

Article

Pro-Environmental Behaviors of Generation Z in the Context of the Concept of *Homo Socio-Oeconomicus*

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Abstract: The research reported here aims to investigate the pro-environmental behavior of respondents in the context of the concept of homo socio-oeconomicus. The main research question addressed in this paper considers the pro-environmental behavior of Generation Z representatives, due to the fact that this age group is believed to display different behavior patterns. In order to identify the differences in the pro-environmental behaviors of Generation Z, the results obtained from this group have been confronted with declarations of respondents from an older group (aged 25 to 65). It is worth noting that in the research on pro-environmental behavior of households in Poland conducted so far, Generation Z has not been taken into consideration as a separate demographic, so this study aims to make a contribution to the existing research gap. The data on the surveyed population were obtained through a standardized research questionnaire. The survey was carried out using the internet surveying technique—computer-assisted web interview (CAWI). This paper uses descriptive, tabular and graphic methods to analyze and present the collected materials. The basic measures of descriptive statistics were used in the analysis of the dataset, i.e., mean, median, mode, Pearson chi-square test and Mann–Whitney U test. The conducted research has shown that the representatives of Generation Z are less engaged in pro-environmental behavior than people from the older age group. Their pro-environmental actions mainly included turning off lights when leaving a room and choosing public transportation as the basic means of transport. For the whole surveyed sample, the most highly rated pro-environmental behaviors included those imposed by legal regulations and those whose implementation brings financial benefits in the form of lower maintenance costs. The main motivating and demotivating factors determining pro-environmental behavior were predominantly economic in nature.

Keywords: household; economic incentive policy; environment; Generation Z



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1. Introduction

Consumer behavior is an extremely dynamic area that requires cyclical research. The concept itself started to be recognized in scientific literature only in the mid-1960s. Consumer behavior can be defined as any human behavior involving thinking about shopping, purchasing goods or using the purchased products, whether at home, at work, in the store and even in the street [1]. Thus, research on consumer behavior investigates the motives, location and object of purchases [2]. The neoclassical theory of economics proposed a paradigm of rational human behavior (*homo oeconomicus*) [3]. It was assumed that the entities operating on the market, that is sellers and buyers, make rational decisions [4]. Rationality in households, from an economic point of view, refers to material rationality consisting in the optimal management of disposable income, in order to meet the needs of its members and the economical use of the means of consumption. Additionally, in this concept, it is assumed that households operate on the basis of true, accurate and complete information and have unlimited possibilities of processing it. Their main goal is to act in

the narrowly understood self-interest and to maximize the expected utility. This approach ignored the fact that households may also take into account the broader social interest, including e.g., environmental factors.

The criticism of the traditional homo oeconomicus model pointing to its limitations in explaining consumers' economic decisions led to the emergence of alternative models [5]. In the field of institutional economics, the concept of homo sociologicus was developed, following the discovery of the role of psychology and sociology as sciences which can contribute to explaining economic phenomena. According to the aforementioned theory, consumer behavior is limited by a social structure with specific values, norms and behavior patterns, as well as performed social roles. The consumer, therefore, does not always make decisions that meet the rigid criteria of economic rationality. They often make decisions based on non-economic factors [6]. From the point of view of economists, homo oeconomicus is a rational individual, however, limited by hard factors, such as, for example, the capital. In turn, homo sociologicus is an individual who is part of a community, who takes decisions guided by values adopted within some social framework and is constrained by soft factors. The common feature of both concepts is the presence of limitations in making economic decisions, although the constraints differ in nature. Despite the fundamental differences, both models may still complement each other. This has been evidenced by the emergence of the concept of homo socio-oeconomicus. According to E.J. O'Boyle, the rise of homo socio-oeconomicus was a natural consequence of the rise of an information society, which emerged alongside mass media and information technologies development [7]. For S. Lindenberg, a socio-economic human is an individual who, although driven by the maximization of utility, is limited in his or her behavior by the complexity of the conditions in which this action takes place [8]. Thus, households generally make rational decisions, however, they are constrained by the norms, patterns of behavior, and values adopted in a given society. Sometimes, social influences limit rational decision making, forcing individuals to behave in an irrational way. Often, making rational decisions is even in opposition to social norms, and such behavior can be considered immoral. The knowledge of the behavior of households was also expanded by behavioral economics [9], which is also critical of the concept of homo oeconomicus, pointing out that consumer behavior is, to a great extent, determined by emotional than rational factors [10]. Behavioral economics indicates the weaknesses of human mind and the potential errors in thinking that can arise as a result of these weaknesses [11]. Instead of purely rational thinking, people often use heuristics, i.e., simplified methods of solving problems. If an individual relies on a heuristic when processing information, they ignore various data and take "mental shortcuts" [12]. Tversky and Kahneman observed these processes when they investigated two systems of human thinking. They called them the fast and slow system. The fast thinking system is based on stereotypes, emotions and habits. The slow thinking system, more difficult to use by the brain, requires reflection and rational data processing [13].

Building on the theory of consumer behavior in the market of goods and services, it can be concluded that the behavior of households in the market depends on many factors. The economic factors include personal income, family income, consumer loans, liquid assets and savings. The non-economic factors include: psychological factors, i.e., motivation, perception, knowledge, consumer's attitudes and beliefs, as well as social factors like family, reference groups, consumers' social roles and, finally, cultural and personal factors such as age, profession, lifestyle [14], gender, education [15] and emotions.

The changing lifestyles of consumers, environmental pollution and the determination to improve the quality of life have become premises for households to take into account environmental criteria when making choices and decisions. Consumer behavior towards environmentally friendly products depends on many different factors. One of them is the level of environmental awareness understood as the attitude of a person to the natural environment, a set of information and beliefs about it, as well as the system of values that this person follows in their behavior [16]. Kollmuss and Agyeman [17] defined ecological

awareness as a “knowing of the impact of human behavior on the environment”. According to them, the formation of environmental awareness is largely influenced by cognitive and emotional limitations. Cognitive limitations include the “non-immediacy of many ecological problems” which “emerge and worsen in a hardly tangible way”, “slow and gradual ecological destruction”, and the “complex nature of environmental problems” that negatively affects an individual’s ability to comprehend the processes and consequently their willingness to take action to protect the environment. The authors also look into the emotional component determining pro-environmental acts, arguing that people may demonstrate no emotional reactions due to lack of knowledge, awareness or resistance against absorbing negative information; or, if they do have emotional reactions, these are predominantly negative feelings that may also prevent pro-environmental action, due to the interplay of psychological defense mechanisms. However, there is a recognition that an individual’s environmental awareness may increase with induced pro-environmental behavior. For example, people can buy eco-labeled products, eat organic food and participate in recycling programs as a result of e.g., the increased availability of organic products or improved infrastructure facilitating this type of behavior, e.g., an increased number of public recycling bins in the neighborhood.

While the environmental worldview reflects fundamental beliefs about the relationship between people and the natural environment, environmental concern is the individual’s general approach to environmental issues. The aim of the development of human environmental awareness is to shape behaviors aimed at environmental protection, both in the individual dimension and the broader social context. In recent decades, a lot of research has been done to identify factors influencing pro-environmental behavior [18–21]. Factors other than environmental knowledge were gradually introduced to explain the behavior of individuals towards the environment [22]. For example, Kollmuss and Agyeman analyzed a set of factors which, in their opinion, may have a positive or negative impact on pro-environmental behavior. They distinguished the following categories: demographic factors, external factors (e.g., institutional, economic, social and cultural) and internal factors (e.g., motivation, environmental knowledge, awareness, values, attitudes, emotions, locus of control, responsibilities and priorities) [17].

The concept of pro-environmental behavior is defined in various ways [17,23–27]. In this study, we define pro-environmental behavior as behavior through which individuals consciously seek to minimize the negative impact of their actions on the natural environment, including both positive environmentally friendly actions (e.g., recycling, minimizing resource and energy consumption, use of non-toxic substances, reducing waste production), as well as avoiding actions that harm the environment (e.g., not using disposable bags in supermarkets). The literature provides similar definitions of the term “pro-environmental behavior” [17,27] and the proposed list of pro-environmental behaviors includes a number of actions, such as recycling [28–32], innovations and forms of using means of transport [33], waste management [34–36], reduction of energy consumption [37], purchase of ecological products [38] and energy-saving electric appliances [39]. Various categories of these behaviors are distinguished. One criterion is the level of effort or commitment required by the behavior. In this case, pro-environmental behaviors are divided into: (a) behaviors that require a lot of effort, and (b) behaviors that do not require effort [40]. Walker et al. divide pro-environmental behaviors into two types: individual and collective behavior [41]. Gu et al. distinguish two categories: present-oriented behavior and future-oriented behavior. They reflect the extent to which individuals take into account the present or distant effects of their current behavior [42].

Most studies are based on an overall assessment of people’s propensity to engage in pro-environmental behavior. Understanding pro-environmental behavior is the key to tackling many environmental problems. Economic theories prove that human behavior is determined by both economic and social factors. One way to identify pro-environmental behavior is to find out why some people display environmentally friendly behavior and others do not. Earlier studies indicated a correlation between age and care for the natural

environment [43]. The current research results are not so clear anymore. Some researchers even prove that age does not influence pro-environmental behavior [44,45]. Hence, there is a need for research on the pro-environmental behavior of young people brought up in times of rapid social and technological changes. Despite their legal adulthood, they only begin their independent life in an economic and organizational sense. This generation is referred to in the literature as Generation Z or Digital Natives. Generation Z is the largest generation, accounting for approximately 32% of the world's population [46,47]. It can be assumed that they will have a significant impact both on global consumer sales [48] and on environmental behavior, as they will probably confront the greatest environmental challenges in the future. That is why it is so important to conduct research that takes into account this particular generation. Generation Z are young adults born in 1995 or later [49] who are now in the process of graduating from university and gaining employment. They are educated, technologically savvy, innovative and creative. It is the first generation born in the digital world that live and socialize online [50–53]. This group of people is technology dependent, as they are digital natives who have had contact with the Internet from birth [54]. Hence, it is the Internet that, to a great extent, shapes their consumer behavior and basic social values.

In the analysis of pro-environmental behavior, it is important to distinguish this age group from the others, i.e., Baby Boomers (BB, born 1946–1964), Generation X (born 1965–1980) and Generation Y/Millennials (born 1981–1995). In the future, Generation Z will play a key role in confronting environmental challenges. Generation Z has not been taken into account as a separate demographic in the research on pro-environmental behavior of Polish households conducted so far, which means that this study contributes to the existing research gap. Although this area has been explored by foreign researchers [55–58], we believe that in Poland, similarly to other former Eastern Bloc countries, the determinants of pro-environmental behaviors of young people may differ.

The aim of the reported research was to investigate the pro-environmental behavior of respondents in the context of the homo socio-oeconomicus model, taking into account both individual and household behavior. The main area of interest was the pro-environmental behavior of Polish Generation Z (i.e., people aged 18 to 24), due to the fact that this age group is believed to display different behavior patterns. Therefore, in order to identify the differences in the pro-environmental behavior of Generation Z, the results obtained from this group have been confronted with declarations of respondents from an older group (aged 25 to 65). For this research purpose, the older group was referred to as “Working Adults” because they are economically active people, and the lower age limit for this group indicates that they should have completed their education. For the purposes of this study, the respondents representing Baby Boomers, Generation X and Y, due to the small size of the sample (Table 1), were classified into one group named Working Adults.

Table 1. Sample characteristics.

Variables		Generation Z	BB	Working Adults (WA)			Total
				X	Y	Total WA	
Gender	Women	176	13	69	48	130	306
	Men	70	15	19	24	58	128
Place of residence	Urban residents	143	11	48	36	95	238
	Rural residents	103	17	40	36	93	196
Education	Primary/lower secondary/vocational	3	-	7	-	7	10
	Secondary/post-secondary	97	7	13	4	24	121
	Tertiary	146	21	68	68	157	303

As the literature points to the influence of place of residence on pro-environmental behavior [40,59], an attempt was made to identify differences in behavior with regard to the place of residence, i.e., village versus city, treating it as one of the most important social factors.

As OECD research [60] shows, there are many different measures that can be introduced by governments to influence household behavior, from economic instruments to direct regulations, information campaigns and the provision of environmentally friendly public goods. Government environmental policy has a significant impact on people's environmental behavior. It can be broken down into regulatory policy and economic incentive policy. According to Chan et al. [61], the government's environmental policy can shape environmentally friendly household behavior by providing subsidies or necessary aid. Our research findings seem to be consistent with that conclusion. Therefore, selected instruments of the economic incentive policy aimed at supporting the pro-environmental behavior of Polish households were assessed as basic economic factors.

Taking into account the research goals, the following hypotheses were formulated:

Hypothesis 1: *Pro-environmental behaviors are implemented, to a greater extent, by Generation Z than by the Working Adults and are mainly limited to their households;*

Hypothesis 2: *According to the concept of homo socio-oeconomicus, economic and social conditions equally determine taking actions aimed at the reduction of the negative impact on the environment.*

2. Research Methodology

The dataset on the surveyed sample was obtained through a standardized research questionnaire. The survey was carried out using the computer-assisted web interview method (CAWI), which in the situation of the COVID-19 pandemic and restrictions on direct social contacts, was one of very few possibilities to collect empirical data. The CAWI enables quantitative measurement through questionnaires provided via the Internet. The method makes it possible to reach large samples, while ensuring the respondents' anonymity. The research involved the proprietary questionnaire prepared on the Google Forms platform at the turn of October and November 2020. The link to the questionnaire was made available through various communication platforms, including social media from 5 November to 5 December 2020. The questionnaire was addressed to people from Generation Z, but due to the way in which it was distributed, it reached people from other age groups, whose answers were used for a comparative analysis. In order to obtain the most complete picture of the analyzed problem, the questionnaire included different types of questions, including: alternative questions, close-ended multiple and single choice questions, close-ended questions with a 5-point Likert scale, as well as open and semi-open-ended questions. In total 449 questionnaires were received and verified in terms of completeness, out of which 15 incomplete or incorrectly completed ones were rejected. Due to the very small number of questionnaires completed by people under 18 (1 questionnaire) and over 65 (5 questionnaires), they were not included in the analysis of the research results. In this method, the researcher cannot influence the research sample. It has been assumed that people who are interested in the researched issues are more willing to take part in the survey. In the case of this study, the sample consisted mostly of people with higher education. At the same time, the answers to the verification question included in the questionnaire form showed that the respondents had high environmental awareness. The correlation of higher education and environmental awareness in the sample may be seen as consistent with the findings by Klepacki et al., who noted that higher education institutions are entities supporting sustainable development, including pro-environmental actions, through teaching, research and social activities [62].

The choice of Poles as the research sample was deliberate. Although the progressing globalization and participation in the structures of the European Union are reducing the differences between societies and economies of individual countries, and especially between the behaviors of young people, Poland, like other countries, also has its own

specificity. Poland's energy economy is, unfortunately, based on non-renewable resources (coal) and although Poland's authorities are taking small steps to change this situation (e.g., the EU Energy Union), the progress has been rather slow. However, to remain in line with the EU strategy assuming that big changes start with small steps, the authors of this publication assumed that the generation that has the greatest chance to make changes beneficial for the environment in the future is precisely Generation Z, including both young Poles and other Europeans. Their pro-environmental behaviors, even minor ones, may translate in the future into decisions transforming the whole country or continent.

The variable differentiating pro-environmental behavior was, among others, the place of residence. Therefore, in order to verify the significance of this variable in the data analysis, the sample was divided, not only into "Generation Z" and "Working Adults", but also into urban and rural residents. The analysis did not include gender as a differentiating variable, due to the overrepresentation of women in the research sample.

We used descriptive, tabular and graphic methods to analyze and present the collected materials. The pro-environmental behavior was rated on a 5-point scale (where 1—never and it is not important, 2—never, although I know it is important, 3—sometimes, 4—often, 5—always). Higher scores indicate a greater frequency of pro-environmental behavior. Moreover, the basic measures of descriptive statistics were used, i.e., mean, median, mode, Pearson chi-square test and Mann–Whitney test.

The mean, median and mode were used to determine the rank of the factors that induced the respondents to use government programs supporting pro-environmental investments and the rank of factors discouraging them from applying for these programs. Pearson's chi-square test was used to verify the relationship between: (1) place of residence and age group and the declared pro-environmental behavior, (2) age, place of residence, gender and the level of expenditure per person in the household and the participation and the intention participate in government programs supporting pro-environmental investments, (3) between demographic variables and the rank of motivating and demotivating factors determining the participation in programs supporting pro-environmental solutions.

Due to the research questions addressed in this paper, it was important to show statistically significant differences between "Generation Z" and "Working Adults" regarding the motivating and demotivating factors determining the participation in programs supporting pro-environmental solutions. In this case, the Mann–Whitney test was used, which is equivalent to the independent-sample t-test and is used to compare two groups of variables. The study also referred to the results of studies by other researchers.

3. Results and Discussion

Everyday individual human behavior directly or indirectly translates into the condition of the natural environment. Therefore, the aim of the first stage of this study was to find out what pro-ecological behavior is most often declared by the respondents and whether there are relationships between the declared behavior and age or place of residence, which would address Hypothesis 1. The results are shown in Figure 1.

The pro-environmental behaviors most often indicated by the respondents (Figure 1) include those that do not involve a lot of time, money or effort, and consequently are more acceptable. These findings are consistent with the conclusions drawn by Lee and Khan [63]. Some of the highly positioned behaviors have been imposed by legal regulations (e.g., waste sorting, reusable bags).

The research showed a statistically significant correlation between waste sorting and place of residence and age group. People living in rural areas much more often than city residents (as many as 94% of respondents) declared that they sort waste in accordance with the local regulations, which may be related to the fact that they hand over their waste individually, and do not throw it into communal recycling bins (as in cities). In this group, 16% of the population replied that they never sort waste, despite being aware of the importance of these behaviors. The "Working Adults" maintaining their own households

approached this problem with greater responsibility than the respondents from “Generation Z”. This is probably related to higher fees for the collection of unsorted waste.

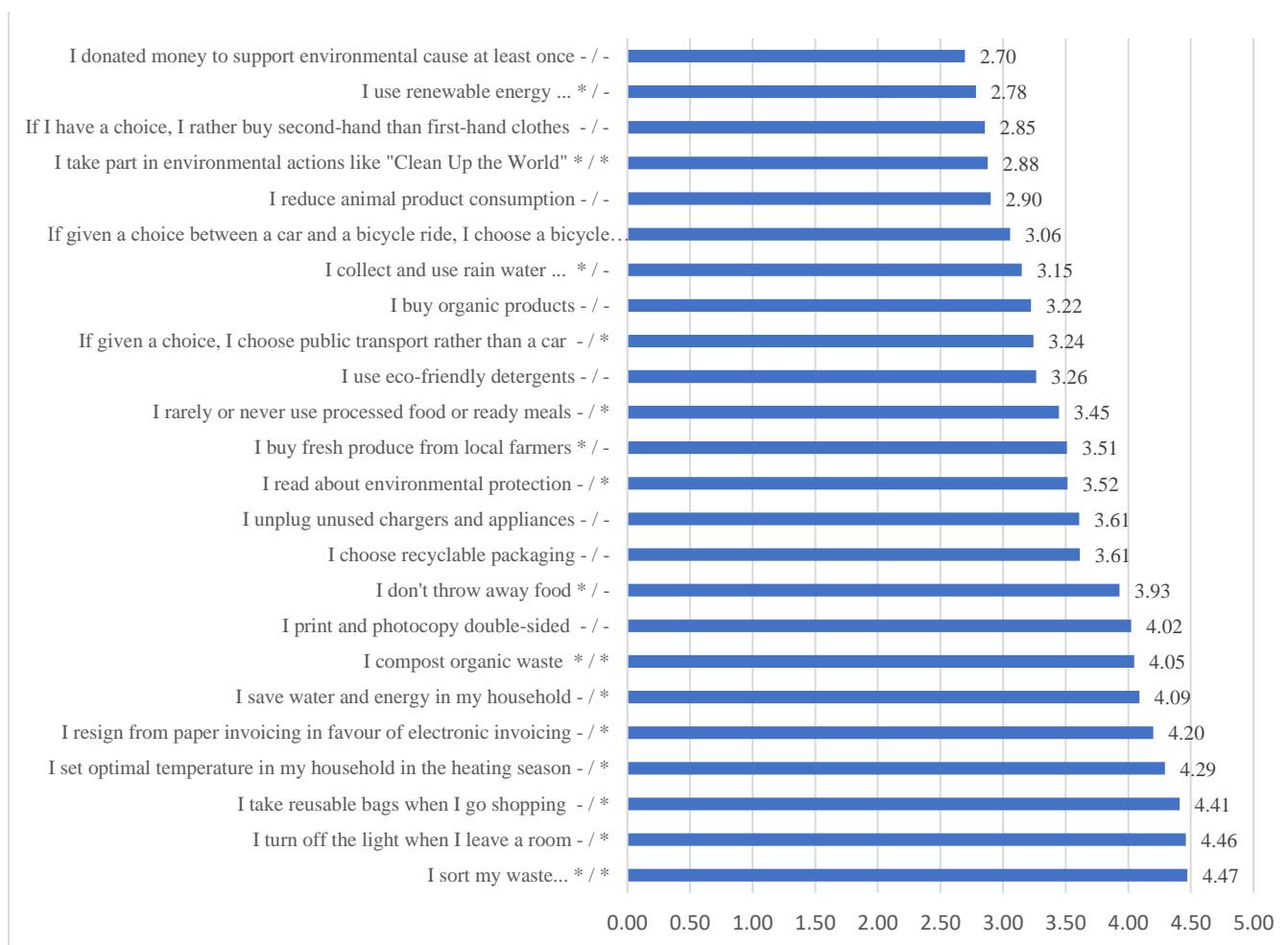


Figure 1. Pro-environmental behaviors declared by the respondents (average of 5-point Likert scale, where 1—never and it is not important, 2—never, although I know it’s important, 3—sometimes, 4—often, 5—always; the averages do not include the division into groups presented in the article). The asterisks before the slash indicate the relationship (measured with the Pearson chi-square test) between the behavior and the place of residence; asterisks after a slash indicate the relationship between the behavior and the age group; * dependence at the level <0.05 ; - no relationship was found.

Moreover, a statistically significant relationship has been demonstrated between the place of residence and such behaviors as: composting organic waste, buying fresh produce from local farmers, rainwater harvesting and using it in the household, using renewable energy and taking part in environmental actions like “Clean Up the World”. Rural residents, compared to city residents, declared much more often that they did not throw away their food and bought fresh produce from local farmers. The place of residence also creates additional opportunities for pro-environmental behavior, such as: installing photovoltaic panels or composting organic waste. In the sample of rural residents, as many as 36% declared that they use renewable energy sources.

Drawing on the analysis of pro-environmental behavior declared by respondents representing “Generation Z”, it seems that most often these are acquired habits, such as turning off the light when leaving a room (declared by 90% of respondents from this group). “Generation Z” was also more willing, compared to people from the second research group, to chose public transport as the primary means of transport. For “Working Adults”, the extra time and effort involved in using public transport can prevent the behavior change. These findings are consistent with the research by Eriksson et al. [34].

Despite their considerable environmental awareness, nearly 50% of respondents from “Generation Z” did not have an active part in organized actions supporting the protection of the natural environment and did not demonstrate the will to independently acquire knowledge about possible methods of environmental protection. Our research, as well as studies by other researchers, e.g., Grønhøj and Thøgersen [64], Wray-Lake et al. [65], showed that the environmental concern and engagement in pro-environmental behavior are greater in older than younger generations, which may seem surprising in the context of regularly held youth climate strikes.

Generation Z get their information mostly from social media, which also play a vital role in shaping their pro-environmental behavior. This generation spends almost 11 h a day reading, “liking” and sharing content on smartphones and check Instagram at least five times a day [48]. Our research shows that 80% of “Generation Z” respondents obtain information on environmental protection only from social media.

The presented research results allowed for a partial verification of Hypothesis 1. It has not been fully confirmed that the representatives of Generation Z display more pro-environmental behavior than the Working Adults. The analysis shows that Generation Z declared mainly habitual behavior that did not require greater cognitive and physical involvement. However, it was confirmed that most of the pro-environmental behavior declared by the respondents is limited to their household.

Research by Enzler and Diekmann has shown that household behavior has a significant impact on the environment [66]. Ivanova and co-authors reached similar conclusions, emphasizing that households generate over 60% of global greenhouse gas emissions and from 50% to 80% of total water consumption [67]. Changing consumer behavior into a more environmentally friendly one and its consolidation becomes a necessary condition for effective environmental protection [68].

Our research findings seem to be consistent with that conclusion. According to the respondents, economic incentives like tax relief for people adopting pro-environmental solutions and programs supporting the installation of pro-environmental facilities are the most effective. The average rating on a 5-point Likert scale was 4.21 (for tax relief) and 4.11 (for government programs). The results are consistent with the previously mentioned OECD studies [60] and the studies by Chan et al. Therefore, this study also investigated respondents’ interest and participation in national programs supporting pro-environmental solutions for owners of single-family houses. We focused on the most important programs implemented in this area, including two programs that have been in operation for several months, i.e., “My electricity” (the “My Electricity” program is aimed at natural persons generating electricity for their own needs, who have signed an agreement regulating the introduction of electricity generated in micro-installations into the grid. The co-financing is a subsidy of up to 50% of the eligible costs of the micro-installation included in the project, not more than PLN 5000 (EUR 1.1 thousand) for one project. The program was launched on 30 August 2019) program, providing co-financing of the installation of photovoltaic panels, and “Replacing furnaces” (the “Replacing furnaces” program is carried out under the broader “Clean Air” program aimed at smog reduction in Poland. It is a program implemented by the National Fund for Environmental Protection and Water Management (NFEP&WM) in agreement with the Polish Bank Association (ZBP), which was launched on 19 September 2018. Each local government has its own regulations regarding support (subsidies for the replacement of an old coal-fuelled furnace with a new, environmentally friendly one). The program is aimed at owners or co-owners of single-family houses or separate apartments in single-family houses. Depending on the commune (gmina) and the choice of heating source, co-financing for the replacement of a coal furnace may amount from PLN 1 to 40 thousand (EUR 223–8949). The condition for obtaining funding is the liquidation of the coal furnace and the purchase of an environmentally friendly heating device) supporting the purchase of a new, more environmentally friendly central heating furnace. In 2020, due to the recurring problems with water supply for the agricultural needs and the maintenance of home gardens, a new program “My Water” (the “My Water”

program aims to protect water resources by increasing retention on the plots of land of single-family houses and by harvesting rainwater and meltwater. The program was launched on 1 June 2020, and the coordinating organization is the Regional Fund for Environmental Protection and Water Management (WFOŚiGW). It provides subsidies (no more than 80% of the eligible costs of the installations included in the project and no more than PLN 5000 (EUR 1124) per project), for the purchase and installation of rainwater harvesting systems for owners of single-family houses) was proposed, which was also included in the research.

In total, 40.3% of the respondents used or declared their intention to use at least one program. In the case of households represented by respondents from the “Working Adults” age group, this share was 45.7%, and in the case of households of “Generation Z” respondents—34.6%. We verified the differences in knowledge and use of the above-mentioned programs depending on the place of residence (Table 2).

Table 2. The respondents’ declarations regarding the knowledge and use of the government pro-environmental programs by place of residence and age (%).

Item	Programs	Declarations of Respondents			
		I Am a Beneficiary	I’ve Heard of the Program and Intend to Apply	I’ve Heard of the Program but Will Not Apply	I Don’t Know the Program
Total (N = 434)	My Electricity	5.8	12.9	18.7	62.7
	My Water	1.8	13.4	17.3	67.5
	Replacing furnaces	10.4	18.4	47.7	23.5
Urban residents (N = 238)	My Electricity	2.5	9.7	20.2	67.6
	My Water	2.9	9.7	18.1	69.3
	Replacing furnaces	8.0	15.1	50.8	26.1
Rural residents (N = 196)	My Electricity	9.7	16.8	16.8	56.6
	My Water	0.5	17.9	16.3	65.3
	Replacing furnaces	13.3	22.4	43.9	20.4
Working Adults (N = 188)	My Electricity	5.3	17.6	29.3	47.9
	My Water	1.1	20.2	27.7	51.1
	Replacing furnaces	9.6	21.3	53.2	16.0
Generation Z (N = 246)	My Electricity	6.1	9.3	10.6	72.0
	My Water	2.4	8.1	9.3	78.0
	Replacing furnaces	11.0	16.3	43.5	27.2

The most recognized and most frequently applied for was the program “Replacing furnaces”, while the least popular was “My water” (Table 2). Only one in four respondents have not heard of a program supporting replacing old type of furnaces with more ecological ones. This program is quite often promoted in mass media in the context of the need to improve air quality in Poland, especially in winter. Its positioning was high, both among urban and rural residents, although the share of rural residents informed about this program was slightly higher. More representatives of Working Adults heard about this program compared to Generation Z. The share of respondents who did not hear about the “My Water” and “My Electricity” programs was very high, and it was higher in the case of urban residents and Generation Z. So, the villagers and Working Adults were, to a greater extent, engaged and interested in these programs (Table 1). The responses of the younger and older respondents did not differ significantly by their place of residence.

Unfortunately, no statistically significant correlation was found between gender, age and the level of expenditure per person in a household and the use of the analyzed programs. There was also no statistically significant relationship between the main sources of income and the use of the programs.

In order to verify the differences in applications for the pro-environmental programs depending on the age of the respondents, the Mann–Whitney test was used (Table 3).

Table 3. Difference in participating in pro-environmental programs between “Working Adults” and “Generation Z” (Mann–Whitney test).

Specification	My Electricity	My Water	Replacing Furnaces
Mean rank (“Working Adults”)	188.67	180.25	201.09
Mean rank (“Generation Z”)	239.53	240.57	225.65
Z	4.18522	4.99712	2.03319
p	<0.00001	<0.00001	0.04236

There was a statistically significant difference between the declarations by “Working Adults” and “Generation Z”. The older respondents were significantly more active in participating in the above-mentioned programs than respondents from the younger age group.

The research questions that this paper aims to address included the reasons that prompted the respondents to take part in the analyzed programs. To verify their rank, the basic measures of descriptive statistics were used (Table 4).

Table 4. Reasons motivating respondents to use the pro-environmental programs by age and place of residence (5-point Likert scale, where 1-not important, 5-very important).

Item	Measures	Covering Part of the Costs	Convenience of New Solutions	Environmental Protection	Lower Electricity/Water Costs	Following the Neighbors’ Example	Encouragement by Authorities	Adverts of Providers of the Solutions	Concern for the Future of Children
Total	M	3.83	3.84	3.95	4.07	2.25	2.57	2.26	3.33
	Mo	5	5	5	5	1	1	1	5
	Me	4	4	4	5	2	3	2	4
Working Adults	M	3.93	3.85	4.00	4.10	2.22	2.46	2.11	3.46
	Mo	5	5	5	5	1	1	1	5
	Me	4	4	4	5	2	2	2	4
Gen Z	M	3.69	3.83	3.87	4.03	2.29	2.71	2.46	3.15
	Mo	5	5	5	5	3	4	3	3
	Me	4	4	4	4	2	3	2	3
Urban residents	M	3.60	3.64	3.92	3.97	2.43	2.86	2.48	3.54
	Mo	5	5	5	5	1	3	1	5
	Me	4	4	4	4	2	3	2	4
Rural residents	M	4.00	4.00	3.96	4.15	2.10	2.33	2.09	3.15
	Mo	5	5	5	5	1	1	1	5
	Me	4	4	4	5	2	2	2	3

M-Mean, Mo-Mode, Me-Median.

The perspective of long-term economic benefits (i.e., reducing energy and water costs) played an important role in the respondents’ decisions (Table 4). Lower electricity and water costs were the most appreciated, regardless of the generation group and place of residence.

Interesting arguments pointing to long-term benefits were also provided by Pimentel et al. Their research shows that in the US, buildings account for about 20% of primary energy consumption, (energy obtained directly from natural resources). Due to the proper insulation and replacement of heating systems, energy consumption can be reduced by up to 50% [69]. The factors with the lowest impact in the authors’ research include following the example of neighbors and the offers of companies producing and installing solutions under the studied programs (Table 4).

Long-term benefits are related to the support instruments. Taher and Hajjar [70] and Borroni and van Tulder [71] draw attention to the important role of supporting instruments (especially provided by the authorities). On the other hand, research by Broughel et al.

showed that for Swiss prosumers, financial support is not the key motivating factor (only one fifth—21%—of Swiss consumers considered financial returns to be one of the two main reasons for investing in renewable energy projects), and for 54% of respondents, it was more important to contribute to the benefit of the local community [72]. However, in less developed countries, economic motivators are of greater importance. For example, Jaccard and Dennis [73] pointed to the role of financial resources in introducing pro-environmental energy and heating solutions by owners of individual houses. Meanwhile, the deteriorating situation in the supply of drinking water around the world suggests that it is precisely the concern for the environment and the future of new generations that should define priorities. However, in our research, these motives received a low rating regardless of the age and place of residence.

The issue of drinking water is quite often discussed in scientific publications in a regional and local context. Harvesting rainwater also for the needs of the residents of multi-family buildings is included in the concept of energy-efficient buildings, because the reduced demand for clean water translates into the lower consumption of energy used to distribute this water [74]. Rainwater harvesting is increasingly seen as a major strategy to boost agricultural productivity and increases farm incomes in many drought-prone areas. While this technology is being promoted in many developing countries, there is conflicting evidence in the literature about its impact on household welfare. The studies by Zingiro et al. show that household size is positively correlated to the likelihood of farmers collecting rainwater [75]. In our research, such a correlation did not occur, which may result from the specificity of the Polish context. In Poland, the search for such a relationship should rather take into account the direction of agricultural production. The studies by Zingiro et al. also show that the level of household income has a positive and significant impact on the decision to harvest rainwater (marginal effects indicate that an increase in household income by 1% increases the likelihood that a household will install rainwater harvesting facility by 15.1%, with the remaining conditions unchanged), which may exclude households with less purchasing power. Their findings also show that membership in farmers' organizations positively and significantly increases the probability of adopting such solutions [75].

Our study showed no statistically significant relationships between socio-demographic variables and individual determinants of participation in government programs. Interestingly, there was no significant correlation even between the number of people in the household, which also includes children, and the reason "environmental protection". It could be assumed that having children inspires concern for the environment to a greater extent than the lack of them. The environmental determinant, although it was not the leading one in this research, was slightly higher rated by "Working Adults" than by "Generation Z". The importance of this factor has been demonstrated in the research by Broughel et al. Their findings show that the contribution to environmental protection and transition towards renewable energy sources were the main reasons behind the motivation (65%) to invest in this type of solutions [72].

Due to the relatively low engagement of respondents in programs co-funding pro-environmental investments, the ranking of selected demotivating factors has been verified (Table 5).

The barrier which proved most important for the respondents was predominantly economic in nature, i.e., the lack of funds for their own contribution (Table 5). This barrier was most often indicated regardless of the respondents' generational group and place of residence. Complicated procedures, which came in second, were also pointed out in the research by Feron et al. [76]. The condition for eligibility is ownership of the property covered by the program. The lack of property rights is therefore a significant barrier rated a bit higher by "Generation Z" and city residents. Moreover, Broughel et al. draw attention to the problem of property rights when it comes to the installation of pro-environmental solutions. These authors pointed to the benefits of regulations, allowing for joint action within "energy cooperatives", however their research also shows that Swiss

residents approach this idea with great caution [72]. The problems relating to installing photovoltaic panels on multi-family buildings were also addressed by Pintér et al. [77] and Yang et al. [78].

Table 5. Factors discouraging respondents from participating in pro-environmental programs, by age and place of residence (5-point Likert scale, where 1-the least discouraging and 5-the most discouraging).

Item		Lack of Funds for Own Contribution	Old Age	Complicated Procedures	Lack of Property Rights	Intention to Change the Place of Residence	Not Applicable—I Live in a Block of Flats	I Am Not Interested in Environmental Problems	I Don't Believe It Makes Sense	I Do Not Trust Novelties
Total	M	3.55	1.78	3.17	2.82	2.67	2.54	1.76	1.71	1.81
	Mo	5	1	4	1	1	1	1	1	1
	Me	4	1	3	3	3	1	1	1	1
Working Adults	M	3.51	2.18	3.19	2.59	2.32	2.55	1.83	1.77	1.81
	Mo	5	1	4	1	1	1	1	1	1
	Me	4	2	3	2	2	1	1	1	1
Gen Z	M	3.58	1.47	3.15	2.99	2.94	2.53	1.71	1.66	1.80
	Mo	5	1	4	1	3	1	1	1	1
	Me	4	1	3	3	3	1	1	1	1
Urban residents	M	3.33	1.99	3.13	3.09	2.88	3.03	1.85	1.79	1.84
	Mo	5	1	4	1	1	5	1	1	1
	Me	4	1	3	3	3	3	1	1	1
Rural residents	M	3.82	1.50	3.21	2.47	2.40	1.82	1.64	1.60	1.76
	Mo	5	1	4	1	1	1	1	1	1
	Me	4	1	3	2	2	1	1	1	1

M-Mean, Mo-Mode, Me-Median.

In the case of innovative solutions (and the discussed pro-environmental programs should be considered as such), an important role is played by trust, the rank of which, in the respondents' perception, was rather low. In the authors' research, it was not a leading barrier (Table 5). Meanwhile, the lack of trust was identified by Feron et al. as a significant demotivating factor. Their research showed that the lack of trust did not only concern the solution itself, but also the providers of these solutions (i.e., the companies offering services in the field of pro-environmental installations). Such attitudes often result from poor information transfer. According to S. Feron et al., Chilean citizens' extremely short time horizon for expected return on their investments makes these technologies unattractive. Indeed, while the Chilean population appears to be aware of the potential of renewable energy, their technology expectations are unrealistic, as they expect a return on investment in less than five years [76].

We also searched for relationships between the rank of the above-mentioned demotivating factors and demographic variables. A weak correlation was shown between the age of the respondents and the "old age" barrier ($r = 0.371$). A weak correlation was also noted between age and the intention to change the place of residence ($r = -0.261$), as well as age and lack of property rights ($r = -0.203$), which means that the significance of this barrier decreased as the respondents' age increased.

To address the research questions, the Mann–Whitney test was used to verify the difference in the rank of individual demotivating factors between "Generation Z" and the older age group (Table 6).

A statistically significant difference was found only for three demotivating factors. The decisions of the respondents from "Generation Z" were more influenced by the lack of property rights and the intention to change their place of residence than the choices of respondents from the older age group. Generation Z are most often people still living with their parents, which was reflected in the assessment of the analyzed demotivators. In turn, the older group was more determined by the age factor than the younger one.

Table 6. The difference in the validity of factors discouraging respondents from participating in pro-environmental programs between “Working Adults” and “Generation Z” (Mann–Whitney test).

Factors	Mean Rank (Working Adults)	Mean Rank (Gen Z)	Z	p
Lack of funds for their own contribution	141.1	141.81	0.07135	0.9442
Old age	159.52	120.59	−4.02983	0.00001
Complicated procedures	144.44	140.95	−0.35558	0.71884
Lack of property rights	128.66	147.98	1.98737	0.0466
Intention to change the place of residence	120.39	152.23	3.28152	0.00104
Not applicable—I live in a block of flats	139.45	140.41	0.09827	0.92034
I am not interested in environmental problems	136.82	132.75	−0.42434	0.67448
I don’t believe it makes sense	135.13	135.13	−0.20945	0.83366
I do not trust novelties	135.41	136.45	0.10786	0.9124

According to the concept of homo socio-oeconomicus, in the process of making a choice, an individual is guided by both rationality and social norms. This was confirmed by the results of the research reported in this article, which shows that pro-environmental behavior is determined by both economic and non-economic factors. However, the adopted Hypothesis 2 assumed an equal influence of these factors on the behavior of the respondents. This hypothesis was not fully confirmed, because the analysis showed that economic factors had a much greater impact on pro-environmental behavior. On the one hand, the implemented policy of economic incentives motivates individuals to invest in pro-environmental programs that enable the reduction of energy and water costs; on the other hand, limited income, costs and complicated procedures create a large barrier preventing such behaviors.

To conclude this discussion, it is worth paying attention to the approach proposed by Schebesch, who indicates that perceptual, psychological and socio-economic factors, which may not be universal for various economic regions, are involved in a stable process of adopting new energy solutions [79]. They will have a different rank of impact in highly developed countries than in less developed regions.

4. Conclusions

This paper has focused mainly on young people from Generation Z. It seems important to investigate their pro-environmental behavior, because in the future, this generation will take decisions in the field of environmental protection. In this study, 24 pro-environmental behaviors were investigated. Only seven of them showed a slight correlation with age. The respondents from Generation Z, to a slightly greater extent than the respondents from the “Working Adults” age group, indicated that they would rather choose public transport than a car and turn off the lights when they leave a room. In turn, the respondents from the older age group indicated as many as five behaviors more often than respondents from the younger group, i.e., minimizing the use of processed food and ready meals, sorting waste, composting organic waste, saving water and electricity at home and resigning from paper invoices in favor of electronic ones. In conclusion, “Generation Z” is more engaged in pro-environmental behavior than people from the older age group.

The pro-environmental behavior of the respondents concerned mainly actions performed in the household, including mainly: waste sorting, turning off lights in empty rooms, using reusable shopping bags or maintaining an optimal temperature in the rooms. The respondents were much less involved in pro-environmental actions beyond their household (like financial support for organizations and environmentally friendly campaigns, purchase of second-hand clothes instead of new ones, participation in actions such as “Clean Up the World”) and actions requiring significant financial outlays, i.e., investing in renewable energy sources. The scope of performed pro-environmental actions corresponded to the reasons for not taking them. In this research, economic barriers came

to the fore, followed by the reluctance to change the lifestyle habits (going beyond the comfort zone), which is consistent with the concept of homo socio-oeconomicus.

The pro-environmental actions performed most often include those that were either imposed by legal regulations (waste sorting, reusable bags) or whose adoption brings financial benefits in the form of lower maintenance costs (e.g., switching off the light in an empty room, optimizing the temperature). The role of economic and institutional factors was also visible in the case of declared participation in programs providing the co-funding of pro-environmental investments. The highest-rated encouraging factor was the long-term economic benefits in the form of energy and water costs reduction. The most important factor discouraging respondents from participating in pro-environmental programs was the lack of funds for their own contribution, which is a prerequisite in the procedure of obtaining funding (the beneficiary is reimbursed part of the costs, i.e., they first invest their own funds, part of which is recovered later). Measures still need to be taken to shape pro-environmental attitudes and support pro-environmental behavior. State administration can play a crucial role in these initiatives by investing in pro-environmental solutions, namely, investing in environmental sectors of the economy, e.g., renewable energy sources and infrastructure enabling effective waste collection and recycling.

The presented research fits into the existing research gap, especially in the Polish scientific research. Generation Z has not yet been included as a separate demographic group in research on pro-environmental behavior of Polish households. In addition, the analyzed issues are extremely dynamic, which creates the need for periodic research. The results of this study enrich the existing knowledge about pro-environmental behavior of Generation Z. In particular, this study is the first attempt to look for differences depending on the place of residence (in our case, city-village), which is treated as an important factor of a social nature. In our study, this factor did not prove significant. The place of residence mainly determined the possibility of using the support instruments discussed in the article.

The research area that this paper aimed to contribute to is extremely broad. Its importance for socio-economic development is undisputable, but it is impossible to discuss all the important issues in one article, as the interdependence of various factors is so multidirectional. This paper enters into a discussion with the studies of other authors and contributes to wider research that undoubtedly should be conducted.

Due to the fact that the sample selected for the study presented in this article was not representative, it does not entitle us to formulate general conclusions. However, due to the fact that the obtained research results are consistent with the findings of other authors, as shown in the text, they provide the opportunity to formulate the following observations:

- pro-environmental solutions requiring financial investments were stimulated by economic and social factors, which is consistent with the concept of homo socio economicus,
- the real pro-environmental behavior of Generation Z does not live up to their declarations,
- at the level of households, the undertaken pro-environmental behaviors include first of all the ones that do not require a lot of time, money or effort,
- there is a need to carry out research taking into account the pro-environmental behavior of various socio-demographic groups,
- further research on pro-environmental behavior should take into account the economic, social and cultural context, including the socio-cultural specificity of a given country.

Although our empirical research contributes to the existing literature on environmental behavior, it does show some limitations. The research focused on a selected age group, i.e., Generation Z, without taking into account the specificity and differences between individual generational groups (Baby Boomers, Generation X and Y). Moreover, it was limited to one country, and it would be interesting to compare these generations on a global scale.

The research also faced the difficulty of collecting a sufficient number of responses from people from outside Generation Z. Unfortunately, the computer-assisted web interviewing does not ensure that the respondents fit in the target group specified in the survey instructions. Another barrier is the limited recognition of pro-environmental behavior of

the group called Working Adults. This is a very diverse group which does not constitute a separate generation in the economic, socio-demographic sense. Therefore, the results obtained from this group could only be used as a background for Generation Z (more so as the numbers of both samples were different). In further research, the study should be planned and implemented in a more systemic way so that each group could be represented.

Based on the literature analysis, the empirical research findings and the authors' reflections, the following implications were formulated:

1. Economic incentives can solve many problems related to environmental protection, but only the community that is aware of the consequences of not taking preventive action is able to bear the necessary costs.
2. Initiatives to protect the environment are disliked due to their high capital intensity and relatively long payback period. Therefore, it is important to shape appropriate pro-environmental behavior, including integrating pro-environmental content into school curricula at every level of education. It will have an impact on shaping an environmentally friendly attitude from an early age and, as a result, should translate into pro-environmental behavior. The appropriate attitude of individuals, and, consequently, the community, is the foundation for pro-environmental initiatives. Society with pro-environmental awareness is able to put pressure on leaders and push for more nature-friendly regulations.
3. The discrepancies between pro-environmental declarations and the behaviors displayed by Generation Z may result from the fact that their declarations are shaped to a large extent by social media, i.e., the social factor. The economic factor has a smaller impact, perhaps due to the fact that, first of all, they usually live with their parents and do not run their own household. Secondly, it is the first generation that was born after the period of the political transformation that took place at the beginning of the 1990s in Poland. Thirdly, due to the intensive development of information technologies, this is a generation that, unlike the previous ones, does not differ from its peers from highly developed countries. Therefore, shaping appropriate pro-environmental behavior requires action from international organizations and cooperation of governments of individual countries in this area. The use of broadly understood media, and above all social media, to disseminate information about the dangers resulting from the negative impact of humans on the natural environment may contribute to the reflection on the individual and collective behavior of this generation.
4. When formulating the implications of our research, we cannot ignore the concept of sustainable development, which equates the importance of environmental protection policy with economic and social policy. Particular care should be taken to ensure that environmental policy is not subordinated to other types of policies, which may occur in less developed countries struggling with social and economic problems. In such a situation, targeted programs and financial instruments may serve as stimuli.

The authors are aware that the problem areas presented in the article do not exhaust all issues related to pro-environmental behavior, but nevertheless, they constitute the basis for further research. They also indicate the need to undertake interdisciplinary research.

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