – review & editing. **George Kwame Fobiri:** Conceptualization, Investigation, Validation, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] K. Ahiable, C. Triki, Tackling Ghana's Textile-Waste Challenge, Tony Blair Institute for Global Change, 2021. https://institute.global/sites/default/files/articles/Tackling-Ghana-s-Textile-Waste-Challenge.pdf.
[2] K. Amanor, Developing a Sustainable Second-Hand Clothing Tracer in Ghana, [Doctoral, University of Southampton], 2018. https://eprints.soton.ac.uk/433269/.
[3] E.B. Andersen, N.E. Jensen, N. Kousgaard, Multiple linear regression. Statistics For Economics, Business Administration, and the Social Sciences, Springer, Berlin Heidelberg, 1987, pp. 316–346, https://doi.org/10.1007/978-3-642-95528-0_15.
[4] D. Appiadu, M. Kuma-Kpobee, E. Vandyck, Apparel shopping styles of Ghanaian female young adults, J. Fash. Mark. Manag. Int. J. 26 (4) (2022) 661–675, https://doi.org/10.1108/JFMM-09-2020-0187.
[5] E.A. Awafo, E. Amankwah, I. Agbalekpor, Assessing solid waste management practices in the Techiman municipality of Ghana and the potential of recycling for revenue mobilization and reduction of waste menace, Cogent Soc. Sci. 9 (1) (2023), 2182867, https://doi.org/10.1080/23311886.2023.2182867.
[6] E. Awere, P.A. Obeng, A. Bonoli, P.A. Obeng, E-waste recycling and public exposure to organic compounds in developing countries: a review of recycling practices and toxicity levels in Ghana, Environ. Technol. Rev. 9 (1) (2020) 1–19, https://doi.org/10.1080/21622515.2020.1714749.
[7] Baden S., & Barber C. (2005). The impact of the second-hand clothing trade on developing countries. In: Oxfam GB. https://oxfamilibrary.openrepository.com/handle/10546/112464.
[8] S.I. Bangdiwala, Regression: multiple linear, Int. J. Inj. Control Saf. Promot. 25 (2) (2018) 232–236, https://doi.org/10.1080/17457300.2018.1452336.
[9] Barrera T. (2021). NuCycl Recycling Technology: A Step Closer To Achieving Fashion Circularity. The Tech Fashionista. Retrieved February 7, 2023 from https://thetechfashionista.com/what-is-nucycl-by-evrnu/.
[10] P.D. Berger, R.E. Maurer, G.B. Celli, Multiple linear regression. Experimental Design: With Application in Management, Engineering, and the Sciences, Springer International Publishing, 2018, pp. 505–532, https://doi.org/10.1007/978-3-319-64583-4_15.
[11] R. Bick, E. Halsey, C.C. Ekenga, The global environmental injustice of fast fashion, Environ. Health 17 (1) (2018) 92, https://doi.org/10.1186/s12940-018-0433-7.
[12] R. Boddu, K. Gadey, Kenya's Import of Second hand Clothing and Accessories between 2016-2020: An Overview of Mitumba market in Kenya, Textile Value Chain, 2021. Retrieved March 30, 2023 from, https://textilevaluechain.in/in-depth-analysis/kenyas-import-of-seconhand-clothing-and-accessories-between-2016-2020-an-overview-of-mitumba-market-in-kenya/.
[13] F. Chekol, Y. Alimaw, N. Mengist, A. Tsegaye, Consumer choice for purchasing imported apparel goods and its effect on perceived saving in Debre Markos district, Amhara Ethiopia: a logistic regression analysis, Cogent Soc. Sci. 8 (1) (2022), 2140509, https://doi.org/10.1080/23311886.2022.2140509.
[14] M. Cobbing, S. Daaji, M. Kopp, V. Wohlgemuth, Poisoned Gifts From Donations to the dumpsite: Textiles Waste Disguised As Second-Hand Clothes Exported to East Africa, G. International, 2022. https://www.greenpeace.org/international/publication/53355/poisoned-gifts-report-fast-fashion-textile-waste-disguised-as-second-hand-clothes-exported-to-east-africa/.
[15] S. Cuc, S. Tripa, Fast fashion and second hand clothes between ecological concerns and global business, Ann. Univ. Oradea 15 (1) (2014) 163–167.
[16] G. Darren, P. Mallery, IBM SPSS Statistics 23 Step by Step: A Simple Guide and Reference, 14th ed., Routledge, 2016 https://doi.org/10.4324/9781315545899.
[17] J.K. Debrah, D.G. Vidal, M.A.P. Dinis, Raising awareness on solid waste management through formal education for sustainability: a developing countries evidence review, Recycling 6 (1) (2021) 6. https://www.mdpi.com/2313-4321/6/1/6.
[18] M.H. Dehghani, G.A. Omrani, R.R. Karri, R.R. Karri, G. Ravindran, M.H. Dehghani, Chapter 11 - solid waste—sources, toxicity, and their consequences to human health. Soft Computing Techniques in Solid Waste and Wastewater Management, Elsevier, 2021, pp. 205–213, https://doi.org/10.1016/B978-0-12-824463-0.00013-6.
[19] W. Fadhullah, N.I.N. Imran, S.N.S. Ismail, M.H. Jaafar, H. Abdullah, Household solid waste management practices and perceptions among residents in the East Coast of Malaysia, BMC Public Health 22 (1) (2022) 1, https://doi.org/10.1186/s12889-021-12274-7.

[20] Ghosh S. (2022). HKRITA's Green Machine is Breakthrough that Recycling of Blended Textiles Needed, at Scale. Texfash. Retrieved January 18, 2023 from https://texfash.com/special/hkritas-green-machine-is-breakthrough-that-recycling-of-blended-textiles-needed-at-scale.

[21] S. Gray, A. Druckman, J. Sadhukhan, K. James, Reducing the environmental impact of clothing: an exploration of the potential of alternative business models, Sustainability 14 (10) (2022) 6292. https://www.mdpi.com/2071-1050/14/10/6292.

[22] E.S. Gruber, V. Stadlbauer, V. Pichler, K. Resch-Fauster, A. Todorovic, T.C. Meisel, S. Trawoeger, O. Hollóczki, S.D. Turner, W. Wadsak, A.D. Vethaak, L. Kenner, To waste or not to waste: questioning potential health risks of micro- and nanoplastics with a focus on their ingestion and potential carcinogenicity, Expo. Health 15 (1) (2023) 33–51, https://doi.org/10.1007/s12403-022-00470-8.

[23] S.E. Hasan, Public awareness is key to successful waste management, J. Environ. Sci. Health A 39 (2) (2004) 483–492, https://doi.org/10.1081/ESE-120027539.

[24] A.F. Hayes, Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach, Guilford Publications, 2013.

[25] S. Ho, H&M Circular: Textile Recycling Startup Renewcell Lands Multi-Year Agreement With Fashion Group, Green Queen, 2020. Retrieved February 7, 2023 from, https://www.greenqueen.com.hk/hm-circular-textile-recycling-startup-renewcell-lands-multi-year-agreement-with-fashion-group/.

[26] R. Hoekstra, J. Vugteveen, M.J. Warrens, P.M. Kruyen, An empirical analysis of alleged misunderstandings of coefficient alpha, Int. J. Soc. Res. Methodol. 22 (4) (2019) 351–364, https://doi.org/10.1080/13645579.2018.1547523.

[27] E. Hur, Rebirth fashion: secondhand clothing consumption values and perceived risks, J. Clean. Prod. 273 (2020), 122951, https://doi.org/10.1016/j.jclepro.2020.122951.

[28] S. Iran, S.M. Geiger, U. Schrader, Collaborative fashion consumption – a cross-cultural study between Tehran and Berlin, J. Clean. Prod. 212 (2019) 313–323, https://doi.org/10.1016/j.jclepro.2018.11.163.

[29] M.H. Jalil, S.S. Shaharuddin, Consumer purchase behavior of eco-fashion clothes as a trend to reduce clothing waste, Int. J. Innov. Technol. Explor. Eng. 8 (12) (2019) 4224–4233.

[30] L.C. Jenner, J.M. Rotchell, R.T. Bennett, M. Cowen, V. Tentzeris, L.R. Sadofsky, Detection of microplastics in human lung tissue using μFTIR spectroscopy, Sci. Total Environ. 831 (2022), 154907, https://doi.org/10.1016/j.scitotenv.2022.154907.

[31] G. Kanhai, S. Agyei-Mensah, P. Mudu, Population awareness and attitudes toward waste-related health risks in Accra, Ghana, Int. J. Environ. Health Res. 31 (6) (2021) 670–686, https://doi.org/10.1080/09603123.2019.1680818.

[32] A. Khare, S. Rakesh, Predictors of fashion clothing involvement among Indian youth, J. Target. Meas. Anal. Mark. 18 (3) (2010) 209–220, https://doi.org/10.1057/jt.2010.12.

[33] K. Khurana, R. Tadesse, A study on relevance of second hand clothing retailing in Ethiopia, Res. J. Text. Apparel. 23 (4) (2019) 323–339, https://doi.org/10.1108/RJTA-12-2018-0063.

[34] Klawikowski L. (2021). LARA KLAWIKOWSKI SS 2021 'inflorescence' showcased at South African Fashion Week. Retrieved February 7, 2023 from http://www.laraklawikowski.com/collections/lara-klawikowski-ss-2021/.

[35] I. Kursan Milaković, D. Miocevic, Consumer's transition to online clothing buying during the COVID-19 pandemic: exploration through protection motivation theory and consumer well-being, J. Fash. Mark. Manag. Int. J. 27 (1) (2023) 21–41, https://doi.org/10.1108/JFMM-04-2021-0105.

[36] D.I. Kwun Omang, G.E. John, S.A. Inah, J.O. Bisong, Public health implication of solid waste generated by households in Bekwarra Local Government area, Afr. Health Sci. 21 (3) (2021) 1467–1473.

[37] H.A. Leslie, M.J.M. van Velzen, S.H. Brandsma, A.D. Vethaak, J.J. Garcia-Vallejo, M.H. Lamoree, Discovery and quantification of plastic particle pollution in human blood, Environ. Int. 163 (2022), 107199, https://doi.org/10.1016/j.envint.2022.107199.

[38] Lidell J., & Jonsson A. (2022). Used clothing acquisition for reuse : a case study on take-back schemes of used children's clothing [student thesis, University of Borås]. DiVA. Sweden. http://urn.kb.se/resolve?urn=urn:nbn:se:hb:diva-28075.

[39] L.A. Manieson, T. Ferrero-Regis, Castoff from the West, pearls in Kantamanto? A critique of second-hand clothes trade, J. Ind. Ecol. (2022), https://doi.org/10.1111/jiec.13238.

[40] Mazibuko T. (2021). What went down on day 1 of SA Fashion Week SS21 digital collections. Independent Online (IOL). Retrieved February 7, 2023 from https://www.iol.co.za/lifestyle/style-beauty/fashion/what-went-down-on-day-1-of-sa-fashion-week-ss21-digital-collections-0f077d3e-710c-43eb-9f7a-1baa70cb67f6.

[41] O.F. Morera, S.M. Stokes, Coefficient α as a measure of test score reliability: review of 3 popular misconceptions, Am. J. Public Health 106 (3) (2016) 458–461, https://doi.org/10.2105/ajph.2015.302993.

[42] L.R. Morgan, G. Birtwistle, An investigation of young fashion consumers' disposal habits, Int. J. Consum. Stud. 33 (2) (2009) 190–198, https://doi.org/10.1111/j.1470-6431.2009.00756.x.

[43] Morlet A., Opsomer R., Herrmann S., Balmond L., Gillet C., & Fuchs L. (2017). A new textiles economy: redesigning fashion's future. Ellen MacArthur Foundation. Retrieved January 12, 2023 from https://www.ellenmacarthurfoundation.org/assets/downloads/publications/A-New-Textiles-Economy_Full-Report.pdf.

[44] I.E. Napper, R.C. Thompson, Release of synthetic microplastic plastic fibres from domestic washing machines: Effects of fabric type and washing conditions, Mar. Pollut. Bull. 112 (1) (2016) 39–45, https://doi.org/10.1016/j.marpolbul.2016.09.025.

[45] M.K. Paras, R. Pal, D Ekwall, Systematic literature review to develop a conceptual framework for a reuse-based clothing value chain, Int. Rev. Retail Distrib. Consum. Res. 28 (3) (2018) 231–258, https://doi.org/10.1080/09593969.2017.1380066.

[46] K. Pathak, A. Yadav, S. Sharma, R. Bhardwaj, Young residents' household waste recycling intentions: extending TPB through place attachment, Rajagiri Manag. J. 17 (2) (2023) 138–155, https://doi.org/10.1108/RAMJ-12-2021-0088.

[47] Pilkington B. (2022). Unique Hydrothermal Processing Technology for Recycling Blended Textiles. AZO Materials (AZOM). Retrieved February 6, 2023 from https://www.azom.com/article.aspx?ArticleID=22284.

[48] Raupp N. (2022). TechVision Fonds I and High-Tech Gründerfonds invest in textile recycling startup EEDEN https://www.htgf.de/en/htgf-investment-eeden/#:~:text=EEDEN%27s%20technology%20counters%20these%20developments,and%20environmentally%20friendly%20textile%20recycling.&text=With%20EEDEN%27s%20process%2C%20used%20textiles,as%20viscose%2C%20lyocell%2C%20etc.

[49] Renewcell. (2022). We make fashion circular. Renewcell. Retrieved February 7, 2023 from https://www.renewcell.com/en/.

[50] Rewoven. (2022). Our recycled fabrics. Rewoven. Retrieved February 7, 2023 from https://www.rewoven.africa/reclaimed-fabrics.

[51] Rougier E., Clément M., Combarnous F., Osei R.D., & Afrani S. (2023). Multiple, polarized and vulnerable": A socio-economic exploration of Ghana's middle class. A. F. d. Développement. https://issuu.com/objectif-developpement/docs/multiple_polarized_and_vulnerable_a_socio-economi.

[52] SAJN N. (2019). Environmental impact of the textile and clothing industry: What consumers need to know. E. E. P. R. Service. https://policycommons.net/artifacts/1335345/environmental-impact-of-the-textile-and-clothing-industry/1941806/.

[53] Scott Jones J. (2019). Learn to Use Cronbach's Coefficient Alpha Test in R With Data From the British Crime Survey (Unrestricted Teaching Dataset) (2007–08) 10.4135/9781526497055.

[54] A. Shrivastava, G. Jain, S.S. Kamble, A. Belhadi, Sustainability through online renting clothing: circular fashion fueled by instagram micro-celebrities, J. Clean. Prod. 278 (2021), 123772, https://doi.org/10.1016/j.jclepro.2020.123772.

[55] A. Siddiqua, J.N. Hahladakis, W.A.K.A. Al-Attiya, An overview of the environmental pollution and health effects associated with waste landfilling and open dumping, Environ. Sci. Pollut. Res. 29 (39) (2022) 58514–58536, https://doi.org/10.1007/s11356-022-21578-z.

[56] M. Soyer, K. Dittrich, Sustainable consumer behavior in purchasing, using and disposing of clothes, Sustainability 13 (15) (2021) 8333. https://www.mdpi.com/2071-1050/13/15/8333.

[57] Startup City Hamburg, Media Startup Flip launches Recycled Sneaker, Startup City Hamburg, 2022. Retrieved February 7, 2023 from, https://startupcity.hamburg/news-events/news/media-startup-flip-launches-recycled-sneaker.

[58] D.L. Streiner, Starting at the beginning: an introduction to coefficient alpha and internal consistency, J. Pers. Assess. 80 (1) (2003) 99–103, https://doi.org/10.1207/S15327752JPA8001_18.

[59] X. Tong, J Su, Exploring young consumers' trust and purchase intention of organic cotton apparel, J. Consum. Mark. 35 (5) (2018) 522–532, https://doi.org/10.1108/JCM-04-2017-2176.
[60] T. Tweneboah Kodua, K. Asomanin Anaman, Indiscriminate open space solid waste dumping behaviour of householders in the Brong-Ahafo region of Ghana: a political economy analysis, Cogent Environ. Sci. 6 (1) (2020), 1779553, https://doi.org/10.1080/23311843.2020.1779553.
[61] C.O. Ugwu, C.G. Ozoegwu, P.A. Ozor, N. Agwu, C. Mbohwa, Waste reduction and utilization strategies to improve municipal solid waste management on Nigerian campuses, Fuel Commun. 9 (2021), 100025, https://doi.org/10.1016/j.jfueco.2021.100025.
[62] H. Wang, X. Liu, N. Wang, K. Zhang, F. Wang, S. Zhang, R. Wang, P. Zheng, M. Matsushita, Key factors influencing public awareness of household solid waste recycling in urban areas of China: a case study, Resour. Conserv. Recycl. 158 (2020), 104813, https://doi.org/10.1016/j.resconrec.2020.104813.
[63] Waste and Resources Action Programme - WRAP. (2012). Valuing our clothes: the true cost of how we design, use and dispose of clothing in the UK (2012). W. a. R. A. P. (WRAP). https://wrap.org.uk/sites/default/files/2021-01/WRAP-valuing-our-clothes-2012-07-11.pdf.
[64] Wright B. (2022). Worn Again Technologies launches Swiss textile recycling ecosystem. JustStyle. Retrieved February 7, 2023 from https://www.just-style.com/news/worn-again-technologies-launches-swiss-textile-recycling-ecosystem/.
[65] R.M. Yoada, D. Chirawurah, P.B. Adongo, Domestic waste disposal practice and perceptions of private sector waste management in urban Accra, BMC Public Health 14 (1) (2014) 697, https://doi.org/10.1186/1471-2458-14-697.
[66] N.M. Zahid, J. Khan, M. Tao, Exploring mindful consumption, ego involvement, and social norms influencing second-hand clothing purchase, Curr. Psychol. (2022), https://doi.org/10.1007/s12144-021-02657-9.