

Article

THE IMPORTANCE OF TEXTILE RECYCLING FOR FAST-FASHION CONSCIOUS PEOPLE

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Abstract: The textile industry's pollution is a growing environmental concern. This study promotes sustainable fashion awareness through clothing recycling. By addressing strengths, weaknesses, opportunities, and threats, we aim to advance eco-friendly fashion. This research can benefit future students and interested individuals. Our methodology included a questionnaire with 105 respondents. Results revealed high support for clothing recycling. The study emphasizes textile waste's environmental consequences, such as water and energy consumption, greenhouse gas emissions, and ecosystem pollution. While most people are environmentally concerned, apathy still poses a threat to the environment.

Keywords: textile recycling, fast-fashion, sustainable development.

INTRODUCTION

Textile products, especially clothing, are part of the primary human needs, and the development of human society is obviously reflected in their diversity, quality and ability to better satisfy the needs of society members (Udrea, 1990). The quick development of the world economy in recent decades has confronted contemporary society with new problems, among which an important place is occupied by the use, to an ever-greater extent, of materials from non-renewable sources (Florescu, 1985). The materials used in the textile industry can be classified into two main categories: natural textiles and synthetic textiles. This distinction is based on the raw material used and the manufacturing process.

Natural textiles are made from fibers with natural origins, such as animal fur and skin, plant seeds, leaves and even certain minerals. These represent the oldest resources for textile production and include well-known materials such as cotton, wool, silk, linen, hemp and cashmere.

On the other hand, synthetic textiles are obtained by synthesizing fibers with the help of technology, using chemicals such as petroleum and coal (Florescu, 1985). Synthetic fibers require less manual labor and can benefit from mechanized and automated manufacturing processes, resulting in lower costs and a wider

range of applications with lower initial investment. Notable examples in this category include polyester, acrylic, nylon, rayon, acetate, spandex, latex, and kevlar.

The waste generated by the textile industry can be divided into five main categories. There are pre-consumer wastes which are yarn and fabric scraps resulting from the manufacturing process (Nayab-Ul-Hossain et al., 2023) or waste generated from product packaging, such as cardboard, plastic film and labels (Sareen et al., 2018). Post-consumer waste originating from discarded textiles such as clothing, household products (e.g., bed linen, towels, curtains) and non-reusable textiles such as upholstery and carpets (Sareen et al., 2018).

Process waste consists of water contaminated with dyes and chemicals resulting from textile dyeing and printing, chemical waste generated from the use of chemicals and solvents, as well as carbon and other emissions with a negative impact on the environment, generated by energy consumption in the processes of manufacturing (Sareen et al., 2018). By-products and recyclable waste - cotton waste, fabric scraps and textile strips that can be reused, residual thread waste from weaving or sewing processes, and paper waste from administrative activities and packaging (Nayab-Ul-Hossain et al., 2023; Sareen et al., 2018), hazardous waste - chemical

contaminants, such as dyes, bleaches and finishing agents, which can contaminate wastewater and pose risks to the environment and human health in the absence of proper management. Also, agricultural practices associated with textile fiber production can generate hazardous waste in the form of pesticides and biocides, which have a negative impact on the environment and natural resources (Sareen et al., 2018). To minimize the impact on the environment, each of these categories is managed, collected, stored and treated separately.

Textile waste has a significant impact on the environment, including landfill overcrowding, water pollution with harmful chemicals, excessive consumption of energy and natural resources, greenhouse gas emissions and microplastic pollution. Landfill overcrowding is caused by the fact that textiles, especially synthetic ones, decompose very slowly, taking up valuable space and emitting greenhouse gases during decomposition (Weber, 2015). Water pollution occurs due to chemicals used in the textile process (Aishwariya, 2018), affecting aquatic ecosystems (Saravanja et al. 2022). Also, the textile industry requires substantial amounts of resources and energy, contributing to their depletion and climate change (Weber, 2015; Martire, 2021).

Greenhouse gas emissions are linked to the entire life cycle of textiles, from manufacturing to disposal, contributing to global warming (Martire, 2021). Microplastic pollution is a growing problem, especially from synthetic textiles, which release microplastics into the environment during washing. These plastic particles end up in the oceans and affect marine life, also threatening human health through the food chain (Saravanja et al. 2022; Katsnelson, 2015). In addition, textile production can lead to biodiversity loss through deforestation and the conversion of natural habitats to agricultural land or plantations. All these harmful effects highlight the importance of managing and reducing the impact of the textile industry on the environment (Martire, 2021).

This paper is based on research to provide a simple and comprehensive theoretical framework regarding people's perspective on the importance of recycling clothing items. Pollution caused by the textile industry has

become a major environmental problem in recent decades. Overall, this paper aims to contribute to the knowledge of the concept of sustainable fashion by making people aware of the importance of recycling clothing items. By highlighting strengths, addressing weaknesses, capitalizing on opportunities, and managing threats, we can pave the way for a more sustainable and environmentally responsible fashion industry.

The term "fast fashion" is based on the rapid and mass production of clothing items, following current fashion trends and emphasizing low costs and quick availability for consumers. Collections are created and manufactured at an accelerated pace, often at affordable prices, to meet consumer demand as quickly as possible.

The economic impact of "fast fashion" lies in stimulating consumption by promoting new trends and collections at short intervals, leading to increased sales and profits for fashion brands. However, this model can also contribute to reducing production costs, including through the use of cheap labor and the exploitation of natural resources in developing countries.

From a social perspective, "fast fashion" can have negative consequences on working conditions and the rights of workers in the textile industry, especially in countries where the production process takes place. Additionally, promoting a culture of excessive consumption can lead to increased waste and constant pressure on natural resources.

The environmental impact is significant, as "fast fashion" contributes to generating large amounts of textile waste, water and soil pollution, and greenhouse gas emissions. Moreover, the use of toxic chemicals in the production process can severely affect the environment and human health.

Thus, fast fashion is associated with immediate economic benefits but generates significant negative impacts on society and the environment. Therefore, a more responsible and sustainable approach is necessary in the fashion industry.

The aim of this study is to provide a realistic vision of textile recycling management.

The research subject can be placed in a broader context of sustainable development policies, in line with the 2030 Agenda for

Sustainable Development adopted by the member states of the United Nations. Specifically, it can be associated with Sustainable Development Goal 12, which aims to ensure responsible consumption and production. By promoting awareness and practices of sustainable fashion, including clothing recycling, our research contributes to achieving this global objective. Thus, by reducing textile waste and promoting a more responsible consumption pattern, we align with global efforts for sustainable economic and social development.

The objective developed in this paper is to obtain a large volume of people's opinions on textile recycling and analyze them in detail. It is extremely important to maintain a balance between quality, time, performance and costs, four extremely important dimensions to follow throughout the preparation of the material. (Olt, Szasz, 2019)

The hypotheses on which the research is based are:

- There is an increasing public awareness regarding environmental issues.
- The demand for sustainable and recycled products is on the rise.
- The fast-fashion industry dominates the market, generating a significant amount of textile waste.
- Consumers may not be sufficiently aware of the importance of textile recycling.
- Recycling technologies need to continue to develop and improve.
- Textile recycling infrastructure may be underdeveloped in some regions.
- The costs of recycling technologies can be high.
- Government regulations concerning the environment and recycling may be constantly changing.

MATERIALS AND METHODS

Methodology

As for the methodology, specialized literature was consulted, and it was determined that employing a questionnaire would likely be the optimal approach for collecting diverse perspectives and maximizing the amount of gathered data.

The questionnaire was distributed online through the Google Forms platform. The link to the form was disseminated across various online channels, such as social media networks, relevant discussion groups, and by directly sending the link to potential respondents via email or other online communication means. The distribution of the questionnaire took place over a specified period of time (one week in March 2023) to allow for the collection of a sufficient number of responses and to ensure the representativeness of the sample. All respondents are from Romania.

(i) Study participants

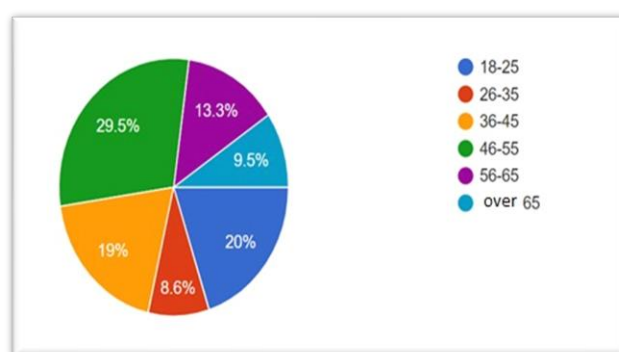


Figure 1. The age of the participants.

A number of 105 subjects between the ages of 18 and 80 took part in the present study. Responses came predominantly from people aged 46-55 (29.5% of total responses), followed by the 18-25 age group (20% of total responses) and the 36-45 age group (19% of total responses). This is important because it gives us a wider range of opinions on the importance of recycling clothing items.

Most of the answers received were given by women, i.e., 87.6% of the total answers, as can be seen in figure 2. It should be noted that statistically, worldwide, women purchase clothing products more often and in larger quantities (Babel and Mehta, 2019).

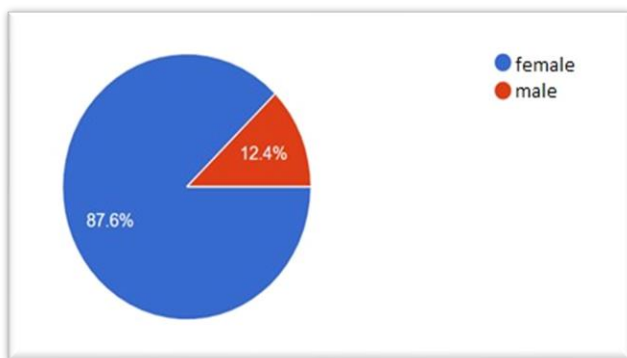


Figure 2. The gender of the participants.

All participants, except for one case (which has only secondary school), have at least completed high school, most of them have completed university studies, as can be seen in Fig. 3 (63.8% of total responses). This is relevant because individuals' educational background and training can often shape their behaviors and attitudes concerning certain subjects, in this case the recycling of clothing items. University studies can provide solid information and knowledge about the benefits of recycling, recycling processes and environmental impact. Consequently, University graduates may be more familiar with the concepts and practices of recycling and have a deeper understanding of its importance.

It should be noted that the level of education is not the only factor that influences recycling behavior. Other factors such as awareness, accessibility of recycling infrastructure and individual motivations can also play a significant role.

It was concluded that all participants live in urban areas, so they have access to the stores of many fashion retailers.

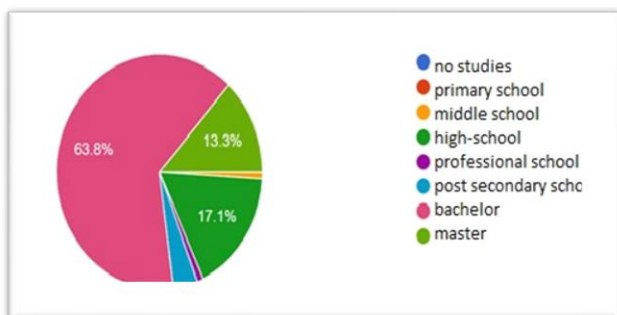


Figure 3. The subjects' education level.

(ii) Research tools

The present research used the survey as a research method, and the questionnaire as a

study tool, which was built around the purpose and objectives.

The questionnaire identifies itself as a flexible research tool, allowing the collection of primary data through questions. The questions are structured according to well-defined principles. (Turner, J.R., Simister, J.S., 2004).

Using a questionnaire as a data collection method offers several advantages. This allows for standardized data collection, ensuring that all participants receive the same questions, in the same manner. This helps maintain consistency and comparability in the data collected.

As the questionnaire is in electronic form, it can be distributed to a large number of people simultaneously, making it an effective method of collecting data from a diverse sample. The questionnaire comprises multiple-choice questions, open-ended questions or a combination thereof.

In this case, people were asked to answer the questionnaire, giving opinions and answers to the questions asked. Participants' responses were then compiled and analyzed to gain insights, identify patterns, or draw conclusions related to the research topic.

The questionnaire focused on people's awareness of the importance of recycling clothing items, their preference for types of textile materials and the criteria behind their choice when shopping.

The questionnaire includes a number of 11 items, clear, non-threatening questions being used. The first questions are introductory, of a general nature, having the role of giving the subject confidence both in himself and in the one who carries out the marketing research. One of the questions accesses the subject's memory by being an open question. Both closed, dichotomous and multichotomous scales and scale questions are identified in the questionnaire. The last four questions are identification, being used in the analysis of the questionnaire responses to identify the study participants and to describe the given sample.

Before being implemented on a sample of 5 target subjects, the questionnaire was pre-tested to find out if the questions are clearly stated enough to be understood correctly, if they are understood from all points of view, if they are in the correct order in the questionnaire, as well as if the answers provided are sufficient.

Another aspect tested was the time required to complete the questionnaire.

Following the pretest, changes were made to the questionnaire and the respondents were subsequently excluded from the investigated population.

(iii) *Research design and data analysis*

The present study is a descriptive, non-experimental, transversal type, which aims to analyze the perception of the population on the importance of recycling clothing items.

The research is non-representative quantitative, without the possibility of extrapolating the results to the entire population, so the research results remain localized at the level of the studied sample. (Ungureșan, 2022)

To obtain the data, we used a sampling method based on accessibility.

RESULTS AND DISCUSSIONS

Participants in the questionnaire were asked to what extent they consider themselves informed about the importance of recycling clothing items. The answers were quite different, only 9.5% of the participants considered that they were very much informed about this topic (Fig. 4).

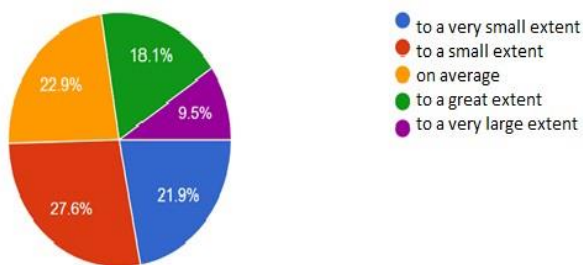


Figure 4. People's awareness of the importance of clothing recycling

Almost half of the subjects, respectively 44.8% of all respondents, did not consider that they were sufficiently informed about this subject, although they expressed their desire to learn more. Many people mentioned that campaigns promoting textile recycling are not popularized enough to reach a wider audience, and in some locations there are no known collection points for used clothing items.

Fast-fashion, characterized by cheap clothes made for short-term use, has contributed to a culture of disposable clothes. The constant cycle of buying and throwing away clothes results in a significant amount of textile waste

ending up in landfills. By purchasing clothes less frequently, people can help reduce textile waste and promote a more sustainable approach to fashion.

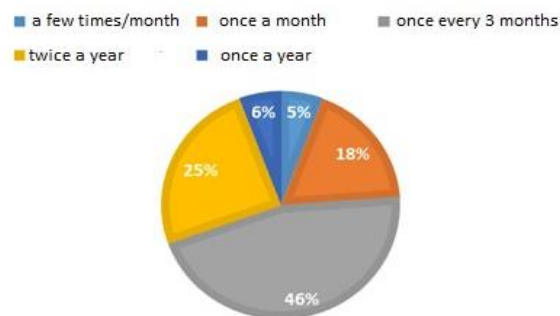


Figure 5. Purchase of new clothing items.

Another aspect that is highlighted is the frequency of purchasing new clothing products. A large percentage of participants, namely 46%, stated that they renew their wardrobe once every three months, and only 5% buy clothes several times a month (Fig. 5). This may also be influenced by differences in income, but the study focuses on the amount of waste that can emerge from the data collected. By purchasing clothing less frequently, people can support ethical and responsible brands that prioritize fair labor practices, thereby helping to promote positive change in the industry.

The criteria behind the choice of clothing items can provide a lot of information about people and can reflect different aspects of their personality and values. Clothing choices reflect a person's personal style and their fashion tastes. Whether it's classic, minimalist, bohemian, sporty or alternative, the way a person chooses to dress can highlight what they like and how they express their individuality through their clothes. Some people emphasize comfort and functionality when choosing their clothes. These people may turn to soft and flexible materials, clothing that allows freedom of movement, and items that fit their specific needs based on the activities they do. For some people, the choice of clothing is based on quality and durability. They prefer clothes made of high-quality materials, well-stitched and durable. They emphasize investing in pieces that will last longer and withstand wear and tear, rather than lower quality clothing or fast fashion products. Alternatively, some people are concerned about the impact clothes have on the environment and society. They can steer their clothing choices towards sustainable and ethical brands that use

recycled or organic materials, practice fair labor conditions and promote transparency in the supply chain. Last but not least, some people let themselves be guided by the fashion trends and cultural influences of the moment. They choose their clothes to conform or stand out within a particular style or trend and to connect with contemporary fashion and culture.

The most important criteria for choosing clothing items resulting from the study are the materials from which they are made and their price, as can be seen in Table 1. People are not very interested in the company or the country in which the product is made, but in the price-quality ratio.

Table 1. Criteria for choosing clothing items

| The factor impacting clothing choices | Number of subjects | % |
|---------------------------------------|--------------------|-------|
| Material composition | 82 | 78,1% |
| Latest fashion trends | 9 | 8,6% |
| Manufacturer | 15 | 14,3% |
| Price | 61 | 58,1% |
| Country of manufacture | 9 | 8,6% |
| Functionality | 6 | 6,3% |

The material preferred by the majority of study participants was cotton, with a weight of 94.3% of the total, followed by linen, with 54.3%, the answer options being multiple (Table 2).

Table 2. Popular textiles

| Material | Number of subjects | % |
|------------|--------------------|-------|
| Cotton | 99 | 94,3% |
| Linen | 57 | 54,3% |
| Hemp | 16 | 15,2% |
| Silk | 28 | 26,7% |
| Velvet | 11 | 10,5% |
| Satin | 9 | 8,6% |
| Chiffon | 4 | 3,8% |
| Synthetics | 9 | 8,6% |

The subjects argued the choice made for cotton as follows: several people said that it is the most popular material, which allows the skin to breathe, but offers comfort at the same time; others have claimed that the material lasts longer and performs better in frequent washes. Those who chose linen had similar opinions to those

about cotton, choosing a natural fiber considered classic in Romania. Those who chose synthetic materials (8.6%) mentioned that they prefer them for sportswear, because sweat evaporates much faster from them. When the subjects were asked what they do with the clothing items after they no longer use them, the answers varied, but the most common answer was "I donate them to other people" with 89.5% of the participants voting for this option (Table 3).

Table 3. What happens to used clothes

| Disposal Method for Used Clothes | Number of subjects | % |
|--|--------------------|--------|
| Throw them in the trash | 9 | 8,6% |
| Donate them to other people | 94 | 89,5% |
| Take them to special clothes collection container | 34 | 32,4% |
| Return them to stores with special programs for collecting used clothing items | 4 | 3,8% |
| Burn them | 1 | 1% |
| Give them new purposes (e..: house cloths) | 7 | 6,67 % |

About a third of the participants also indicated that the clothes were taken to a special clothes collection container (32.4%), while others mentioned that they had never seen such a container. This is a wake-up call for the authorities to make it easier for people to access collection points for used textiles.

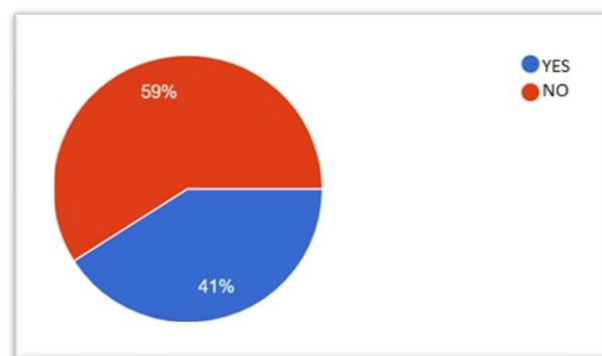


Figure 6. Subjects' awareness of special used clothing collection programs.

Only 3.8% answered that they return clothing items to stores with special campaigns, and only 41% of participants know of their existence (Fig. 6), which suggests that they should be more advertised. Almost a fifth (8.6%) throw away used textiles, turning them directly into waste and contributing to landfill overcrowding.

At the end of the study, it was asked to what extent people consider it important to recycle clothing items. While the majority answered very much (61%) or a great deal (28.6%), there were also some interesting responses. 2.9% of the participants declared themselves completely indifferent to this topic, considering that it does not represent an urgent environmental problem (Fig. 7). While it is good that most people are somewhat concerned about the environment, the existence of disinterested people will continue to be a danger to the environment, continuing to pollute it without restraint.

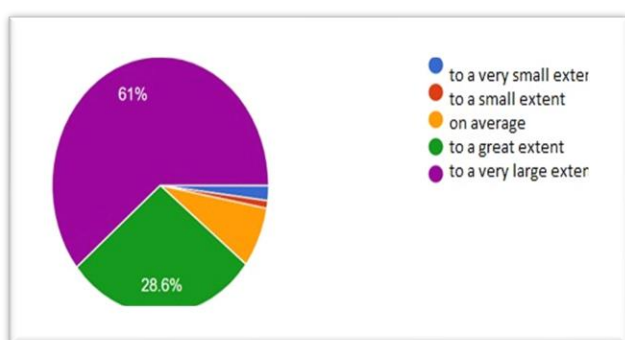


Figure 7. The importance of recycling clothing items.

SWOT ANALYSIS

Strengths:

- 61.7% of respondents consider clothing recycling to be very important.
- Textile recycling is an integral part of the circular economy, which aims to minimize waste and maximize resource utilization. By recycling textiles and creating new products from recycled materials, the industry follows the principles of a closed-loop system, reducing the need for continuous extraction of raw materials.
- Respondents prefer to donate clothing for reuse or place them in special containers for collecting used garments.
- There is an increasing demand from consumers for sustainable and recyclable products.
- Textile recycling encourages innovation and product diversification.

Weaknesses:

- It is observed that study participants purchase clothing at short intervals, caught

up in the "fast fashion" trend, thereby generating the most textile waste.

- A large percentage of participants are not informed about the importance of clothing recycling. Limited awareness among people leads to an increase in textile waste volume and limits recycling.
- Not all respondents have access to collection points for used textiles. Infrastructure is insufficient for textile recycling in some regions, leading to difficulties in managing and processing textile waste.
- The high costs associated with the technologies and equipment necessary for efficient textile recycling can discourage investments and innovations in this industry.
- Textile recycling faces challenges related to contamination and sorting of collected materials, as people are not aware of how to recycle properly.

Opportunities:

- Sustainability and eco-friendly options can provide an opportunity for the textile recycling industry to establish itself as a sustainable solution, attracting environmentally conscious customers.
- Governments can adopt new laws on textile recycling and waste reduction, providing incentives for involved companies. These initiatives could support the growth and expansion of the textile recycling industry.
- By transforming old clothes into fashionable garments, textile recycling can meet the demand for recycled products on the market, attracting environmentally conscious consumers who appreciate creativity and originality.
- Advancements in recycling technologies have the potential to enhance the efficiency and scalability of textile recycling processes. Innovations such as advanced sorting and separation, chemical recycling and automation can reduce costs, increase production capacity, and strengthen the global competitiveness of the industry.
- Public education campaigns focused on the benefits of textile recycling can promote a culture of responsible consumption and stimulate demand for recycled textiles.

- Textile recycling has the potential to expand into emerging markets, where sustainable practices and recycling infrastructure are still developing. By entering these regions early, companies can benefit from the growing demand for textiles, promoting sustainable production and waste reduction.

Threats:

- The "fast fashion" industry, characterized by cheap clothing, continues to dominate the market. The constant influx of new and cheap clothes may discourage consumers from opting for recycled textiles.
- Lack of consumer awareness regarding the importance and benefits of textile recycling may slow down the demand for recycled textiles and, consequently, the growth of the industry in this field, even in the context of increasing awareness of environmental issues.
- The production of recycled textiles faces difficulties in meeting consumer expectations, as variations in quality, color, and texture of recycled fibers can make it challenging to produce textiles that meet industry standards.
- The development and implementation of advanced recycling technologies can be costly and require significant investments.
- Economic fluctuations, funding availability, and market demand can affect the viability of textile recycling. Market instability and economic uncertainty can influence the profitability and investment opportunities in the industry.
- Compliance with environmental regulations and waste management policies can add complexity and costs to the textile recycling industry.

CONCLUSIONS

The results provide valuable insights into the concept of sustainable fashion, people's current state of awareness, specific context, geographic location and cultural factors influencing outcomes in different regions and populations.

A large part of the tested sample considers it very important that clothing items are recycled, and around 41% of people are

aware of special programs for collecting used clothing. The data shows that most people buy new clothing items on average 3 times a year (about 46% of people). They are followed by those who buy new clothes twice a year (25% of people), and monthly (18% of people). The materials from which the clothing items are made represent the most important criterion in choosing such a product, a percentage of 78.1% of the participants choosing this option. Also, the most popular materials are cotton (94.3%), linen (54.3%), and silk (26.7%). 89.5% of used clothes are "donated to other people". About a third of the participants (32.4%) take them to a special container for collecting clothes.

The main limitation of the research is the impossibility of generalizing the conclusions of the study at the level of the entire country, the subjects tested being only in Cluj County.

The purpose of the research was to obtain information that can be generalized globally, to reach deeper levels of information, to better understand the causes underlying the population's motivation for recycling clothing items, as well as to explain their motivations, attitudes and behaviors.

Another limitation of the research was the impossibility of interacting with the investigated subjects. This may have damaged the sincerity of the respondents. Added to this was the fact that the possible questions that the subjects probably had could not be answered.

In addition, a random sampling was not done, on subjects from all over the country, therefore the results obtained are significant only at the level of the investigated sample or possibly at the level of Cluj County. Another limitation of the research is the short time in which the observation was carried out.

In the legislative context of Romania, especially within the framework of the circular economy, there is an increasing trend towards adopting and implementing policies and regulations that promote sustainable practices in the textile industry. These policies aim to reduce waste, efficiently utilize resources, and encourage recycling and material reuse.

Based on the results of our research and the importance of promoting sustainable fashion and clothing recycling, we make the following policy recommendations:

- Development and implementation of educational and awareness programs for the general public, emphasizing the importance of clothing recycling and its impact on the environment.
- Establishment of a legislative framework to promote and facilitate clothing recycling, including setting clear standards and rules for the textile industry and recycling processes.
- Encouragement of innovation and investment in advanced recycling technologies and processes, through the provision of subsidies and grants for companies adopting sustainable practices.
- Support and promotion of social and solidarity economy initiatives, providing local solutions for clothing collection, sorting, and recycling.
- Introduction of taxes and levies for companies that don't adopt sustainable practices and generate a negative impact on the environment, in order to encourage transition to more responsible business models.

These recommendations could contribute to create a legislative infrastructure and a favorable regulatory framework for the development of a circular economy in the textile industry in Romania, thus reducing environmental impact and promoting sustainable economic development.

There are several possible solutions for improving the situation of textile recycling:

- Education and awareness: Awareness campaigns can be implemented to inform people about the importance of textile recycling and the correct recycling methods.
 - Improvement of recycling infrastructure: Expanding the network of collection points for used textiles and investing in recycling facilities can enhance the accessibility and efficiency of the recycling process.
 - Promotion of recycled products: Companies and designers can promote products made from recycled materials to stimulate demand and increase awareness of sustainability.
 - Technological innovation: Continued research and development in recycling technologies can lead to more efficient and sustainable methods of processing used textiles.
- To further develop the topic in the future, it would be useful to conduct a more detailed analysis of specific issues and local needs. Additionally, collaboration among governments, private companies, non-governmental organizations, and consumers may be essential for implementing effective and sustainable solutions in the field of textile recycling. Promoting continuous research and innovation could also lead to the discovery of new and improved solutions for managing and recycling textiles in the future.

Thus, awareness of textile waste is an essential catalyst for promoting sustainable fashion practices and reducing the negative impact of the fashion industry on the environment. Collective action and commitment from all stakeholders are required to bring about meaningful change and protect our planet for future generations.

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