

## Article

# Recognizability of Ecolabels on E-Commerce Websites: The Case for Younger Consumers in Poland

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**Abstract:** In the modern retail system, labels may be defined as silent-sellers which, if recognized and understood by consumers, may allow them to make conscious choices. This simple concern is particularly important considering e-commerce: it ensures customers to find nearly everything they demand without the need to exit from home; however, as shoppers are not in direct contact with sales-clerks, labels play even more a crucial role in the purchasing decision. Online shopping is increasing, notably among young people, and ecolabels represent for producers a tool to distinguish their goods and to provide consumers reliable and credible information about the environmental characteristics of their products. Despite the growing interest in the above-mentioned topics, research which investigate the recognition of ecolabels in online shopping by young consumers lack. To this purpose, the authors conducted an online questionnaire that was distributed to a sample of 559 young consumers who shop online in the most popular Polish retailing chains. Results reveal that online shopping is becoming increasingly popular in Poland, but only some ecolabels were recognized by more than 50% of respondents. This result is not correlated to the frequency of online purchases nor to gender. The recognition of ecolabels among consumers is fundamental.

**Keywords:** ecolabeling; e-commerce; ecological product; younger consumers



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## 1. Introduction

The Fourth Industrial Revolution has provided technological opportunities for the ever-increasing transition to online retail [1]. As a result of technological advancement, online sales have increased. The beginnings of e-commerce, which are currently symbolized across the globe by Amazon, iTunes, and eBay, and in Poland by Allegro, have led to changes in buying patterns, the virtualization of consumption, and the revolutionization of the strategies of numerous brands and companies [2]. Large-scale retailers operating in the food market, such as Europe's Tesco, Auchan, E.Leclerc, and Carrefour, having recognized the development of e-commerce, have also opened e-selling channels, in line with the increase in the group of customers buying daily necessities (generally classified Fast-Moving Consumer Goods) [3] from online stores. The trend of purchasing increasing varieties of products online is especially noticeable amongst representatives of the younger generations [4].

Online shopping is becoming increasingly popular in all parts of the world. In developed countries, the growth rate of e-commerce has reached 30%, and in developing countries, it has reached as high as 90% [5]. According to data from Ecommerce Europe [6], the European countries with the largest percentage share of people shopping online in 2018 were Switzerland (88%), Great Britain (87%), and Denmark (86%). For Poland, the percentage of people who were shopping online reached 60%. However, the market prospects and the dynamics of change are very promising for the further development of e-commerce

in all the countries across Europe in the future. According to [statista.com](https://www.statista.com), the revenue of e-commerce retailers is forecasted to grow in Europe from USD 393.8 billion to 510.5 billion in 2024 [7]. One of the major influences on e-commerce development is the increase in the number of Internet users. Between 2008 and 2018, in the European Union, the share of society who said they had used the Internet within the last three months rose by 25 percent and reached 84% of the population in 2018. The progress in the domain of logistics and parcel delivery services is another factor supporting the development of e-shopping [8].

However, shopping at online stores may limit customer access to information placed on packaging and labels, and therefore, may shape their image, perception, and impression. The message transmitted via the website of an online store provides the opportunity to emphasize or limit certain information characterizing a given product. Important information regarding the ecological features of products may influence customer buying decisions [9]. Currently, there are many different types and variations of ecolabels and certification approaches, which provide information about the ecological nature of products [10]. One of the key targets of using ecolabeling is the provision of reliable and credible information about the environmental impact of goods, facilitating the consumer selection of products that are environmentally friendly [11]. Consumers are informed about the environmental impact of products and are encouraged to mitigate adverse environmental impacts by changing their buying decisions [12,13]. Some researchers claim that it is sufficient to understand key features related to ecological production to influence consumer buying behavior [14]. The development of ecological products that effectively address environmental concerns has increased the efforts to design recognizable features of related products for consumers [15]. Within this context, ecolabeling is an essential factor of ecological products, which has an impact on consumer buying decisions [16,17].

Due to the fact that the e-commerce market follows the trends [18] and expectations of increasingly ecologically aware consumers, activities aimed at promoting ecological products can also be seen in this market. This is not only a strong consumer-specific trend but also an important development trend for the whole e-commerce industry [19,20]. Producers and distributors are expected to create their products in ways that assure consumers that the brands they choose are environmentally friendly. While the number of sustainable products available in e-commerce is growing year after year and numerous producers and retailers treat sustainable development as an integral part of their strategies, marketing research warns that not all sustainable products are perceived positively by consumers [21]. Concerning informing consumers about the ecological features of a product, ecolabeling (environmental labeling), which aims to attract possible customers and enable them to make pro-environmental choices, plays a crucial role. To the best of the authors' knowledge, the literature lacks research on the recognition of ecolabels in the e-commerce market as scholars have focused basically on products sold in traditional retail system.

Based on this framework and considering the above-mentioned gap, this manuscript aims firstly to evaluate the recognizability among young consumers representatives of Generation Z and those from Generation Y of ecological labeling used in e-commerce by the most popular retail chains operating in Poland (Carrefour, Tesco, Piotr i Paweł, E.Leclerc, Auchan, Allegro, and Rossmann). Furthermore, the correlation between the frequency of online purchases of ecological products and their recognition by young consumers are evaluated also considering the gender.

Generation Z is defined as individuals born between 1981 and 1999 [22–24]. It must be emphasized that the birth periods assigned to each generation are not fixed in the literature, e.g., Strauss and Howe [25] argue that Generation Y (also called Millennials) was born between 1980 and 2000, while Maloni [26] focuses on the period 1980–1994 for Generation Y and 1995–2012 for Generation Z. As a result, individuals aged 40 years can still be defined as millennials. Generation Y is the first generation that, since birth, has been immersed in the digital environment. Technological progress during their lifetime and widespread Internet access have strongly influenced their lifestyle, work, environmental attitudes, and consumer habits [27].

## 2. Literature Review

Although the conceptual framework of the ecolabeling program was for the first time initiated by Germany and Scandinavia in 1977 [28,29], as early as 1690, J. Locke presented semiotics as the study of signs, their nature, and their role in the process of cognition. He claimed that a sign was an intermediary between an object studied for a reason and the very reason itself [30]. The semiotic nature of a sign was, however, precisely defined by American Philosopher Ch.S. Pierce, is regarded as a creator of the general theory of signs. The interpretation of signs is process-oriented toward the acquisition and expansion of knowledge on the subject matter [31].

In the case of ecolabeling, the correct interpretation of a sign by means of quick perception (primarily visual) utilizes the knowledge resources related to ecolabeling [32] and may help consumers identify an environmentally friendly product and make decisions to buy a product that will be less detrimental to the environment. A correct communication process with the use of ecolabeling allows us to model consumer knowledge regarding the product's environmental aspects and thus influence their buying decisions [33,34]. Choosing ecological products undoubtedly mitigates negative environmental impacts and thus leads to the accomplishment of major objectives of sustainable production and sustainable consumption [35].

This is one of the reasons why, in recent decades, an ecolabel has been a strategic tool used for communicating that a product is environmentally friendly [36]. Its positive influence has been noticed by companies and organizations to the extent of publicizing the identity of ecological products [32,37]. The change in the management of enterprises is related to global environmental concerns that encourage enterprises to manufacture ecological products. Therefore, companies also emphasize assuring a competitive advantage by proving that they are environmentally friendly, e.g., through the mitigation of the environmental impact of their business operations [38,39]. For this purpose, companies use ecolabeling, which informs consumers about how their products are less detrimental to the environment [40]. As well as gaining profit from a long-term perspective, enterprises use ecolabeling to distinguish themselves from their competition and to prove higher corporate social responsibility [39].

With the development of ecolabeling, there is an increase in research in this field. For instance, Tang et al. [41] verify whether the pattern of ecolabeling with visual and verbal communication is relatively effective in terms of information about consumer buying behavior. Nilsson et al. [42] imply that ecolabels adjacent to products in stores constitute a key source of consumer information about the environmental impact of a product. The more recent literature reveals the most significant determinant of ecological awareness that improves the mental perception of consumers [36,43–45]. The perceived significance between businesses and the natural environment plays an essential role in the consumer decision-making process [46]. Some research focuses on how consumers make informed choices after having been exposed to ecolabeled products [47], while other research projects are oriented toward factors conditioning the attention paid to ecolabels [48]. The considerable impact on ecological consumption that has been revealed in recent research is controversial and even more complex than expected [49].

Researchers agree that ecolabeling is, therefore, a system that informs consumers about the environmental impact of products throughout production and consumption [50,51]. Ecolabeling is characterized by a pre-set graphic form and is proof of compliance with specific standards on the part of a producer; therefore, ecological products cannot be labeled according to one's discretion, although ecolabels are placed on products voluntarily, as they are under the condition of complying with the standards required by specific labels [52]. Ecolabeling must be easy to understand, reliable and consistent, and show features that are in line with legal accountability. Features that ecolabeling must comply with are referred to by Global Network Ecolabeling [53]. Thus, an ecolabel means the characteristic labeling of a product, which communicates that a given product has a mitigated environmental impact as compared to another product with kindred features. Ecological products comprise

safe components and non-toxic ingredients that may be reused and have no adverse impact on the environment throughout their entire life cycle [29]. This is why ecolabeled products have a higher value as compared to conventional products [39]. Amongst the most important value components, apart from quality, are safety and environmental impact. Product usability comparisons are emphasized, drawing attention to ecological quality as the category according to which ecolabels should be assigned and evaluated [54,55]. Some ecolabels may have a broader range; for instance, they may take into account social issues alongside the ecological aspect [45].

If consumers understand the meaning of superior ecological features, they are inclined to pay an ecological premium [56–58]. This situation is particularly visible in the food and textile industries [35,59]. Ecolabels thus constitute an important tool used for increasing consumer trust in products and services that are environmentally friendly [60,61]. Consumer attitudes toward ecolabeling matter as consumers should know the meaning of respective ecolabels and trust them [62–64]. On the other hand, it is worth noting that irregularities in oversight and the imperfect regulatory system have also created opportunities for the improper use of ecolabeling in the market [65], undermining the credibility of the system [44].

The recognizability of ecolabels is, therefore, a very important element in the environmental communication system [66]. Labeling systems must be understandable and recognizable to consumers for them to be able to use them properly. In a study by M. Gawron et al. [67], the recognition of 15 ecological labels among Polish and German students was examined. Among the respondents, none of them gave all correct answers, and the overall indicator of correctly recognized ecolabels was 42% for Polish respondents. The least recognized signs were “Ozone friendly” and “Krav”. The subjects from Germany obtained better results of recognition in this study [67]. Very similar results were obtained in a study by Chudzian et al. [68]. This study also confirmed the low level of recognition of ecolabels in the Polish community. Only 1/3 of the respondents confirmed that they recognized ecolabels. The rest of the respondents claimed that they did not know the meaning of these labels. In addition to domestic labels, pan-European labels, such as the EU Organic logo, were recognizable. In another study by Grunert et al. (2014), where the sustainability labels on food products were assessed on the basis of research conducted in five countries (UK, France, Germany, Spain, Sweden and Poland), the conducted analyses confirmed that among the analyzed countries, the lowest level of understanding and recognition was among the respondents from Poland [69]. In this case, European-wide ecolabels were also analyzed.

For instance, over half of end-consumers in the United States (USA) expressed their lack of trust in the ecological features of a product, which was confirmed by its ecolabeling [58]. Similarly, consumers also doubt the credibility of ecolabeling in some developing countries, such as Romania and the Czech Republic [33,70]. The Polish ecolabel research presented in the literature analysis was conducted on smaller samples [67,68]. The scope of their research did not include labels used in e-commerce [67–69]. The way of presenting products in traditional stores and e-commerce are very different from each other. In e-commerce, consumers cannot see the product’s packaging and labeling directly. Consumers use the information and photos that are presented by the e-shop owner. In a way, the owner modifies the information message from the manufacturer of the product. An example of such behavior on the part of retailers is the introduction and promotion of products using their own ecolabels.

Moreover, discussed works were carried out about a decade ago. Based on the presented literature review, the following research question was set out:

RQ1: What is the level of recognizability of ecolabels in e-commerce stores among younger consumers in Poland?

Annunziata et al. (2019) researched several underlying factors that impact the recognition of ecolabels including level of knowledge and frequency of purchases with the label. In the analysis of dependencies, they compared the level of knowledge of the label and the frequency of purchasing products with this label. In the case of the Organic logo, this relationship was the highest. However, in the case of labels such as Fair Trade or Libera Terra, a statistically significant relationship was not observed. These results give evidence that in some cases there may be a relationship between frequency of product purchase and knowledge of the ecolabel [71].

This problem was investigated by Rihn et al. (2019), at their work. Based on an analysis of labeling in traditional stores, they found that those labels that appear more often on products are more recognizable, in their case the “non-GMO” label [72]. On the other hand, industry ecolabels were less known by consumers due to their smaller range [72].

Musova et al. (2021) and Jad’ud’ová et al. (2020) also confirmed the positive relationship between the frequency of purchases and the recognition of ecolabels in their research [73,74]. However, this research also concerned traditional trade.

However, this research also concerned traditional trade. Research on the e-commerce market by Brady et al. Indicates that online stores and other promotion channels used on the Internet are powerful tools for influencing respondents [75]. These authors also indicate that the Internet environment has a greater impact on brand recognition and product image creation than traditional media [75]. As the above-mentioned research was conducted in a group of young consumers, it gives rise to the suggestion that frequent use of various websites and portals among young users may result in better remembering and recognizing the content appearing on them.

Based on the above discussion, the following hypothesis is proposed:

**Hypothesis 1 (H1).** *There is a dependence correlation between the frequency of online purchases of ecological products and the recognizability of ecolabels by younger consumers.*

The issue of gender differences in their environmental behavior is extremely interesting. Many studies have attempted to analyze this relationship [76–79]. Sigith et al. (2017) study found that women were buying ecolabeled products to a greater extent. According to the author of this study, it resulted from a more positive attitude of women toward the environment than in the case of men [80]. Similarly, in [77,78], where women expressed more support and interest for ecolabel criteria. Darnall et al. (2018) were also identified statistically significant gender differences in the overall use of labels and specific measurements of the use of five ecolabels (EU Energy Rating, EU Eco Flower, Forest Stewardship, Mobius Loop, Organic Standard) [76]. In the case of Brecard et al. (2009), women, younger people, and people with higher education belonged to the groups of consumers who were more willing to buy ecological products than others [79]. Felix et. al. (2021) identified significant differences in the perception of the ecolabel on the packaging. They noticed significant differences in the impact of messages using color depending on the gender of consumers [81]. Based on the above, the following hypothesis was adopted:

**Hypothesis 2 (H2).** *Gender differentiates the correlation between the frequency of ecological purchases and the recognizability of ecolabels in e-stores.*

According to Gallastegui, ecolabeling has two primary aims. The first aim is to inform consumers regarding their consumption impact on the environment and to encourage consumers to change their attitudes towards sustainable consumption models. The second aim is to encourage governments, producers, and other suppliers to create services and goods in compliance with environmental standards [52]. Therefore, it is plausible to state that the next ecolabeling goal is to create the demand for more environmentally friendly goods, and consequently, to urge manufacturers to supply goods that satisfy such expectations. Accordingly, the following functions of ecolabeling may be distinguished: ecological, informative, stimulative, marketing, and educational. However, the fundamental role of



ecolabeling is to assist consumers in recognizing environmentally friendly products [29,82], labeling is defined as every recognizable symbol affixed to a product or its packaging, indicating company or product efficiency in terms of environment-friendliness [36,53,83]. Within this context, ecolabeling is regarded as one of the best tools to promote ecological products, which influences consumer buying decisions [36,84,85]. Research shows that the ethical attributes of products may motivate consumer attitudes and usually constitute an effective indicator of converting positive attitudes into real buying behavior [86]. Researchers confirmed that the appearance of the word “green” has a significant impact on the volume of purchases [21,87]. Simon [88] suggests that products labeled as environmentally friendly correspond to new attitudes toward environmental values. Awareness of environmental protection issues is considered to be a pre-condition for attracting consumers to relevant features of a product [60]. Effective communication may influence the value perceived by consumers in terms of environmentally friendly goods [89]. In the meantime, some researchers draw attention to the education function of ecolabeling. Thus, in the communication process, ecological education plays a crucial role and should achieve such a level of influence that a consumer becomes aware of and is able to consciously interpret ecolabels and, based on them, to make appropriate buying decisions [90]. In the case that such a requirement is not met, the information overload arising from advertising and marketing campaigns causes the target groups to incorrectly interpret messages from the sender. However, to achieve positive results, the ecolabel needs to be scientifically standardized and its recognition among consumers increased.

### 3. Materials and Methods

The survey targeted individuals who reside in Poland. The pre-designed survey questionnaire was distributed amongst the respondents via email. According to Annunziata et al. [71], online survey presents many positive aspects such “low costs for researchers, simple and low time-consuming for respondents”: these advantages may be related also to questionnaire sent by email. Each of the surveyed individuals gave informed consent to participate in the survey. The main survey was preceded by a pilot survey conducted amongst several dozen respondents in the presence of a surveyor ( $n = 50$ ). As a result, it was confirmed that the respondents understood the questionnaire, and any unclear content was eliminated from it. The main survey was carried out from December 2019 until February 2020. It is worth noting that it took place one month before the COVID-19 pandemic was announced in Poland. The real number of collected questionnaires was higher. However, after their verification, some of them were deleted due to, for instance, omitted responses. The number of valid responses included in the study was 559, with a response rate of 93%. The researchers considered the sample of 559 respondents to be sufficient to achieve the aims and verification of the validity of the hypotheses within the framework of this paper. We made every effort to consider a more diverse sample when selecting participants. It was considered inappropriate to sample only university students; therefore, the study was extended beyond students, resulting in a more balanced and representative sample. The online survey was distributed via email, social media (Facebook), and youth websites and redistributed to increase diversification. Email addresses were obtained from students and graduates of the university and other stakeholders. The questionnaire was also sent to the other research centers. The used snowball sampling method is widely used in Internet research, especially in order to reach as many people with similar features, which are often difficult to access [91–93]. The scope of the sample covered the entire country. Data collection via email may introduce some bias, similar to the ones indicated by Annunziata et al. [71] for online questionnaire which are related to “over representation of some socio-demographic characteristics”, “self-selection bias”, and “social desirability”.

The study was not fully representative, as it aimed to draw attention to the problem of ecolabels in e-commerce, and was of an exploratory nature, to inform further representative studies on a larger scale. Convenient sampling methods targeted at young respondents were used. Table 1 presents the characteristics of the surveyed respondents. The majority

of them were women, accounting for 75% of all respondents. Men accounted for approximately 25%. Women were represented by a larger group of respondents. This was due to the fact that, according to the data of Statistics Poland [94], women more often use the Internet to do shopping. For products in the “food, beverages, stimulants, cosmetics, cleaning agents” category, the share of women was 67% [94]. In addition, women, in general, are more likely to be the primary household food purchasers [78]. The authors of this study made the decision not to remove the female responses in order to bring the proportions into line with the men’s responses. Especially that the study undertook an analysis of the relationship in terms of gender—hypothesis no. 2.

**Table 1.** Characteristics of the sample.

Parameter		N	%
Gender	Women	421	75.31%
	Men	138	24.69%
Place of residence	Cities with a population of over 100 thousand	184	32.92%
	Cities with a population of up to 100 thousand	152	27.19%
	Rural area	223	39.89%
Age	16–21	294	52.59%
	22–35	242	43.29%
	36–40	23	4.11%
Education	Undergraduate	296	52.95%
	Bachelor’s degree	210	37.57%
	Master’s degree	53	9.48%
Monthly disposable income (EUR)	Up to EUR 162	250	44.72%
	EUR 163–348	201	35.96%
	EUR 349–535	63	11.27%
	EUR 536–814	25	4.47%
	EUR 814	16	2.86%
No response	4	0.72%	

The majority were rural area residents, accounting for almost 40% of the respondents. Urban area residents in cities with a population size of up to 100 thousand accounted for 27%, and representatives of the largest metropolitan areas accounted for 33% of all respondents. According to the data from Statistics Poland, people living in the rural area accounted for 36% of the population who ordered goods or services online. Cities up to 100 thousand—31%, and the largest cities with more than 100 thousand inhabitants—33% [94]. Therefore, due to the fact of living, the studied population did not differ much from the real one. The remaining variables characterizing the studied population (age, education and monthly disposable income) are presented in Table 1.

The respondent sampling was deliberate and was oriented toward younger shoppers, i.e., millennials and Generation Z, by the aims of this paper. The sampling arose from the study conducted by Yao Song et al. [95], who stated that ecolabeling plays an important role in improving people’s attitudes to the environment and is especially strong among representatives of younger generations, who can use ecolabeling to enhance their pro-environmental attitudes. They noted that, regarding ecolabeling, younger generations are usually more concerned about the environment. This assumption has also been confirmed by earlier studies, showing that younger consumers are more inclined to accept new constructs [96] and ideas, and to support environmental protection campaigns, as compared to older generations [97].

The Computer-Assisted Web Interview (CAWI) method was utilized in the conducted survey. This method consists in sending out the questionnaire by electronic means. The questionnaire is filled in on a computer or other device (e.g., a mobile phone) and the

obtained results are saved in electronic form and sent to a database. Then the researchers use the data collected in the database. The survey encompassed the graphic representations (Table 2) of ecolabels used by respective retailers, and the possibility to display them was convenient for the respondents participating in the survey thanks to the online questionnaire. The same method has been successfully used in many studies examining ecolabels, e.g., Festila et al. [98], Annunziata et al. [71], and Buunk et al. [62]. Collecting data using this method allowed the implementation of the planned research objectives.

**Table 2.** Ecolabels assessed in terms of recognizability.

Label No.	1	2	3	4	5
Meaning:	Natural food	Product supplied by Carrefour as a certified supplier	Ecological product	Food produced by means of ecological agriculture	Product in beneficial low price
Online Store:	Auchan ( <a href="http://www.auchandirect.pl">www.auchandirect.pl</a> ) accessed on 3 January 2022	Carrefour ( <a href="http://www.carrefour.pl">www.carrefour.pl</a> ) accessed on 3 January 2022	Carrefour ( <a href="http://www.carrefour.pl">www.carrefour.pl</a> ) accessed on 3 January 2022	Carrefour ( <a href="http://www.carrefour.pl">www.carrefour.pl</a> ) accessed on 3 January 2022	E.Leclerc ( <a href="http://www.leclerc.pl">www.leclerc.pl</a> ) accessed on 3 January 2022
Form:	Graphic	Letters and graphic	Letters and graphic	Graphic	Letters and graphic

The questionnaire consisted of three parts: 1—related to online shopping habits; 2—the assessment of the recognizability of ecolabels used in e-commerce (Table 2); 3—defining a general profile of the surveyed respondents. The survey questionnaire included scale-based closed-ended questions. Very few questions gave a respondent the opportunity to provide an additional answer. All the survey questionnaire parts contained 16 questions overall. In the first section of the questionnaire, the respondents provided answers about their shopping habits. It consisted of four questions. The respondents answered on 7-point scales for all questions. In the second section, the respondents recognized ecological labels. For each of the labels, the respondent could choose one answer out of four possible responses. In each case, the marked ecolabel had one correct answer, two incorrect answers, and the possibility of “I don’t know”. In the third section, information on the characteristics of the sample was collected.

The ecolabels included in the study (Table 2) were selected by analyzing the websites and offers at the online stores of the retail chains. We assumed that some of these labels could also appear on products and at the point of sale. The study focuses on younger consumers, who are the main target market in e-commerce in Poland. There is no doubt that the display of labels and the possibility of obtaining information about products are different in the case of traditional trade and e-commerce. In traditional trade, consumers face shelves filled with various types of packaging. Very often, those at the bottom of the rack or on the top shelf are beyond their reach. In e-commerce, access to and presentation of product information is different. It seems that consumers have more equal access to information, but this information is somewhat dependent on the form of its presentation adopted by the owner of the e-shop.

The knowledge about labels among the respondents could be shaped in various ways, e.g., through visits to stores, conversations with sellers, information campaigns of retail chains, and other communication channels. However, we studied the effect of these actions, and we did not consider where the knowledge about labels is acquired.

The compiled data were analyzed by means of the software R version 4.0.2 [99] and Excel 2016. The level of significance was found to be 0.05. Therefore, all the *p*-values below 0.05 were interpreted as proving significant relationships. The research used Cramér’s statistic (developed by Harald Cramér), which facilitates the interpretation of nominal-variable association estimates, given this index ranges from 0 to +1. A higher VC indicates a stronger association [100]. The statistical analysis was oriented toward the research



objective and verification of the validity of the research hypotheses. Descriptive statistics and correlation analysis were utilized.

#### 4. Results

The analysis of the buying habits of surveyed consumers began with assessing the frequency of online shopping. Categories of daily necessities were surveyed, such as food, cosmetics, clothing and shoes, household chemicals, and over-the-counter drugs. The product categories were chosen on the basis of the report published by the Global Web Index [101].

The survey outcome is displayed in Table 3, according to which, the products that the respondents declared to never buy via the internet include food and over-the-counter drugs, whereas, for clothing and shoes, as well as cosmetics, respondents declared buying them via the Internet much more frequently. In the case of the two categories of products regarded as necessities, 7.54% and 23.16% of the respondents, respectively, declared that they had never bought them via the Internet.

**Table 3.** Frequency of buying selected products at online stores.

	Food	Cosmetics	Clothing and Shoes	Household Chemicals	Over-the-Counter Drugs
Never	74.09%	23.16%	7.54%	71.32%	73.29%
Less than once a month	12.50%	47.58%	47.22%	19.96%	19.68%
Once a month	4.35%	21.72%	31.06%	6.17%	5.42%
Several times a month	1.99%	5.75%	12.03%	1.63%	1.08%
Once a week	1.27%	1.08%	1.97%	0.54%	0.54%
Several times a week	3.44%	0.72%	0.18%	0.36%	0.00%
Every day	2.36%	0.00%	0.00%	0.00%	0.00%

The average expense incurred by the surveyed persons on products bought at online stores was also identified. Out of all categories of products included in the survey, the largest amounts of money were spent on clothing and shoes, as well as cosmetics, although both amounts differed substantially. Therefore, the average expense incurred during one-time online shopping for clothing and shoes amounted to EUR 41.1, and the average expense incurred for cosmetics amounted to EUR 20.1. This difference is to be expected as clothing and shoes are generally more expensive than cosmetics. The third group of products on which the most money was spent during one-time shopping was food. The average expense incurred for such transactions amounted to EUR 17.2. The detailed data on the money spent during one-time online shopping are presented in Table 4.

The surveyed respondents were also requested to determine the frequency of their online purchasing of products with ecological characteristics. According to the survey, the most frequently purchased categories of products were cosmetics, clothing, and shoes, as well as food, whereas household chemicals or over-the-counter drugs with ecological characteristics were least often purchased by consumers. The percentage of respondents who said they had never bought such products was 89% for over-the-counter drugs and 81% for household chemicals. Very few consumers, however, confirmed that they bought such products less than once a month or not more than once a month. A slightly different structure of ecological shopping was observed in the case of cosmetics, clothing and shoes, and food. Among these three categories, cosmetics and clothing, and shoes were characterized by a slightly higher number of responses corresponding to a frequency of less than once a month and once a month, whereas in the case of buying ecological food much more often than in other categories of products, the frequency of shopping was higher: once a week or several times a week. The detailed results displaying the frequency of products with ecological characteristics bought at online stores are presented in Table 5.

**Table 4.** An average expense incurred during one-time online shopping for selected products.

	Food	Cosmetics	Clothing and Shoes	Household Chemicals	Over-the-Counter Drugs
Arithmetic mean (M)	EUR 17.2	EUR 20.1	EUR 41.1	EUR 13.3	EUR 14.7
Standard deviation (SD)	EUR 17.6	EUR 12.7	EUR 25.4	EUR 10.8	EUR 6.2

**Table 5.** Ecological products are bought at online stores.

	Food	Cosmetics	Clothing and Shoes	Household Chemicals	Over-the-Counter Drugs
Never	72%	42%	59%	81%	89%
Less than once a month	13%	38%	31%	12%	8%
Once a month	8%	15%	8%	6%	3%
Several times a month	3%	4%	1%	0%	0%
Once a week	2%	1%	0%	0%	0%
Several times a week	1%	0%	0%	0%	0%
Every day	0%	0%	0%	0%	0%

In the final part of the analysis of the buying habits of younger consumers, they were asked to specify in which online stores and how often they shopped. The survey questionnaire included e-stores such as Carrefour, Tesco, E.Leclerc, Auchan, and Rossmann, which belong to European retail chains operating in Poland, as well as Piotr i Paweł, a retail chain operating only in Poland in the form of physical retail stores and an online shop. Additionally, the online shopping portal Allegro was included, a Polish equivalent to E-bay and Amazon, which is an online market for other sellers, giving them access to the portal's IT infrastructure in exchange for a sales commission. The question had the option of adding other online stores. Allegro turned out to be the most popular e-store, with approximately 79% of respondents declaring that they shopped there. Nearly every fourth respondent (23%) shopped at the online store once a month and every tenth of them (10%) shopped there several times a month. Rossmann turned out to be the second most popular online store, with almost every third person (29%) shopping there. The vast majority of respondents declared (18%) that they shopped there less frequently than once a month, and 9% of the surveyed respondents declared that they shopped there once a month. The remaining online stores were markedly less popular. For the Tesco online store, 9% of the surveyed individuals declared that they shopped there; in Auchan, 4%; in Carrefour, 2%; and in Piotr i Paweł and E.Leclerc online stores, 1%, respectively.

As above-mentioned, the first aim of this study was to assess the recognizability of ecolabels used in e-commerce in the most popular Polish retailers. All the labels analyzed within the framework of this study were available on store websites. The purpose of their representation in the graphic form adjacent to products is to communicate specific environmental features to buyers.

Table 6 presents the results of the survey on the recognizability of ecolabels used in e-commerce. According to the data compiled through the survey, the "EKO" label proved to be the most recognizable label used at the Carrefour e-store. It is affixed to environmentally friendly products, mainly household chemicals, and cosmetics. As many as 88% of the surveyed respondents correctly identified the meaning of these ecolabels. "Product supplied by Carrefour's certified supplier" was the second most recognizable and understood label, which is also used in e-stores of the Carrefour chain store. This label was recognized by 60% of the respondents. The "Natural Food" label, used at the e-store of the Auchan chain store, was slightly less recognizable. The subsequent two labels were much less recognizable to the respondents. The "Food produced by means of ecological

agriculture” label was correctly identified by 49% of the respondents, and the “Product with Beneficially Low Price” label was recognized by 22% of the respondents. Interestingly, the analysis of the recognizability of the surveyed labels indicated that the labels containing text in the graphical design were more recognizable to consumers. Attention should also be paid to the significant percentage of respondents who answered, “I don’t know”, as well as those who chose the wrong answer.

**Table 6.** Recognizability of ecolabels used in e-commerce—all respondents.

Ecolabel No.	1	2	3	4	5
Correct answer:	58%	60%	88%	49%	22%
Incorrect answer:	31%	30%	10%	46%	48%
Answer—“I don’t know”	11%	10%	2%	5%	30%

The greatest number of people who replied, “I do not know” concerned the labels “Natural food” and “Product supplied by Carrefour as a certified supplier”. These values were around 10%. Therefore, it can be assumed that there is a group of consumers who completely did not recognize these ecolabels and decided not to respond.

The highest number of incorrect answers was attributed to the labels “Product in beneficial low price” and “Food produced by means of ecological agriculture”. A high percentage of incorrect responses may confirm that these labels evoked some associations among the respondents and may have been noticed earlier by them, while these associations and understanding of ecolabels were not correct.

Having analyzed the research presented above, aiming to answer the research question RQ1 (What is the level of recognizability of ecolabels in e-commerce stores among younger consumers in Poland?), it is plausible to state that, as a result of the conducted analyses, the research question was answered. Among the surveyed labels, only one of them, label No. 3, achieved a satisfactory result, according to the survey. However, this could have been due to its intuitive graphic form and the “EKO” abbreviation. The recognizability of labels No. 4 and No. 5 was significantly below average. The low result of label No. 4 was especially surprising. This exemplifies widely used ecolabels that, in addition to at the Carrefour online store, are affixed to the packaging of numerous products offered in traditional commerce, as well as beyond the Carrefour chain. The arithmetic mean of the correct answer of the tested ecolabels was 55.4%. Averaging the values obtained for all analyzed labels confirmed that the general level of recognition cannot be considered satisfactory, especially since in similar studies in Europe it is much higher [69]. Analogous values obtained in the research, e.g., for Sweden, were 80% recognizability and higher. On this basis, we accept the answer to the research question we posed that the level of recognizability of ecolabels in e-commerce stores among young consumers in Poland is low and unsatisfactory. The obtained percentage value of correct answers differs from other countries where similar studies were conducted [69].

Having analyzed the data on the recognizability of ecolabels, we decided to survey whether individuals who more often bought ecological products at online stores could recognize ecolabels used in e-commerce better than individuals who shopped less frequently. This correlation was analyzed by means of Cramer’s V.

The resulting figures of the analysis are presented in Table 7. The conducted correlation analysis allowed us to check whether there is any relationship between the frequency of online shopping for ecological products and the recognizability of ecolabels found at online stores to verify the validity of research hypothesis No. 1. The resulting figures indicate that a statistically significant correlation ( $p < 0.05$ ) between these variables was found in only three cases. This was the case with buying cosmetics and label No. 1, food purchase and label No. 3 and in the case of purchasing drugs without a prescription and label No. 3. However, only when purchasing food, does Cramer’s V show a fairly strong correlation ( $V = 0.207$ ). Thus, the verification of research Hypothesis H1. There is a dependence

correlation between the frequency of online purchases of ecological products and the recognizability of ecolabels by younger consumers, proving that it must be rejected and considered groundless. The data presented in Table 7 clearly show that there are no strong dependencies between the frequency of buying ecological products at online stores and the recognition of ecolabels. Thus, we could observe the frequent purchasing of products. The lack of a correlation proves that regardless of whether the consumer shops often or less frequently, their recognition of labels is the same. This may contradict the presumption that consumers who shop frequently are more familiar with ecolabels.

**Table 7.** Results of the correlation analysis of the frequency of buying ecological products and recognizability of ecolabels in e-commerce.

Frequency of Buying Ecological Products	Recognizability of Ecolabel No.				
	1	2	3	4	5
Food	V = 0.081 <i>p</i> = 0.732	V = 0.062 <i>p</i> = 0.905	V = 0.207 <i>p</i> = 0.001 *	V = 0.093 <i>p</i> = 0.565	V = 0.100 <i>p</i> = 0.474
Cosmetics	V = 0.167 <i>p</i> = 0.017 *	V = 0.139 <i>p</i> = 0.095	V = 0.089 <i>p</i> = 0.624	V = 0.084 <i>p</i> = 0.692	V = 0.083 <i>p</i> = 0.697
Clothing and shoes	V = 0.057 <i>p</i> = 0.772	V = 0.102 <i>p</i> = 0.217	V = 0.078 <i>p</i> = 0.491	V = 0.090 <i>p</i> = 0.340	V = 0.075 <i>p</i> = 0.533
Household chemicals	V = 0.119 <i>p</i> = 0.253	V = 0.069 <i>p</i> = 0.854	V = 0.103 <i>p</i> = 0.435	V = 0.096 <i>p</i> = 0.532	V = 0.081 <i>p</i> = 0.725
Over-the-counter drugs	V = 0.070 <i>p</i> = 0.603	V = 0.119 <i>p</i> = 0.096	V = 0.172 <i>p</i> = 0.003 *	V = 0.057 <i>p</i> = 0.774	V = 0.041 <i>p</i> = 0.922

V—Cramer's V; *p*—chi-squared test; \* Statistically significant correlation (*p* < 0.05).

For the purpose of more in-depth analysis, we decided to check whether the correlation between the frequency of buying ecological products at online stores and the recognizability of ecolabels differed based on the gender of the respondents. For this purpose, a correlation analysis was conducted for the groups of women and men separately. Table 8 presents the resulting figures for women. They indicated that the frequency of buying ecological products at online stores was significantly correlated (*p* < 0.05) with recognizability only in two cases, i.e., labels No. 2 and 3. However, only in the case of label No. 3 for food based on Cramer V, this relationship can be described as quite strong (*V* = 0.216). Furthermore, there were no other statistically significant correlations. Thus, it must be concluded that in the case of women's recognizability of ecolabels, it may be assumed that their knowledge in this area is not dependent on the frequency of buying ecological products at online stores.

The same analysis was conducted amongst men. Additionally, in this case, the resulting figures were compared to those obtained in the correlation analysis for women. Table 9 presents the correlation coefficients for the respective relationships. In this case, statistically significant correlations were noted for a label No. 1—"Natural Food", and similarly to the case of women, label No. 3—"Ecological Product". In both cases, a statistically significant correlation was found in the case of buying ecological products such as household chemicals. Therefore, it should be stated that in the group of men, there was no visible correlation between the frequency of purchases and knowledge of ecolabels.

In order to verify the second research hypothesis, an independence test was performed. The results of the *t*-test for independent samples are presented in Table 10. The obtained results confirmed that, with the adopted significance level (*p* < 0.05), the differences in the frequency of buying and the recognizability of ecological labels between women and men do not differ statistically.

**Table 8.** Results of the correlation analysis of the frequency of buying ecological products and recognizability of ecolabels in e-commerce—the group of women.

Frequency of Buying Ecological Products	Recognizability of Ecolabel No.				
	1	2	3	4	5
Food	V = 0.094 p = 0.718	V = 0.057 p = 0.969	V = 0.216 p = 0.004 *	V = 0.144 p = 0.192	V = 0.128 p = 0.336
Cosmetics	V = 0.159 p = 0.101	V = 0.168 p = 0.067	V = 0.110 p = 0.532	V = 0.113 p = 0.501	V = 0.112 p = 0.509
Clothing and shoes	V = 0.035 p = 0.972	V = 0.110 p = 0.286	V = 0.071 p = 0.715	V = 0.086 p = 0.540	V = 0.092 p = 0.471
Household chemicals	V = 0.115 p = 0.475	V = 0.116 p = 0.472	V = 0.098 p = 0.673	V = 0.117 p = 0.453	V = 0.119 p = 0.430
Over-the-counter drugs	V = 0.066 p = 0.616	V = 0.143 p = 0.036 *	V = 0.194 p = 0.001 *	V = 0.072 p = 0.542	V = 0.049 p = 0.802

V—Cramer's V; p—chi-squared test; \* Statistically significant correlation ( $p < 0.05$ ).

**Table 9.** Results of the correlation analysis of the frequency of buying ecological products and recognizability of ecolabels in e-commerce—the group of men.

Frequency of Buying Ecological Products	Recognizability of Ecolabel No.				
	1	2	3	4	5
Food	V = 0.257 p = 0.061	V = 0.159 p = 0.487	V = 0.198 p = 0.255	V = 0.112 p = 0.790	V = 0.047 p = 0.989
Cosmetics	V = 0.194 p = 0.270	V = 0.193 p = 0.279	V = 0.262 p = 0.051	V = 0.131 p = 0.672	V = 0.110 p = 0.800
Clothing and shoes	V = 0.200 p = 0.138	V = 0.147 p = 0.396	V = 0.172 p = 0.253	V = 0.143 p = 0.420	V = 0.074 p = 0.862
Household chemicals	V = 0.277 p = 0.016 *	V = 0.192 p = 0.177	V = 0.305 p = 0.006 *	V = 0.190 p = 0.184	V = 0.178 p = 0.237
Over-the-counter drugs	V = 0.097 p = 0.733	V = 0.115 p = 0.617	V = 0.240 p = 0.051	V = 0.177 p = 0.236	V = 0.158 p = 0.341

V—Cramer's V; p—chi-squared test; \* Statistically significant correlation ( $p < 0.05$ ).

**Table 10.** Results of the independent *t*-test.

Variable	Women	Men	Test Statistic
Frequency of ecological buying and recognizability of ecolabels	0.1114 <sup>a</sup> (0.0434) <sup>b</sup>	0.1731 <sup>a</sup> (0.0635) <sup>b</sup>	t = −1.316 p = 0.096

<sup>a</sup>—Mean. <sup>b</sup>—Standard deviation.

The obtained values of test statistics did not indicate the existence of significant differences between the genders in the case of the impact of the frequency of ecological online shopping on the recognition of ecological labels at online stores. Therefore, H2: gender differentiates the correlation between the frequency of ecological purchases and the recognizability of ecolabels in e-stores must be rejected. The obtained low correlation values between the frequency of purchases of products and the recognition of ecolabels as well as the result of the independence test confirmed that both in women and men, the frequency of purchases of ecological products in online stores does not improve the recognition of their labels. This regularity applies to both women and men.



## 5. Discussion and Conclusions

Research to date shows that ecolabels create new opportunities to act in ways that engage the present generation in order to benefit future generations by promoting a more sustainable society. Therefore, this study is in line with the growing interest of consumers in sustainable products, pointing to a path that could eventually change customer habits [102]. According to [103], this will be possible if the young generation also practices sustainable consumption, that is, *inter alia*, chooses ecological products, *i.e.*, products with ecolabels. For this, however, they must recognize them correctly. It is worth noting that the growing number of consumers who prefer and want to buy ecological products, *i.e.*, with ecolabels, creates new opportunities for companies offering these types of products. Therefore, establishing the recognition of ecolabels among young consumers should lead to companies adopting a more market-oriented approach in order to survive and remain in a competitive market [104]. Therefore, the main novel finding in this paper is the definition of ecolabels recognition in the e-commerce market.

This paper discussed the behavior of the younger generation of consumers in the e-commerce market in the context of ecological products. Tracking trends in consumer behavior and introducing new products with ecolabels into the distribution network allows eco brands retailers to shift the market towards a more sustainable trajectory and enhance competitiveness [105]. Li et al. [106] examined the factors that influence consumer decisions concerning the purchasing of ecological products, emphasizing that the consumer's emotional engagement in the protection of the environment provides the producer with the possibility of manufacturing environmentally friendly products. Our study bridges the gap regarding the assessment of consumer behavior while purchasing ecological products via the Internet. The conducted research shows that younger consumers, as a potentially large group participating in pro-ecological activities, do not appear to show a high level of recognition of ecolabels in e-commerce. Such a situation may be problematic because, according to D'Souza and others, consumers who always read product labels are more likely to be more environmentally conscious and show a greater tendency to be less tolerant of slightly inferior product quality [107]. In research conducted by other authors, we find a certain contradiction since, on the one hand, younger generations show increasing concern about, and a willingness to undertake actions beneficial for, the environment [85], while on the other hand, other research studies indicate that the younger generations do not show notable interest in the environment [108], which is supported by our research. The analysis of the answers concerning the significance of the ecolabels tested enabled us to determine, through the analysis of the first research question, that younger consumers have low recognition of ecolabels used by retail chains in e-stores. Label No. 3, used at the Carrefour chain of stores, turned out to be the most recognizable label. It is worth mentioning that it consists of the term "EKO" (see Table 2), which certainly made it much easier for the respondents to grasp its meaning. Virtually only every second consumer recognized the ecolabel of ecological farming; however, it is often placed directly on the packaging of food products across the European Union.

The conducted research showed that the key to success is increasing the recognition of ecolabels among consumers who can mitigate their impact on the environment and make positive changes in their purchasing decisions. This could be the main focus of future e-commerce model research, which will look at different perceptions of labels. This is a key topic given the current COVID-19 pandemic and the associated and noticeable changes in consumer habits [35]. These changes should also be noticed by producers, who should adapt their message to the e-commerce model. The following question, therefore, arises: what should the objectives for the development of an ecolabel be?

The verification of the hypotheses allowed us to conclude that the frequency of ecological shopping does not contribute to the greater recognizability of the labels in e-stores. This relationship was rejected in the analysis of all respondents. In the case of the analysis by gender, the verification of Hypothesis 2 allowed to confirm this regularity in the analysis by gender. Both in women and men, the values of this relationship were low and did not

confirm the impact of frequent purchases on label recognizability. This provides the basis for the statement that consumers do not acquire knowledge of the meaning of ecolabels through frequent shopping. Therefore, in order to make them aware of it, the authors of this work suggest the implementation of educational initiatives, the standardization of labels, and the development of rules to make them more intuitive for consumers. Achieving an improvement in the recognizability of ecolabels will require efforts from two sides: consumers and retailers. However, the engagement of both parties will be the guarantor in improving the current state of the environment. Therefore, the key unresolved problem is the low recognition of ecolabels by consumers, which is the main barrier to the correct application of this tool. Overcoming this barrier will require education and information campaigns aimed at the entire society, as only then will the ecolabels be able to perform its functions effectively.

The conclusions of this study are subject to the inherent quantitative limitations of survey research. From a theoretical perspective, this study enriches the current literature on the recognition of ecolabels among young consumers.

The potential use of ecolabels in e-commerce may contribute more to improving consumers' eating habits. Compared to traditional trade, they may limit the purchase of ultra-processed products due to the disturbance of habitual decisions, which are usually observed in supermarkets [109,110]. Machin et al. (2020) research confirm that the current labels in traditional stores do not have a significant impact on customers. It seems that the potential of ecolabels can be strengthened in e-commerce. Similarly, ecolabels in e-commerce can help promote the sale of health-promoting products and limit the message directed at children [111]. Thanks to the graphic and editorial capabilities, websites can present the ecological features of products to a greater extent—through the description, colors, font size, photos, etc., and present, for example, the EU organic logo in a more visible way than in traditional trade [112]. On the other hand, it is uncertain to assess consumer confidence in the internal labeling systems of retail chains [113] and the low recognizability of these labels, which was confirmed by this research.

The main contribution of this research is the in-depth analysis of the relationship between ecolabel visibility and purchases of ecological products. We strongly recommend further research into the different perspectives and goals of stakeholders interested in ecolabeling. In this also, the differences in the recognizability of ecolabels by product type are interesting. The nature of the pandemic crisis has strongly influenced the changes in social and working type relationships, other values regarding personal hygiene and health care. The current socio-economic situation takes place in a new consumption paradigm that differs from that of the pre-COVID-19 pandemic.

Based on our findings, increasing the number of environmental campaigns targeting the importance of ecolabels is advised. However, there is a need for more research to test the effectiveness of ecolabeling as a tool to promote ecological products in e-commerce. In the future, similar research on other markets, especially within countries with highly developed ecolabeling systems, such as Italy, is warranted. Such research will make it possible to identify differences in approaches to ecological products between emerging and highly developed countries in terms of products with ecolabels.

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