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## Article

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# The Impact of COVID-19 on Sustainability and Changing Consumer Behavior in the Textile Industry. Is it Significant?

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**Abstract:** Understanding consumer behavior and clearly predicting its subsequent direction is a complex process. We can often see significant differences between how a consumer behaves in a given market and what his attitudes, needs, or expectations are. It is very important to place much more emphasis on the area of consumer behavior than on the individual, to meet his needs and wishes as much as possible. In the following article, we conducted a survey in the form of a questionnaire on an online platform with a sample of 500 respondents from the Slovak Republic. The foundation of our study was to examine whether the COVID-19 pandemic, which is still a topical issue and it is a significant impact on daily life, has changed the shopping behavior in the clothing industry with which they consciously purchase. We were also interested in the dependence between income and frequency of purchase. The methods used in the paper were based on a theoretical elaboration of the issue of consumer behavior and the clothing industry as the second-largest polluter of the environment after the oil industry, subsequent analysis and synthesis. Another statistical method that we used in the paper was the analysis of qualitative data from the questionnaire survey through the creation of contingency tables and determining the dependence, respectively, independence between individual variables. We consider this article to be a good basis for further research.

**Keywords:** consumer behavior; textile industry; sustainability; COVID-19; impact.

## Introduction

The economy, the world, and our lives have seemed to have stopped since March 2020, when the world was hit by the COVID-19 pandemic or coronavirus. The coronavirus has not only claimed many lives but also has a massive impact on the service sector, tourism, retail, and many other sectors. This pandemic has a major impact, especially on unemployment, as a result of which large populations around the world have lost and are constantly losing their jobs. The loss of income from labor was reflected mainly in lower consumption of goods and services, which has an adverse effect on business continuity and the associated slowdown in business activities (Hall, 2021). Consumer behavior changes during a prolonged pandemic. People are becoming more and more insecure, and many have reduced their predatory desires for constant shopping, but the fact remains that a large percentage of people remain true to brands they know and trust. Customers who did not like online shopping and preferred to try on clothes in brick-and-mortar stores directly had no choice but to adapt to the situation (Granskog et al., 2020).

Indeed, research by Lord Simon Wolfson confirms that more than half of consumers spend less on clothes because they are forced to stay at home (Thomann, 2020). The Fashion Revolution movement published an article a few months ago about the impact of the pandemic on the people who make our clothes. They mentioned that many retailers are forced to close their stores due to insufficient income and make radical decisions to lay off their employees. While retailers encourage their customers to shop online, the reality is that many people do not even consider this solution, as they find themselves in financial

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distress (2020). In the global fashion market, suppliers usually pay in advance for the materials and fibers used in their production, so that retailers buy products from them. In response to the pandemic, many major fashion brands and retailers cancel their orders and stop payments for orders that have already been placed, even when the work has already been done. They do not take into account the impact this has on people working in factories, so the factories have no choice but to stop production and lay off workers who have either not received any severance pay or are only very low. Bloomberg reports that as a result of the coronary crisis during 2020, about 1,089 clothing factories in Bangladesh canceled orders worth about \$ 1.5 billion.

In order not only to have an impact on consumers and clothing manufacturers, we should also mention the masks that are used daily to protect and prevent the spread of COVID-19. Face masks can slow the spread of the COVID-19 pandemic and therefore, according to the World Health Organization (WHO), wearing them is essential. But what is the impact on the environment? The pandemic has led to a significant increase in the use of masks, gloves, face shields, protective suits, but also safety footwear. These products are made from polymeric materials, including antiviral fabrics, which usually end up as microplastic waste. Researchers have recently developed an antiviral polymer textile technology composed of silver and copper nanoparticles to reduce pandemic transmission. Antiviral polymeric textile wastes can also have a long-term negative impact on the aquatic environment because they are part of an emerging class of contaminants. A pandemic will have detrimental effects on beach pollution, which will also increase damage to marine species (Arduzzo et al., 2021).

### **Literature review**

The fashion and clothing industry is the second most polluting environment in the world (Pereira et al., 2021). For many years, we have not only talked about the functional form of clothing, which serves to cover our bodies and protect against the cold. It is the 21st century and clothing, as well as humanity, has undergone many changes. It is part of our lives. By clothing, one can express a lot: attitude, style, emotions, art, and the like. Whether we like it or not, we need to be honest with each other and really think about how the fashion industry has engulfed us and our behavior has changed from "necessary" to "headless" and "thoughtless". The concept of fast fashion is becoming more debated every day. topic. The value of the fashion industry is about \$ 3 trillion, which represents 2% of the world's gross domestic product (Grazzini et al., 2021). Before 1850, fashion was slow. All garments were made by hand as homemade or to order from tailors and tailors (Steele, 2020). People had to procure their own materials (wool or leather), prepare them and weave them (Rauturier, 2020). The dress was considered an asset. With the rise of new technologies, such as the sewing machine, the factory production system was on the rise. With the expansion of retail outlets, clothing produced in series in standard sizes and sold at fixed prices came more and more (Steele, 2020). As for the fashion industry, it is driven by rapidly changing preferences, especially for young women who want to be modern, but at a fraction of the price.

The so-called big players of "fast fashion" provide them with this opportunity. Low-cost fashion reaches peak sales. These brands take over the look and design elements of top fashion houses and can reproduce them quickly and cheaply. Everyone can buy trendy clothes, anywhere and anytime. Consumers, as well as industry, are constantly advancing (Linden, 2016). Clothing prices have fallen over the last twenty years, resulting in much higher clothing consumption than in the past. We currently own five times more clothes than our grandparents. It was great until we found out what tax we are paying for this trend of excessive consumption of clothing. In fact, this constant accumulation of cheap clothes is only possible because of the constant reduction of production costs. This in turn has serious consequences for our health, our planet, and the lives of clothing workers (Charpail, 2017). Until the middle of the 20th century, two collections per year were designated in the fashion industry, namely spring/summer and autumn/winter. The

designers worked many months in advance to plan each season. They had to learn to predict what customers would be interested in. At present, new collections of fashion brands are published at least once a week, representing 52 "micro-seasons" per year. Almost all companies that produce these clothes set fashion trends. They present their models on the catwalks during "Fashion Week" when fashion designers present to buyers and the media the latest collection, which they can then offer for sale in less than a few weeks. Manufacturers make every effort to avoid a moment of bored customers. Thanks to countless new collections, we constantly feel like we are wearing outdated clothes, which encourages us to constantly change our wardrobe and buy new pieces of clothing (Stanton, 2019).

All companies use different strategies that make them more competitive, which can captivate us as customers. The strategies include a wide range of services that suppliers provide to us for continuous purchasing. The authors of Huang and Jin also describe one of the strategies in their work, namely the BORS service, which means "buy online, return in the store", which also increased the cycle of clothing, from the seller to the consumer. (Huang & Jin 2020). Fast fashion can be described as a process of mass production of disposable clothing characterized by a low selling price. It is a key component of the toxic system of overproduction and consumption, making the fashion industry the second largest polluter in the world after the oil industry, with environmental damage constantly increasing in direct proportion to the growth of the industry (Charpail, 2017). The fact remains that approximately 800 trillion garments are produced each year. The frequency of models is also increasing. At present, there are no longer 2 main seasons, but 52 micro-seasons. From this point of view, we can see that the trend of fast fashion is an uncontrollable phenomenon to waste, which burdens the environment not only in its final form (finished product - clothing) but also in the production process (chemical use, cotton cultivation consumes an enormous amount of water, inhumanity in-text factories, child labor, etc.). If we compare the production of clothing in a period of about two pieces, we find that the increase in production represents a 400% increase compared to 20 years ago. the next wearing of one garment is seven times, then the garment is unused or the consumer throws it away. Textile waste is 35 kg per person per year. When buying and using clothes based on the analysis of the use of women on average 20-30% of clothing.

The fashion cycle, its dynamics, and the affordability of textile products, the main feature of which is a shorter lifespan, lead to an increase in the amount of textile waste (Arafat et al., 2015). One example of a fast-fashion chain is Inditex, specifically the Zara chain owned by Spanish businessman Amancio Ortega, who faced severe criticism and accusations when a case was discovered a few years ago in Brazil, where workers in inhospitable conditions worked in a local clothing factory.

### ***Changes taking place in consumer behavior***

One of the levels of human behavior is the behavior of the individual as a consumer (Koudelka, 2006). Kunc et al. (2012) divided it into individual spheres that have an impact on it, namely the psychological, sociological, geographical, and economic levels. Cruz-Cardenás et al. (2021) addressed the topic of consumer behavior and the effects that its changes may cause. In a study by Cruz-Cárdenas and Arévalo-Chávez (2018), changes in consumer behavior occurred on a personal level in connection with disasters or adverse events such as divorce, death, or illness. In these cases, most consumers get rid of old things that remind them of these events. In the case of natural disasters, such as predictable hurricanes, consumer behavior is characterized by the accumulation of basic needs. The feeling of fear of losing property or loved ones evokes impulsive shopping in consumers.

Few studies are focusing on shopping behavior during pandemics. In the case of influenza A and H1N1 outbreaks, Goodwin et al. (2009) found that during this period, people mainly stockpiled food and protective equipment such as masks or other personal hygiene items. In China, on the other hand, at the onset of SARS, Wen et al. (2005) found that the change

in consumer behavior was significant, especially in the leisure activities, mode of transport, and places they visited. The research carried out in the Czech Republic by Eger et al. (2021) based on a generational cohort, showed that the attractiveness of fear (fear of health and economic concerns) is related to changes in customer behavior and affects traditional and online shopping related to COVID-19. Pantano et al. (2020) point out that consumers have reconsidered their shopping habits while discovering the benefits of services they have never used before. For example, some consumers switch to online shopping and discover the security and benefits of home delivery, pick-up at the store, and cashless payments.

## Methods

The methods used in our paper are mainly the analysis of the theoretical basis of the researched issues and the overall generalization of the acquired knowledge. The first step was to compile a questionnaire, which consisted of several questions. The first two questions of the survey serve to further define the respondent according to demographic data, which are age and gender. The third question is based on economic data, which is monthly income. The following questions further specify the consumer behavior that creates a relationship with fashion and the perception of the fast fashion trend. The last two questions are used to determine the consumer behavior affected by the current state of the COVID-19 pandemic. After evaluating and collecting a sufficient number of responses, the questionnaire had to be evaluated. Using the Sample Size Calculator system, which is used to calculate the sample size, we calculated how many respondents in the territory had to complete the questionnaire to obtain relevant information.

For the purposes of this calculation, an online calculator was used, which contained data from the statistical office on the population. We determined the population interval from 15 to 70 years, which subsequently calculated that 384 respondents must participate in the survey. 500 heterogeneous respondents participated in our survey. Prior to launching our survey, we conducted a pilot survey of several respondents to help us identify gaps and adjust our response options. Subsequently, we performed an analysis of categorical data, respectively. Word characters, which were found in a questionnaire survey with 500 respondents in the Slovak Republic. Using the SPSS program, where they assigned a numeric code to qualitative variables. In the next step, we created a PivotTable. We investigated whether there was a relationship between gender and purchasing behavior, between age and consciousness during the purchase process, and between income and the frequency of fast fashion purchases. We used Pearson's  $\chi^2$ -independence test to verify independence. In this case, we test the null hypothesis  $H_0$  and the alternative hypotheses:

$H_{10}$ : There is no relationship between gender and consumer behavior.

$H_{11}$ : There is a relationship between gender and consumer behavior.

$H_{20}$ : There is no dependence between age and awareness of the use of clothing during the purchase.

$H_{21}$ : There is an addiction between age and awareness of using clothes during a purchase.

$H_{30}$ : There is no dependence between income and frequency of purchase.

$H_{31}$ : There is a relationship between income and frequency of purchase.

Subsequently, we chose a level of significance at the level of  $\alpha = 0.05$ . We created a contingency table with actual and theoretical numbers. The need to meet the conditions in the case of contingency tables for  $r * s$  must be respected. The first is at least 80% of the theoretical numbers that are greater than or equal to 5, and the other condition is met if neither of the theoretical numbers is equal to 0 and at least equal to 1. Both conditions must be met.

The decision of the test result depends on the p-value of the test. If the p-value of the test is greater than the selected level of significance, then the null hypothesis is not rejected, so we consider the variables to be independent. Otherwise, we reject the null hypothesis and accept the alternative hypothesis. There is a dependency between the variables.

## Results

The survey, which took the form of a questionnaire and was distributed through communication channels in the online space, involved mostly women with an 82.6% share. Men answered this questionnaire to a much lesser extent, only 17.4%. The reason for the higher interest in fashion on the part of women compared to men may also be the fact that women are generally more closely related to fashion. Many women take fashion as a part of life. Women's relationship with fashion is often a therapy, hobby, or lifestyle. Generation Y people had the highest share of respondents in our survey, which represents almost half of all respondents, namely 62.8%, ie up to 314 respondents. The second-highest proportion, 132 respondents, is made up of Generation Group X. And members of the Baby Boomers generation participated with a share of 10.8%, ie 54 respondents. In the third question, we focused on the economic indicator, which is the monthly income of respondents. A large representation of 43.8% of respondents (219 respondents) has no regular income (funds from family, brigades, etc.). The second group in terms of economics is respondents with regular incomes. Respondents with incomes ranging from 510 to 1200 € have the largest representation in this group, with a share of 24.2% (121 respondents). The share of 18.2% (91) consists of respondents whose monthly income is below 510. Over 69 €, only 69 respondents earn per month, which is 13.8%. Regarding the frequency of purchases, the most common answer was the purchase of clothes several times a month (46.4% share), and the second most common answer was the purchase of clothes several times in a period of 6 months, namely 42.6% share. Only 55 respondents, which is 11%, said that they only buy clothes a few times a year.

When asked if they realize how long they will wear purchased clothes, the answers were as follows: 43.6% (218 respondents) plan to wear some pieces of clothing seasonally, others long-term; 49% said that they would use the clothes they bought for a long time and only 7.4% decided to use the clothes only seasonally and then throw them away. In the case of assessing consumers' shopping behavior, 43.6% described it as impulsive (they buy according to feeling, randomly without prior thinking), 39.2% of respondents planned their purchase and 17.2% could not clearly determine their shopping behavior. When asked where consumers made their purchases before the coronavirus, the more frequent answer was that 82% shopped, but only 18% of respondents preferred online shopping. Given the current situation affected by the COVID-19 pandemic, which affected the lives of all people without exception and also had a significant impact on all sectors, we asked respondents whether this pandemic affected their shopping behavior. More than two-thirds of respondents (64.6%) say that coronavirus has affected their shopping. The share of respondents who were not affected by this pandemic during the purchase is 34.8%. Only one respondent could not determine exactly whether the situation affected him or not. In the last question, those who stated in the previous that they were affected by the situation in the purchase of clothing were to be verbally expressed by the respondents as. The most common answers were: less shopping, buying the most necessary clothes, and making a purchase online.

When analyzing shopping behavior based on gender, we found that in both cases, whether male or female respondents, impulsive shopping behavior prevails, which is characterized by spontaneity. Deciding, in this case, tends to react quickly, but it is not easy to engage the customer. This type of behavior exceeded 40% for both sexes. Consumers, whether women or men have less often chosen the option of planned shopping behavior, which is characterized by a longer time to think about the offer. He is motivated by quality and is seldom driven by emotions. It is typical for a given behavior that the consumer verifies and searches for details and connections about the product, and also subjects it to competitive analysis. When buying, a rational argument or experience of acquaintances prevails.

According to generational cohorts, we monitored the impact on awareness of the use of clothing that respondents buy. Generations of Baby Boomers, X and Y were mostly involved in the survey. In the first-mentioned generation, these are mostly individual and

competitive personalities who have a high interest in self-realization, especially in personal growth. We also call them technology immigrants (Jackson et al., 2011). They usually predominate in one place near home (Eger et al., 2021). Generation X people grew up in the period of ICT development (Lissitsa et al., 2016). They are sophisticated, but are not afraid to ask questions, seek comfort, and are price-oriented (Edger et al., 2021). The last generation group included is Y, ie it is an internet generation with a focus on success, and the most confident and ambitious individuals (Edger et al., 2021). In the monitored generation X and Y, we recorded a slightly larger share of long-term use of the purchased piece of clothes. In the case of Generation X, the ratio was 1: 1 with the possibility of long-term use of the purchased piece of clothing and planning to wear some pieces of clothing for a long time and others seasonally.

By processing the data obtained in the questionnaire survey, we move on to the subsequent analysis of qualitative variables and confirmations, or refutations of hypotheses, which are in the Methods section.

**Table 1. Chi-Square Tests**

Chi-Square Tests	
	Asymptotic Significance (2-sided)
Pearson Chi-Square H1	0,430
Pearson Chi-Square H2	0,029
Pearson Chi-Square H3	0,003

Source: results of SPSS

**Table 2. Symmetric Measures**

Symmetric Measures		
	Value	Asymptotic Significance (2-sided)
Cramer's V H1	0,058	0,430
Cramer's V H2	0,104	0,029
Cramer's V H3	0,140	0,003

Source: results of SPSS

The first hypothesis we set is the null hypothesis:

H1<sub>0</sub>: There is no relationship between gender and consumer behavior.

Subsequently, we established an alternative hypothesis:

H1<sub>1</sub>: There is a relationship between gender and consumer behavior.

Based on the performance of the Chi-square test of independence, we concluded that the p-value is greater than the significance level we set at 0.05. Therefore, we do not reject the null hypothesis and the relationship between gender and consumer behavior is characterized by its independence. In tab. 2 based on the calculation of the Cramer coefficient, we can observe that the contingency is not significant and a 5.8% dependence can be considered very weak.

The second hypothesis that we set as null is:

H2<sub>0</sub>: There is no dependence between age and awareness of the use of clothing during the purchase.

An alternative hypothesis is:

H2<sub>1</sub>: There is an addiction between age and awareness of using clothes during a purchase.

In Table 1, it can be seen that the calculated p-value is less than the determined significance level. In this case, we are talking about rejecting the null hypothesis and accepting the alternative hypothesis, ie there is a certain dependence between age and the awareness of the use of pieces of purchased clothing. Contingency is significant in this

relationship, but the intensity of dependence between variables is relatively weak at 10.4%.

The last formulated null hypothesis was:

H3<sub>0</sub>: There is no dependence between income and frequency of purchase.

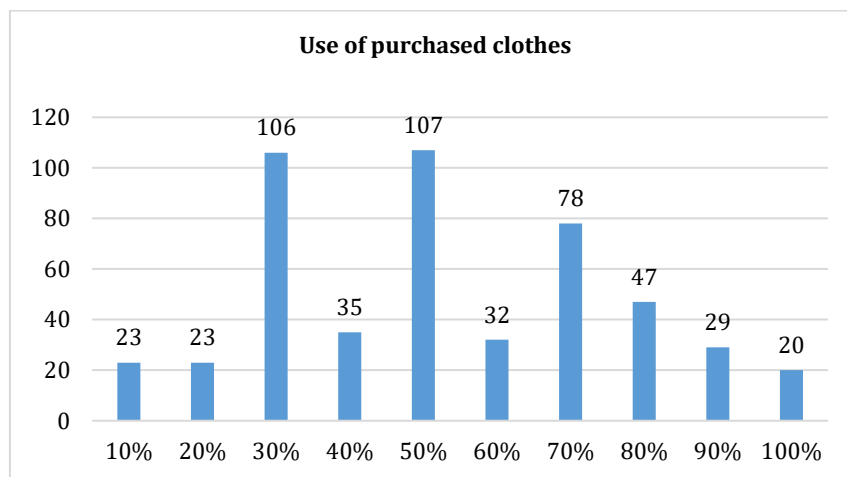
An alternative hypothesis was established as:

H3<sub>1</sub>: There is a relationship between income and frequency of purchase.

Also in this relationship, the calculated p-value was less than the significance level we determined. This is a situation where we again reject the zero and accept the alternative hypothesis that there is a dependence between income and the frequency of clothing purchases. After calculating the Cramer coefficient, we found that the variables are significant, but their dependence is also weak in this case, at the level of 14%.

### ***The issue of sustainability of Slovak consumers in the textile industry***

Sustainability, shared or cyclical economies are terms that we encounter quite often today. Therefore, we were interested in how much clothing really consumers use. Almost 60% of respondents use less than half of their wardrobe. Therefore, we can argue that the consumerist way of life is also reflected in this area, and there is also irrational behavior, where the pleasure of buying far exceeds the need for a given garment (Figure 1).



***Figure 1. Usage of purchased clothes***

Awareness of the recycling and sustainability of clothing is growing, above all, through the activities and awareness of various non-profit organizations that are trying to make consumers aware of the polluters of the fashion industry. When asked whether respondents would wear items already worn, 71.2% of respondents answered in the affirmative, and only 28% would not wear such clothes. In the case of clothes that the respondent does not wear, up to 72.2% stated that they prefer to donate these clothes to others; 8.6% sell them; 5.8% use clothes for something else, so they recycle it in some way and more than 13% of respondents throw clothes as waste.



## Discussion

Using multiple regression analysis, Eger et al. (2021) have shown that the attractiveness of fear or fear of disease and the associated economic concerns are significantly linked to changes in customer behavior and also affect traditional and online shopping during the COVID-19 pandemic. The fast fashion industry is characterized by a short product life cycle, high volatility, affordable prices, and impulsive consumer purchasing decisions, leading to enormous levels of waste and greenhouse gas emissions. In this context, Generation Y, which is the largest consumer of fast fashion products, is believed to exacerbate this situation, as their attitudes and intentions are usually not reflected in real pro-environmental behavior and are still reluctant to dispose of their clothing through sustainable methods. However, the difference in the study of given factors (such as attitudes, intentions, or behaviors) among Generation Y fast-mode consumers remains misunderstood. The study addresses this need by adopting a theory of planned behavior in order to examine the link between attitudes, intentions, and behavior, taking into account consumer participation in recycling.

The results of a two-stage cluster analysis and multiple moderated mediation analysis on a sample of 943 Generation Y fast-mode consumers in Italy show that the difference between attitude, intention, and behavior in the context of Generation Y does not seem to exist, as a favorable assessment of sustainable products and consumption actually leads to socially responsible consumer behavior. However, participation in recycling has been found to strengthen the link between intention and behavior only in individuals with high environmental attitudes (Mason et al., 2022). The ongoing COVID-19 pandemic is disrupting the fashion industry and forcing fashion companies to accelerate their digital transformation. The increased need for more sustainable fashion business operations, coupled with the prospect that business will never look the same again, requires innovative e-commerce-based practices. In the absence of very important empirical evidence of consumers' 'propensity to interact with digital people, our aim is to quantitatively analyze consumers' attitudes towards digital people in order to identify insights that will help fashion companies seek to diversify their operations (Silva & Bonetti, 2021).

With the expansion of mobile commerce, mobile shopping has become a buzzword in the e-commerce industry. To examine the predictive factors that influence usage behavior, experience response and inter-category use when shopping for mobile fashion, an integrated research framework has been proposed, consisting of a mobile technology acceptance model and lifestyle attributes. Quantitative data derived from 500 qualified responses collected through a survey questionnaire were validated using the SEM-ANN two-step predictive analytical approach to identify a non-compensatory and non-linear relationship. All six ANN models showed consistent relationships and evaluations with SEM results. The findings suggest that mobile commerce developers and designers should ensure that the features provided meet the evaluation criteria of users with different lifestyles, and that the benefits of mobile commerce platforms should be emphasized in marketing reports to promote first use, as well as widespread use. across different mobile commerce platforms and product categories. From a theoretical point of view, the findings revealed an indirect impact of the individual attributes on the intention to use innovative mobile technology. Research is also the first to adopt non-compensatory neural network analysis to compensate for linear SEM analysis in a study on mobile fashion shopping (Zi Xuan et al., 2021).

## Conclusion

The production of clothing in conjunction with its consumption around the world is growing every year. Over time, clothing has become an important part of a person's self-expression, taste, comfort, but also his mood. It is not possible to confirm waste in the production or use of textiles. In addition, a sound analysis of shopping behavior and

product life cycle among consumers is essential. The huge amount of textile waste deposited in landfills and incinerators can be reduced to a large level by understanding the dimensions of the product and its compatibility with nature. Textile waste is generated at every stage of the textile production process, such as spinning, weaving, dyeing, finishing, clothing production, and even by consumers. It is not easy to change consumer behavior. As our questionnaire showed, we often shop impulsively and the decisive factors for us are price, quality, and appearance. We assume and firmly believe that we are not indifferent to the issue of fast fashion, its negative effects on the environment, and human rights violations, we just lack sufficient information.

Over the last ten years, slow fashion has been replaced by a fast-growing toxic culture. Hand drawings are replaced by machine-made replicas, which reduce time and costs. The production of branded clothing at the lowest possible price for series production is only possible with the use of synthetic and harmful dyes. This fast-paced fashion culture eventually spits out a huge amount of clothing, accelerating carbon emissions and global warming. Poor quality materials soon end up in landfills.

The study by Akter et al. (2022) examines waste consisting of material in the production of textiles and clothing in several factories. In this context, the authors talk about the efforts of effective management, reducing the impact on the environment, and promoting sustainable practices. The economic loss is estimated at \$ 0.70 for each piece of clothing exported from Bangladesh.

The pandemic affected a number of consumers and had a significant impact on changing their shopping behavior. Above all, it was a reduction in the volume of clothing purchased, which was also related to the lower price that consumers spent on purchases. Of course, the transfer of purchases to the online space was also a big milestone. The consequences of the fast-fashion system can be seen at the corporate level, especially in that companies respond promptly to changing consumer demand and one of the main goals of fast fashion companies is to reach customers thanks to the diversity that companies bring in this way (Long & Nasiry, 2022). The main managerial consequence of promoting sustainability in this sector is, above all, consumer education and also filling a gap in the market, which could largely eliminate the negative environmental consequences of sustainable fashion.

We see the limitations of the study mainly in the sample selection, as the majority of responses are Generation Y respondents. As the research was conducted online through communication channels and social networks, we had a lower number of responses from other generations surveyed.

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