

DIMENSIONS OF SUSTAINABLE FASHION CONSUMPTION. SCALES CONSTRUCTION BASED ON THE PRODUCT LIFE CYCLE

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Purpose: The aim of the article is to identify the factors determining the intention of purchasing sustainable fashion. The article answers three research questions: 1) What observable variables can create dimensions of sustainable fashion consumption? 2) Are the created dimensions characterized by appropriate validity and reliability? 3) Which dimensions have the strongest impact on purchase intentions for a sustainable fashion?

Design/methodology/approach: To achieve the aim of the article, literature and empirical research was conducted. Literature research was conducted based on the determinants of sustainable consumption of clothing products in connection with the life cycle of such product. Empirical research was conducted based on a survey on a sample of 270 respondents from Poland. The collected data was analysed using structural equation modelling (pls-SEM). Thus, the scales measuring the desired dimensions were validated. Additionally, a model was created which allowed us to find out what determines the intention of purchasing sustainable fashion.

Findings: The created model indicates that the intentions to buy sustainable fashion are most strongly influenced by: a) the choice of second-hand clothing, b) the choice of sustainable producers, c) the choice of sustainable packaging, and d) the involvement in repairing clothes. A predictor that turned out to be statistically insignificant is the choice of sustainable fabrics.

Practical implications: We consider our results regarding the validation of scales measuring dimensions of sustainable consumption of a clothing product to be important. The scales we proposed proved to be valid and reliable. Therefore, these scales may be useful for research on consumer maturity in the field of sustainable fashion.

Originality/value: The originality of our work is a set of observable variables measuring the dimensions of sustainable consumption of a clothing product. The set of these variables can be used as a guide for consumers who want to make sustainable purchasing decisions regarding clothing products that are environmentally friendly and limit the exploitation of people in the fashion industry.

Keywords: sustainable fashion, sustainable consumption, dimensions of sustainable consumption, scales validation, pls-SEM.

Category of the paper: Research paper.

Introduction

The clothing industry, which operates mainly in the fast fashion model, is responsible for significant environmental damage. It is responsible for 10% of global CO₂ emissions and 20% of global sewage. Moreover, textile waste is considered the fastest growing municipal waste stream worldwide. Therefore, there is an urgent need to transform the fast fashion model into a sustainable model of consumption of clothing products. Consumers of clothing products play an important role in this process and by putting pressure on clothing manufacturers, they can accelerate the transformation processes of the entire industry. To actively support consumers in applying pressure effectively, it is necessary to investigate the factors that influence purchasing decisions for more sustainable clothing products.

The main research problem of the article is the identification of factors determining the intention to purchase sustainable clothing products. Solving this problem became the main goal of the work. To specify the research problem, the following research questions were asked:

- 1) What observable variables can create dimensions of sustainable fashion consumption?
- 2) Are the created dimensions characterized by appropriate validity and reliability?
- 3) Which dimensions have the strongest impact on purchase intentions for a sustainable fashion?

To achieve the intended goal, literature research and empirical research were carried out. Literature research was based on the life cycle of a clothing product from the formation of fibers to the end of use of the product. The product life cycle provided the theoretical basis for the questions for the survey, which was then conducted on a sample of 270 people. The aim of the survey research was to obtain quantitative data on the factors shaping the intention to purchase and use sustainable clothing products. The data obtained from survey was analysed and used for:

- 1) validation of the questionnaire scales constituting dimensions of sustainable consumption of clothing products and consisting of observable variables;
- 2) modelling factors influencing the intention to purchase and use sustainable clothing products.

During the analysis of the survey data, structural equation modelling (pls-SEM) was used, and all mentioned dimensions became constructs, also known as latent variables.

The article consists of four chapters. The first is an introduction to the topic of sustainable consumption of a clothing product and presents the dimensions of such consumption based on the product life cycle. On this basis, the factors that may shape the intention to purchase and use sustainable clothing products are presented. Therefore, the research model included the following factors related to the choice of sustainable: a) fabrics, b) producers, c) packaging, as well as d) purchasing second-hand clothing and e) repairing clothing. Intentions to buy and use sustainable fashion became the dependent variable. The second chapter concerns the

methodological aspects of empirical research. Research methods used to analyse survey data were discussed. Therefore, the research model, questionnaire, and the research sample are described. The third chapter presents the results of the empirical research, and the fourth chapter presents a discussion of the results and main conclusions.

Sustainable consumption of a clothing product in the context of its life cycle

We analyse sustainable fashion consumption in the context of the product life cycle concept. This concept describes the evolution of a product through the stages of birth, growth, maturity and completion. It assumes that sales are a measure of the product's duration on the market - the product exists as long as it finds buyers, i.e. meets the needs of users. The product life cycle therefore reflects the process of satisfying and gradually losing the product's ability to meet the needs and expectations of customers (Garbarski et al., 2009). If we take into account the production processes of clothing, its life cycle in the currently dominant linear production can be described as follows: 1) fiber production, 2) fabric production, 3) clothing design 4) sewing and refining of clothing, 4) distribution and sales 5) use of clothing, 6) end of life – disposal. The current climate crisis and shrinking resources mean that linear production must be replaced by circular production, which precedes the stage of clothing disposal with stages of repair, regeneration, remanufacturing, reuse and recycling.

The first aspect of sustainable clothing consumption in the phase of product creation and development are fabrics. Recycled polyester is a fabric currently considered to be less harmful to the environment. Although it is definitely better for the environment than virgin polyester, it has many disadvantages, mainly resulting from the release of microplastics into the environment during washing (Nowak, 2024). It is therefore better to choose other, more ecological fabrics. For many years, cotton cultivation was based on non-ecological methods, such as monoculture and the use of artificial fertilizers and pesticides. For this reason, many programs have been developed that promote sustainable development in cotton production, ensuring the well-being of farmers and their environment. Organic cotton is grown without the use of artificial chemicals such as pesticides or growth stimulants and does not require intensive irrigation. Its cultivation supports biodiversity and natural life cycles. There are many certificates that confirm that the product is made of organic cotton. Some of them are: Global Organic Textile (GOTS) Standard, Oeko Tex (OEKO TEX), Fair Trade Cotton (FAIRTRADE). You can also see initiatives such as Cotton Made in Africa, which is a program of the Trade Aid Foundation established as one of the world's leading standards for sustainable clothing production. A fabric proven to be less harmful to the environment and ecological version of viscose is known as lyocell/tencel. In the production of classic viscose fibers, trees are cut down on a very large scale. To transform them into viscose,

it is necessary to use chemicals such as carbon disulfide and sodium hydroxide, and the sewage is often poured into rivers (Włodarczyk, 2021). Meanwhile, lyocell is produced in a closed water cycle and the trees come from controlled forest cultivation (Jiang et al., 2020). Environmentally friendly fabrics also include fabrics made from bamboo viscose fiber. Bamboo belongs to a group of plants with a very fast growth rate, reaching maturity in 3-4 years, which makes it quick to renew resources, and at the same time it is a valuable raw material for various applications. Due to the above, the following research hypothesis was formulated:

H1: The choice of sustainable fabrics significantly influences the intention to purchase and use sustainable clothing products.

Another important aspect of sustainable production are sustainable producers involved in sewing and refining clothing. There are many factors that influence whether a sewing factory produces sustainably. It can be considered as producing sustainably if it complies with labour rights and occupational health and safety regulations. A significant problem of unsustainable clothing production is the exploitation of children and lack of respect for workers' rights. These are the main social problems that the textile and clothing industry faces on a daily basis (Rudnicka, 2014). They occur mainly in developing countries. Occupational health and safety regulations apply to both the employer and the employee. They refer to many aspects of the sewing room. A breakthrough moment that made people aware of the very poor conditions of children and adults working in sewing factories in developing countries was the disaster of April 23, 2013, when the Rana Plaza building in Szabhara (Clean Clothes) collapsed. As many as 1134 people died and thousands were injured. The main factor that caused this was many large structural cracks. Despite receiving warnings, the owners of clothing factories on the upper floors ignored the recommendations and continued to use the building despite numerous cracks detected. Employees were ordered to return to work the next day. A few hours later the entire building collapsed. A total of 1134 workers and rescuers died, and 2600 workers were injured, many for the rest of their lives. Numerous survivors were trapped among the rubble and machinery for hours or even days before they could be extricated, sometimes requiring amputation of limbs to save their lives. Due to the above, the following research hypothesis was formulated:

H2: The choice of sustainable producers significantly influences the intention to purchase and use sustainable clothing products.

An important aspect of sustainable distribution and sale of clothing is ecological packaging. In recent years, it has become more and more common to buy clothes in paper packaging instead of plastic bags. More and more often, we can also see the phenomenon of creating paper labels for clothes instead of those covered with a plastic coating. According to statistics, as many as 57% of fashion brands have made clear progress in terms of sustainable packaging, 34% of brands have started changing from traditional packaging to better ones, while the remaining brands declared that they will either rethink (1%) their packaging in the future or make an effort

to improve their improvements (8%) (Jestratišević, Vrabec-Brodnjak, 2022). The main factor driving the growth of the packaging industry also for the fashion industry is the significantly increasing size of key sectors using packaging (Enlund, Nilson, 2021). Due to the above, the following research hypothesis was formulated:

H3: The choice of sustainable packaging significantly influences the intention to purchase and use sustainable clothing products.

Another aspect that influences sustainable clothing consumption is the use of second-hand clothing. Nowadays, more and more clothing discount stores are being opened. They are a great solution for people who base their theories of life on sustainable development, but also for people who like to stand out in some way and be original. According to the research, the majority of surveyed consumers, as many as 96%, are young people born in the 1990s and 2000s, who are not guided to a significant extent by environmental protection and economic motivations. The main barriers to purchasing used clothing are: concerns about poverty and sanitary conditions (Wang et al., 2022). As it was already outlined, consumers often look for so-called "gems" in second-hand clothes stores (lumpex stores) - clothes that will help them stand out. Before a used item becomes unique, it passes through many hands, places and times, which makes it unique. Its foreign origin increases the chances of finding clothes that stand out from others. Due to the above, the following research hypothesis was formulated:

H4: The choice of second-hand clothing significantly influences the intention to purchase and use sustainable clothing products.

One way to reduce the amount of clothes thrown away is to repair damaged items. According to (Graham, Thrift, 2007), the repair process is also important because the destruction and subsequent repair of objects allows societies to learn and introduce innovations. Repairs can be accomplished using professional repair services (PRS) or do-it-yourself (DIY) practices. People who are unable to undertake such work on their own can use tailoring services. Unfortunately, the tailor's profession is losing popularity due to lower wages and the gradual closure of more and more factories. Companies are moving production to Asian countries, which leads to a shortage of qualified specialists on the local market. For customers, this will result in an increase in the prices of tailoring services and a longer waiting time for necessary repairs. Poles' sewing and clothing repair skills remain at an average level, with most people coping with minor tailoring work rather moderately. However, few Poles can operate a sewing machine - over 66% of people rate their skills in using such equipment at zero. Although respondents from different age groups probably had lessons related to learning to sew, the most common place where they learned these skills was at home. It is possible that the high percentage is since home teaching in this area was more comprehensive, with greater dedication of time and attention to the learner, than was the case in school programs. Interestingly, more and more people are willing to learn sewing on their own and are looking for sources that will allow them to acquire the necessary knowledge. These include tutorials available on platforms such as YouTube and stationary courses. The most popular services, such as

narrowing, widening or shortening clothes, are not activities that the customer needs to perform several times a month. For example, reducing the size of pants or having dresses made to measure is not typical at regular intervals, which is why customers visit tailors less often (Laitala, Klepp, 2018). Due to the above, the following research hypothesis was formulated:

H5: Involvement in repairing existing clothing significantly influences intentions to purchase and use sustainable clothing products.

Methodological aspects of the study

Research model

Based on the literature analysis, a research model was created to be used for empirical research. This model is presented in Fig. 1. The construct that serves as the dependent variable is the intention to purchase and use sustainable clothing. The constructs that act as predictors are: a) choice of sustainable fabrics, b) choice of sustainable manufacturers, c) choice of sustainable packaging, d) choice of used clothing, and e) involvement in clothing repair. Based on the model, it will be determined how the above-mentioned constructs-predictors influence the intentions to buy and use sustainable clothing.

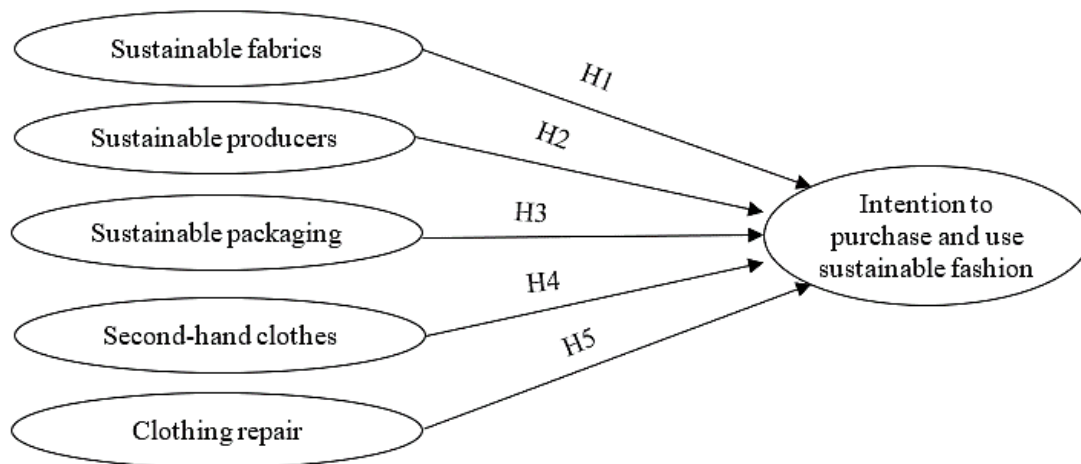


Figure 1. Research model.

Source: own study.

Measurement tool

Each construct of the research model was treated as a latent variable. Therefore, to measure the above-mentioned constructs, a set of observable variables was developed. These variables took the form of statements that were presented to survey respondents. The respondents' task was to respond to these statements on a 5-point Likert scale. The responses were then coded depending on the question as follows: a) 1 - I am not interested in it/never, 5 - very often,

b) 1 - to a small extent, 5 - to a large extent, c) 1 - definitely not, 5 - definitely yes. Observable and latent variables are presented in table 1.

Table 1.
Questionnaire structure

Construct	Variable symbol	Questionnaire question
Fabrics	Fab1	How often do you buy clothes made of fabrics from organic farming (e.g. organic cotton)?
	Fab2	How often do you buy clothes made of recycled fabrics (e.g. recycled polyester, recycled cotton)?
	Fab3	How often do you buy clothes made of fabrics proven to be less harmful to the environment (e.g. lyocell/tencel, modal, bamboo viscose)?
	Fab4	How often do you buy clothes made of fabrics obtained from raw materials from farms that care about animal welfare (e.g. wool or down obtained from such farms)?
Producers	Pro1	How often do you check a clothing producer to ensure that he produces without harming the environment?
	Pro2	How often do you check whether employees working in the production of clothing in a given company are treated fairly and respect their rights?
	Pro3	How often do you draw conclusions about respect for the environment and workers' rights based on information about the country of clothing production?
	Pro4	When making purchasing decisions, how often do you consider amount of emissions into the atmosphere generated by transporting clothes from the country of origin?
Packages	Pac1	How often do you buy clothes in biodegradable packaging (paper/corn, etc.)?
	Pac2	How often do you buy clothes in recycled packaging (e.g. paper, plastic)?
	Pac3	How often do you buy clothes in reusable packaging (e.g. RePack, reusable cartons)?
Second-hand clothing	Seh1	How often do you buy used clothes?
	Seh2	How often do you consider buyin?
Clothing repair	Rep1	How often do you repair your clothes, e.g. through tailoring services?
The intention to purchase and use sustainable clothing	Int1	I would like to buy clothes made of environmentally friendly fabrics
	Int2	I would like to buy clothing produced with respect for the environment and employee rights
	Int3	I would like to buy clothes in environmentally friendly packaging
	Int4	I would like to buy used clothes
	Int5	I would like to repair/regenerate my clothes

Source: own study.

Research sample

The research was conducted in January, February and March 2024 and 270 responses were collected. The questionnaire was prepared in electronic version. The research was conducted in Poland. 141 women and 123 men took part in the survey, 6 people defined their gender as "other/I prefer not to state it". To determine the age of the respondents, the respondents were divided into eight age groups. The largest age group is 18-26 years old (45.56%), followed by the age group under 18 years old (37.41%). The most frequent participants in the survey were people with secondary (38.52%) and primary (37.41%) education. We were also asked about the average budget spent on clothing annually and most respondents stated that they spent less than PLN 4000 net on clothing annually (68.89%). The largest percentage of respondents live

in the countryside (34.44%), followed by cities with 150,000 to 500,000 inhabitants. inhabitants (32.59%), city up to 50 thousand inhabitants (16.3%), city from 50 to 150 thousand inhabitants (8.52%), city with over 500 thousand inhabitants (8.15%).

Results

Questionnaire validation

To validate the scales used in the questionnaire, their validity and reliability were examined. For this purpose, the following were calculated for each scale: 1) factor loadings resulting from conformational factor analysis, 2) Cronbach's α coefficient, 3) CR coefficient and 4) average, variance extracted (AVE). RStudio and the *semnr* package were used for this purpose. To consider the scale valid and reliable, Cronbach's α and CR should exceed the threshold value of 0.7, and AVE the value of 0.5 (Hair et al., 2011, 2014, 2019). The obtained results are presented in table 2.

Table 2.

Questionnaire validation

Construct	Item	Loadings	α Cronbach's	CR	AVE
Fabrics (FAB)	Fab1	0.830	0.804	0.869	0.625
	Fab2	0.790			
	Fab3	0.836			
	Fab4	0.700			
Producers (PRO)	Pro1	0.805	0.825	0.884	0.657
	Pro2	0.852			
	Pro3	0.854			
	Pro4	0.724			
Packaging (PAC)	Pac1	0.854	0.794	0.880	0.709
	Pac2	0.878			
	Pac3	0.792			
Second-hand clothing (SEH)	Seh1	0.947	0.885	0.945	0.897
	Seh2	0.947			
Clothing repair (REP)	Rep1	1.000	1.000	1.000	1.000
The intention to purchase and use sustainable fashion (INT)	Int1	0.816	0.847	0.889	0.618
	Int2	0.808			
	Int3	0.839			
	Int4	0.695			
	Int5	0.763			

Source: own study.

To examine the discriminant validity, the HTMT criterion (Table 3) and the Fornell-Larcker criterion (Table 4) were used. Table 3 shows that none of the values exceeds the assumed threshold value of 0.9, which indicates satisfactory values. In turn, the results in Table 4 show that the main diagonal has the highest values, which also confirms acceptable discriminant validity (Hair et al., 2011, 2014, 2019).

Table 3.*The HTMT criterion representing discriminant validity for scales*

	FAB	PRO	PAC	SEH	REP
FAB					
PRO	0.732				
PAC	0.542	0.479			
SEH	0.337	0.297	0.391		
REP	0.078	0.211	0.225	0.169	
INT	0.402	0.502	0.516	0.638	0.306

Source: own study.

Table 4.*The Fornell-Larcker criterion representing discriminant validity for scales*

	FAB	PRO	PAC	SEH	REP	INT
FAB	0.791					
PRO	0.602	0.811				
PAC	0.432	0.386	0.842			
SEH	0.290	0.251	0.327	0.947		
REP	0.077	0.188	0.200	0.159	1.000	
INT	0.344	0.415	0.417	0.609	0.276	0.786

Source: own study.

Factors determining purchase intentions for sustainable fashion

Acceptable results from the measurement model allowed for further analyses. The bootstrapping technique was used to determine the significance of the paths between the constructs - predictors and the construct - target variable. The results are presented in Fig. 2 and Table. 5.

The variance of the Intention to use and buy sustainable clothing is explained in 48% by the proposed predictor constructs. This model indicates that the construct of Second-hand clothing has the strongest influence on the examined intentions ($\beta = 0.486$) and this is a positive influence. The second significant predictor is the Sustainable producers construct ($\beta = 0.209$) and this is a positive impact. The third significant predictor is the Sustainable packaging construct ($\beta = 0.150$) and this is also a positive impact. The last significant predictor is the construct Clothing repair ($\beta = 0.129$), which is characterized by the smallest positive impact on the examined intentions to buy and use sustainable clothing. The predictor that turned out to be statistically insignificant is the Sustainable fabrics construct ($\beta = 0.003$). In this way, four out of five research hypotheses were supported.

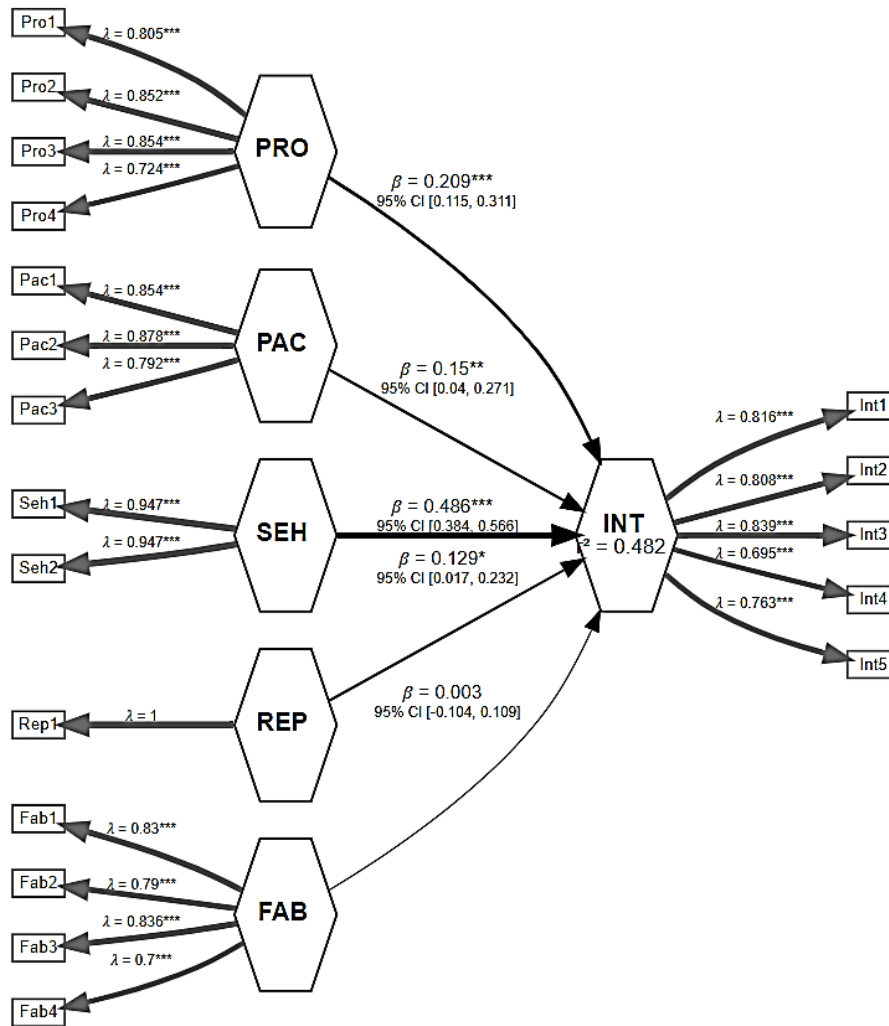


Figure 2. The model of purchase intention and use of sustainable fashion.

Source: own study.

Table 5.

Hypothesis testing results

Hypothesis	Original Est.	Mean	SD	T Stat.	2.5% CI	97.5% CI	Supported
H1: FAB → INT	0.003	0.004	0.054	0.059	-0.104	0.109	No
H2: PRO → INT	0.209	0.210	0.051	4.110	0.115	0.311	Yes
H3: PAC → INT	0.150	0.156	0.059	2.541	0.040	0.271	Yes
H4: SEH → INT	0.486	0.484	0.047	10.284	0.384	0.566	Yes
H5: REP → INT	0.129	0.128	0.056	2.287	0.017	0.232	Yes

Source: own study.

Discussion and conclusion

The presented article poses three research questions and then answers them based on literature research and survey research. In answer to the first research question, sets of statements were found, i.e. observable variables that build the dimensions of sustainable consumption of a clothing product. In answer to the second research question, it was established that these dimensions create scales with acceptable validity and reliability. In answer to the third research question, it was found that the intentions to buy and use sustainable fashion are most strongly influenced by: the choice of second-hand clothing, the choice of sustainable producers, the choice of sustainable packaging and the involvement in clothing repair. A predictor that turned out to be statistically insignificant is the dimension related to the choice of sustainable fabrics.

Commenting on the answers obtained, it should be emphasized that the life cycle of a clothing product has become a good theoretical basis for building the sought scales. Thanks to this, the content validity of the statements creating the sought scales was achieved. Confirmatory factor analysis, which is part of structural equation modelling, allowed us to establish the composite and discriminant validity as well as the consistency of each scale. However, the results related to the third research question require the most extensive comment. In our opinion, the greatest positive role of second-hand clothing in explaining the intention to purchase and use sustainable fashion results from the huge popularity of second-hand clothing. Selling your clothes and buying them in second-hand clothing stores or via an online application is currently very popular in Poland. Although the main reasons for this type of behaviour are undoubtedly economic, they influence the promotion of pro-ecological behaviour and support sustainable consumption by diverting clothing products from the landfill and extending their life cycle. The second important factor explaining sustainable fashion purchase intentions is related to sustainable clothing producers. In our opinion, its positive role results from the information circulating in public opinion regarding the exploitation of people in the fashion industry and environmental damage generated by clothing manufacturers. Our research therefore indicates that consumers are slowly starting to pay attention to whether a clothing manufacturer is trustworthy. The third factor explaining sustainable fashion purchase intentions is the factor related to sustainable packaging. In our opinion, it results from the anti-plastic revolution, which is currently taking place throughout Europe and therefore also in Polish society. The last significant positive factor explaining the examined intention is involvement in repairing clothes. Its weak role, in our opinion, results from the low availability of tailoring services in Poland and the lack of skills of Polish society in repairing clothes on its own. According to our research, the choice of sustainable fabrics does not significantly affect the intention to purchase sustainable fashion. Most of our respondents do not choose such fabrics. In our opinion, this is due to poor education about the impact of fiber production on the

environment and people. We believe that to change this, a broad information campaign in this regard should be carried out. Finally, we will add that the model we created explains 48% of the variance in the intention and use of sustainable fashion. We must therefore assume that, apart from the factors we have described, there are other factors that determine this intention.

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