APPROACHING THE BIOECONOMY IN TERMS OF INCREASING THE ENERGY EFFICIENCY OF HOUSEHOLDS IN ROMANIA

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Abstract
This paper approaches the transition process to the bioeconomy from consumers' perspective and their attitudes **to** decision-making process regarding the **use** of renewable energy systems in households. The article contributes to the literature by introducing a new challenge: identifying and analyzing the Romanian**s**' opinion on increasing the energy efficiency in their households and their intention in using energy obtained from renewable resources. For the purpose, a quantitative marketing research was conducted by interviewing 1123 persons from Romania's eight development regions. Data were collected using an electronic questionnaire.

The research results underline that Romanian**s** have invested in increasing the energy efficiency of their household, the main improvements being energy saving by purchasing low-power home appliances or thermal insulation of the dwelling. These investments were made based on economic considerations, being considered as a long-term benefit for the entire household. The authors propose to the Romanian economic environment to carry out information and promotional campaigns in order to raise awareness of Romanians on the importance of using energy obtained from renewable resources for sustainable development. To the academic environment, the authors recommend including bioeconomics in the curriculum of study programs offered to the education services market.

Keywords: bioeconomy, energy efficiency, consumer behaviour, renewable energy, quantitative marketing research.

JEL Classification: O13, O44, M31, Q01, Q40, Q42, Q57.

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Introduction

In the 1970s two conclusive studies about the knowledge and assimilation of the principles of bioeconomics were published. One of them, the „Limits of Growth" (Meadows, 1970), warned that in the near future of the 21st century, the economic growth would suffer from **the** waste of resources (Panayotou, 2003). The second paper, „The Entropy Law and the Economic Process" written by the founder of Bioeconomics, Nicholas Georgescu Roegen (1971), also emphasizes the idea that the environmental issues are dependent on the scientific and technological progress of present society.

In this context, the concern for sustainable development begins from the 1980s, when society is focusing **on** environmentalism, the center of attention being represented by **the** protection of the environment. The World Commission gives the best-known definition of sustainable development on Environment and Development in the Brundtland Report: „sustainable development is the development that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs" (National Agency for Environmental Protection – Romania, 2018). The definition emphasizes how raw materials are being used, but also how the resulting products are being consumed, individuals playing an important role in protecting the environment through their choices (Dinu, Schileru and Atanase, 2012). At the same time, companies cannot have a healthy development without considering the sustainability of their actions and their impact on the environment and society (Dabija and Băbuţ, 2013).

McCormick and Kautto (2013) argue that a competitive and sustainable bioeconomy requires focusing on two key themes, engaging the public and stakeholders in participatory governance through open dialogue and opening up the government and industry to innovation. For the successful transition to bio-economy, it is essential to identify viable schemes that combine sustainability and cost-effectiveness. In this respect, Bugge, Hansen and Klitkou (2016) have identified three views on what bio-economy is: a biotechnological view that underlines the importance of applying and producing biotechnologies in different economic sectors; a bio-resource vision that focuses on the importance of research, development and testing of biological raw materials, and a bio-ecological vision that emphasizes the importance of environmentally-friendly processes that optimize energy use, promotes diversity in order to avoid environmental degradation.

This paper is based on ~~a~~ quantitative marketing research conducted among households in Romania, focusing on the bio-resource component of the bio-economy, taking into account the perspective of using renewable resources to increase the energy efficiency of the household. Marketing research is necessary because the transformation of energy systems involves many technological, social, cultural, economic and environmental aspects, but also a significant role for citizens and communities (Zabaniotou, 2018). The analysis of the specialty literature shows that, although investments have been made in specific strategies and programs, there is still a low level of energy efficiency of households at both European and global level. These unsatisfactory results are the main marketing issues for decision-makers. In this context, this paper aims to cover aspects of the transition to the bioeconomy from a consumer perspective and its attitude in the decision-making process regarding the adoption of systems based on renewable energy in households. Thus, the research aims at highlighting the Romanian people's views on increasing the energy efficiency of their households and their intentions to use energy based on renewable resources. Considering the proposed objective, the main research questions are: (1) To what extent are Romanian

people involved in increasing the energy efficiency of their households? (2) What is the importance given by Romanians to the reasons regarding the purchase of renewable energy systems?

The results of the research shown that Romanian people have invested in increasing the energy efficiency of their households, the main improvements being energy saving by purchasing low-power household appliances or thermal insulation of the dwelling. These investments were based on economic considerations, being a long-term benefit for the entire household.

To achieve the intended purpose, the authors have structured the work in four parts. Thus, after reviewing the main papers published on the topic of adopting systems based on renewable energy in households, the methodology of the research was described. Then, the main marketing research results as well as the related discussions are presented, and the paper ends with the main conclusions and implications of the research.

1. Literature review

The European Union's (EU) energy policy aims to increase efficiency and upgrade the energetic infrastructure in order to make Europe „a sustainable, green, low-carbon economy" and „an example of renewable energy production" (EU, 2018). EU targets aims for 2020 that 20% of the energy produced to be renewable, with the percentage rising to at least 27% by 2030 and also, the energy efficiency to be increased by 20% in 2020 and by 27% to 30% in 2030 (EU, 2018). Already, the EU share of renewable energy has grown from 8.5% in 2004 to 17% in 2016 (European Parliament, 2018). In 2012, the European Commission adopted a strategy for the transition of the European economy towards sustainable use of renewable resources, starting from the premises that the world population will increase to 9 billion inhabitants by 2050 and that the available resources will still be limited. The strategy is called „Sustainable Growth Innovation: A Bioeconomy for Europe" and addresses three key issues: „developing new technologies and processes for the bioeconomy; market development and competitiveness in the bioeconomy sectors and driving decision-makers and stakeholders to closer collaboration" (European Commission, 2012). In this context, the increase of energy efficiency in buildings is particularly important because they account for 40% of total EU consumption and about 75% of them are energy-inefficient (European Parliament, 2018). In February 2018, the European Investment Bank (EIB) approved the creation of a new financial instrument called Smart Finance for Smart Buildings in order to „increase the attractiveness of investments in energy efficiency projects in residential buildings for private investors through the smart use of EU grants as a guarantee. This instrument, together with other EU policy initiatives for smart buildings, aims to unlock a total of € 10 billion in public and private funds by 2020 for energy efficiency projects" (European Commission, 2018).

Analyzing 12 national and regional strategies from Europe, Besi and McCormick (2015) concluded that a common bioenergy direction based on research and technological innovation is emerging in Europe. One of these directions concerns the market of ecological products that fully contributes to the ascension of bioeconomy. However, there are considerable differences between consumers in different European countries and also between the degree of maturity of the European markets for such products and technologies (Heiskanen and Matschoss, 2017).

In Romania, the domestic sector has the largest share of final energy consumption (34.5% in 2011 and 33.2% in 2016) (Energy Regulatory Authority (ANRE) – Romania 2018). The Romanian Government, through the Green House Program, encourages, by financial support, the use of household heating systems with renewable resources. During 2010-2017, 30000 projects were completed for individuals, the financing rising to around 180 million lei (Environment Fund Administration – Romania, 2018). The implementation of renewable energy technologies in residential buildings is part of the current objectives regarding renewable energy use (Heiskanen and Matschoss, 2017). Researchers estimate by 2050 at least a doubling of the global energy demand for households (Berardi, 2017). In this context, social acceptance regarding the implementation of renewable energy technologies becomes crucial. A study in Finland highlights the importance of the public sector in providing business models and incentives to encourage citizens towards such a behavior (Moula et al., 2013). Moral norms and the influence of others are also considered predictors of the intention to use renewable energy systems (Fornara et al., 2016). Social acceptance can be improved by a better understanding of new technologies, as well as the awareness of planet and life issues (Zabaniotou, 2018).

Energy efficiency of households has become a „major challenge and opportunity" for researchers, practitioners and policy-makers as well as consumers, who are becoming increasingly aware of the need for sustainable energy practices (Frederiks, Stenner and Hobman, 2015). A study conducted in Ireland to investigate the factors that drive investments in household energy efficiency and consumers' motivation to participate in energy-saving programs revealed that the decision to invest is primarily driven by increased energy savings and the cost of investment followed by increased comfort and environmental benefits (Aravena, Riquelme and Denny, 2016). Vassileva and Campillo (2014) conducted a study on lower income households in Sweden and concluded that both environmental factors and income are equally important for energy saving, consumers making efforts to reduce their consumption and also obtain the knowledge needed to keep it down. A study in Spain reveals that high-income households are more willing to invest in energy efficiency but do not adopt energy-saving habits (Ramos, Labandeira and Löschel, 2016).

An important role in increasing the energy efficiency of households, in addition to the authorities' support, can be played by the active organizations in this field which encourage the potential consumers of renewable energy to become prosumers which can create new technological solutions and collaborate with other consumers by sharing their ideas and knowledge. These activities can support the development of sustainable energy technologies (Hyysalo, Johnson and Juntunen, 2017). Olkkonen, Korjonen-Kuusipuro and Grönberg (2017), in a study in Sweden, clarified the role of the energy prosumer as a new type of stakeholder and suggest companies to consider relations with prosumers and communities' involvement. The development of future strategies depends on efficient and effective integration of the prosumer within the framework of the energy market (Parag and Sovacool, 2016).

International literature is rich in studies on the behavior of consumers of energy-efficient products. A survey was made on 682 Vietnamese consumers in order to better understand their purchasing behavior of energy-efficient; the conclusion was that „egoists" have more chances to develop negative attitudes towards environmental protection due to individual inconveniences associated with the purchase of such devices while „generous" consumers can improve their attitude towards environmental protection as they tend to minimise the

individual inconvenience. Another conclusion of this study was that a good knowledge of these products leads to a tendency to overcome the inconveniences associated with the acquisition (Nguyen, Lobo and Greenland, 2017).

Another study, launched in 2012 in China, analyzed the impact of the world's largest electricity subsidy program ($ 4.26 billion). The results have shown that Chinese citizens are aware of the need to save energy and that this principle is important in choosing household appliances, but market information for consumers should be increased (Lei, Yang and Jiayang, 2014) in order to transform the market in an energy efficient one on the long run. A survey of German consumers pointed out that the most powerful predictor of organic purchasing behavior was the desire to pay a higher price, followed by personal rules. Consumers need to be aware of the need to change their buying behavior and to understand the benefits of green products and why they have a higher price (Moser, 2015). An important aspect is highlighted by Testa, Cosic and Iraldo (2016), considering information as a contextual factor influencing the adoption of pro-ecological behavior. In this context, the role of private companies is highlighted in increasing the demand for energy efficient products by providing credible and scientific evidence of their performance.

2. Research methodology

Considering the research problem, namely the low level of population involvement in increasing the energy efficiency of the households, based on the literature review, the general hypotheses that guided the research approach were formulated: (1) Romanians are interested in increasing the energy efficiency of the household, but the investments made so far are of low value, mostly oriented towards financial savings. (2) A small part of researched population intends to purchase renewable energy systems in the near future. (3) The main incentive to purchase renewable energy systems is of economic reason.

In order to achieve the research objectives and to validate the hypotheses, a marketing research based on the survey was conducted among the Romanian population structured on development regions. The data were collected based on an electronic questionnaire using CAWI method (Computer Assisted Web Interviewing) (Barbu and Isaic-Maniu, 2011). This method involves collecting data by uploading an online questionnaire on the Internet and filling it out by the respondents directly in the browser without having to install any application or program. The main advantage is low data collection costs compared to other methods.

The researched population consists of the total households in Romania, no matter of the number of members. The questionnaire link was distributed using email, groups, social networks, the main platform being Facebook. Groups interested in topics such as environment protection or energy efficiency have been identified and invited to fill in the questionnaire. In addition, the „snowball" method was used, the respondents being asked to send the invitation to fill in the questionnaire to other interested people on the topic. The method has the disadvantage of non-random selection of sample members, which leads to a poor representativeness. In order to compensate this weakness, data were collected from as many people as possible but the results should be interpreted with caution (Lefter, 2004).

The final sample consists of 1123 people from all eight development regions of Romania and it was validated by using the t-Student test and weighted in order to ensure a balanced structure that is not statistically different from the population distribution by development regions (Lefter, 2004, p.150). The final sample structure on development regions is: North-East Region (16.21%), South-East Region (12.38%), South Muntenia Region (15.05%), South-West Region Oltenia (10.33%), West Region (9.08%), North-West Region (12.91%), Center Region (12.11%), Bucharest-Ilfov Region (11.93%). Considering the demographic characteristics, the structure of the sample is presented in table no. 1.

Table no. 1: Sample structure

Demographic characteristic	Frequency	%
Income		
Low (≤2000 lei)	353	31.4%
Medium (2001-4000lei)	462	41.1%
High (over 4000 lei)	308	27.4%
Age		
18-35 years old	436	38.82%
36-45 years old	389	34.64%
Above 45 years old	298	26.54%
Education		
Higher education	514	45.77%
High school/vocational	533	47.46%
Elementary studies	76	6.77%

The data obtained were processed using the SPSS software. Univariate, bivariate and multivariate analysis methods were used, being applied statistical tests to identify the relationships between research variables. The first objective was to identify the Romanians' involvement in increasing the energy efficiency of households and the main improvements made to reduce energy consumption. The reasons for these improvements were also assessed.

Subsequently, respondents' intentions to invest in renewable energy systems were analyzed, depending on the region of origin and their demographic characteristics. Multiple Correspondence Analysis, also known as the Homogeneity Analysis (HOMALS), was used in order to design a demographic profile of people intending to purchase renewable energy systems. This is a multivariate analysis of marketing data that provides the possibility to plot the relationship between several nominal variables in a simple chart (Schimmel and Nicholls, 2005). By creating Scatter plot patterns, objects with similar features are close to one another, and those that are different are located at greater distances (Leeuw and Mair, 2009). The variables used in this analysis are: the intention to purchase renewable energy systems, the education, the age and the respondents' income.

The last part of the data analysis aimed at ranking the reasons that influence the intention to purchase renewable energy systems and to test the relationship between these reasons and population's demographic characteristics. For this purpose a numerical scale with 5 equally distanced levels (5=Very Important) was used. Nine items that refer to different reasons to purchase renewable energy systems were evaluated. Then, a reduction in the number of motivational factors was computed by using a factorial analysis method, known as the

Principal Component Analysis (PCA). This method analyzes not only the variation within the variables but also the relationship between the variables in order to reduce their multicollinearity (Qi and Luo, 2015). The result consists in reducing the number of variables and retaining inside the analysis the main components that are orthogonal and explains a large amount of the variance given by the initial variables (Hastie, Tibshirani and Friedman, 2009). In order to test the relevance of data used, were calculated the Kaiser-Mayer-Olkin coefficient (KMO) and the Bartlett test using SPSS. The value of the KMO coefficient should be greater than 0.5 and the value of the significance level for the Bartlett test should be less than 0.05 (Yong and Pearce, 2013). By applying PCA two main components resulted. For each component, a new SPSS variable was generated by calculating for each respondent the mean of the ratings assigned to the variables that contribute predominantly to the component considered. Two continuous variables resulted with values between 1 and 5 points (5=Very high importance). Finally, the relationships between these variables and the main demographic characteristics of the researched population were tested using the Analysis of Variances (ANOVA). In this respect, each of the two components was defined as dependent variable and successively crossed with three demographic variables considered significant for causing different motivations: education, income and age of respondents.

3. Results and discussions

The research results are presented grouped on the research objectives. The analyses and statistical tests are presented in a logical order for obtaining relevant and structured information.

- *The Romanians' involvement in increasing the energy efficiency of the households:*

In order to identify the extent to which Romanians are involved in increasing the energy efficiency of the households, the first research objective was to find the percentage of those who have made improvements that contribute to lower energy consumption. The research results reveal that this percentage represents 71.5% of the total number of 1123 respondents. Among these improvements the most mentioned (by more than 90% of respondents) were electronics and home appliances with low power consumption and economical lightbulbs. Another action meant to reduce the energy consumption was the insulation of the dwelling, which was mentioned by 74.3% of respondents. The investments in systems based on renewable energy received a relatively low number of answers, from only 17.8% of respondents.

The main reasons of improvements were assessed according to their importance in making such decisions. The results show on the first position „economic reasons", with a mean of 4.36 points on a 5-levels numerical scale. The following reasons ranked according to the computed means were: „future investments for family" (4.12 points); „investment to save money later" (4.07 points); „environmental considerations" (3.49 points); „global climate changes" (3.04 points); „interest in technology trends" (2.99 points).

It can be noticed that the main motivation of improving the energy consumption's efficiency is based on economic reasons, while the environmental and technological reasons are ranked on the last places, with mean scores closed to the neutral level of the measurement scale. These results confirm the conclusions of other published research that

shows the dominance of economic factors inside decisions made to increase the energy efficiency of the households (Aravena, Riquelme and Denny, 2016; Vassileva and Campillo, 2014).

As the investments in renewable energy systems have recorded a small number of answers, it is confirmed the first hypothesis of the research, which assumes that Romanians are interested in increasing the energy efficiency of the household, but the investments made so far are relatively small, and rather oriented towards financial savings. This conclusion is also supported by the assessment of the main reasons to invest in renewable energy systems. Considering these results, the answer to the first question of the research is that Romanians are highly interested in increasing the energy efficiency of households, but the motivations are mainly economical, which can be a barrier for sustainable and environmentally friendly investments. These conclusions confirm the results from other published research (Lei, Yang and Jiayang, 2014; Aravena, Riquelme and Denny, 2016).

- *The intention to purchase renewable energy systems:*

Another objective was to find the extent to which Romanians have information on the main technologies that use renewable energy resources. It was intended to identify the assisted notoriety of these technologies by briefly informing respondents about their main characteristics. Subsequently, a hierarchy of technologies was developed according to the multitude of information held by the respondents on a 5-levels scale (5=informed to a great extent). The means obtained were relatively small, close to the neutral level of the scale, which signifies a rather low notoriety of technologies that use renewable resources among the researched population. Solar photovoltaic panels are on the first place with a mean of 3.33 points, followed by wind turbines (2.75 points) and thermal solar energy (2.73 points).

Data analysis shows that the number of those intending to acquire in their household the systems based on the use of renewable resources is quite low, only 17.5% of the sample members answering affirmatively to this question. This situation can also be caused by the low level of information concerning the benefits of using such systems. This confirms the need for marketing strategies aimed at transforming consumers into prosumers. Such a need is also widely addressed in the literature (Hyysalo, Johnson and Juntunen, 2017; Olkkonen, Korjonen-Kuusipuro and Grönberg, 2017; Nguyen, Lobo and Greenland, 2017).

The distribution of answers according to the respondents' region of origin shows a higher concentration of those intending to use such systems in Bucharest-Ilfov Region (35.8%), but also in the South-East Region (23.8%). These regions are located predominantly in lowland areas, with a high potential for solar and wind energy use. In contrast, regions with similar potential, such as the South Muntenia Region or the South-West Oltenia Region, as well as the other regions have registered relatively small (below the sample mean) percentages of the intentions to purchase renewable energy systems. These results confirm the second hypothesis of the research, which states that only a small part of Romania's population intends in the near future to acquire such systems.

- *The demographic profile of people intending to purchase renewable energy systems:*

Multiple Correspondence Analysis was used to build this profile, using nominal variables: the intention to purchase renewable energy systems, the education, the age and the income of respondents. Figure no. 1 shows the associations between the categories of each variable,

represented by points, the proximities between the categories of different variables indicating a strong association between them.

It can be noticed a quite high homogeneity of responses given their agglomeration in the central part of the chart, but despite this homogeneity, interesting associations are emerging: those who intend to acquire renewable energy systems are young people (26-35 years) or middle-aged (36-45 years), with average income (2001-4000 lei) and higher education. High-income people are in the same category, but the association is lower. On another hand, those who do not intend to purchase such systems are very young (18-25 years) or over-average (46-65 years), with low incomes (less than or equal to 2000 lei) and with secondary education (high school or vocational). The groups of people over 65 years old and those with elementary studies have a very poor association with the other categories of the analyzed variables. In order to obtain a good aspect of the chart, the category of elementary studies does not appear, because it is placed far away from the other categories.

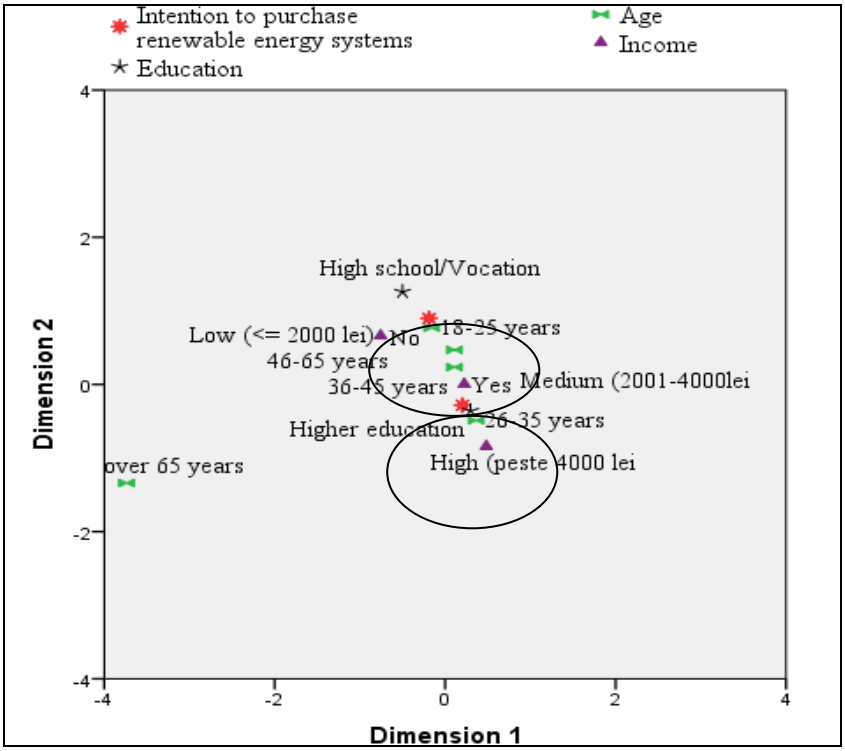

Figure no. 1: Analysis of the correspondence between the intention to purchase renewable energy systems and the demographic characteristics of the respondents

- *Analysis of motivation to invest in renewable energy systems:*

The hierarchy of the reasons to purchase renewable energy systems based on the average importance given by those intending to invest in such systems reveals that on the first places are economic reasons: „investment to save money later" (4.00 points); „economic and financial considerations" (3.97 points); „improving own electrical network" (3.91

points); „future investment for family/children" (3.89 points); „post-implementation maintenance" (3.88 points). Technological and environmental considerations are situated on the last places in this hierarchy: „less dependence on conventional energy" (3.77 points); „interest in technology trends" (3.60 points); „global climate changings" (3.45 points); „environmental protection considerations" (3.36 points).

Starting from these results, a reduction of the number of motivational factors was computed by applying the Principal Component Analysis (PCA) on the nine items listed above. Two main components were retained, having the eigenvalue greater than 1 and explaining 73.99% of the total variance. The data relevance testing indicates a KMO=0.83 and a significance level for the Bartlett test of less than 0.05, meaning that the resulting factors (the main components) are statistically significant.

The table no. 2 shows the correlations between the analyzed items and each of the two components retained in the model. The Varimax rotation of the axes was used to better emphasise the contribution of each variable to the main components. It is noticeable that the first six items loaded mostly on the first component, while the last three variables loaded predominantly on the second component.

Table no. 2: Correlations between variables and factors after rotation

Items	Component	
	1	2
Future investment for family/children	0.920	
Post-implementation maintenance	0.884	
Investment to save money later	0.858	
Economic and financial considerations	0.803	
Improving own electrical network	0.785	
Interest in technology trends	0.657	
Environmental protection considerations		0.891
Global climate changings		0.726
Less dependence on conventional energy		0.625
Eigenvalues	5.59	1.07
% of variance	62.13	11.86

Analyzing the significance of each variable, it can be noticed that the first component is associated with economic reasons, while the second component is associated with environmental considerations. So, he two components were called the „Economic Component", respectively „Environmental Component". Following the computation of new variables for each component in SPSS, the relationships between these variables and the demographic characteristics of the researched population were analyzed (table no. 3).

Table no. 3: Relationships between the main components and demographic variables

Demographic characteristic	Economic Component			Environmental Component		
	Mean	F	Sig.	Mean	F	Sig.
Education						
Higher education	3.71	22.72	0.000	3.50	0.76	0.386
Secondary education	4.66			3.66		

Demographic characteristic	Economic Component			Environmental Component		
	Mean	F	Sig.	Mean	F	Sig.
Income						
Low (≤ 2000 lei)	4.15	20.31	0.000	3.35	8.34	0.000
Medium (2001-4000lei)	4.13			3.81		
High (over 4000 lei)	3.04			3.19		
Age						
18-35 years old	3.71	4.93	0.008	3.40	6.35	0.002
36-45 years old	4.03			4.05		
Above 45 years old	4.36			3.52		
Total	**3.88**			**3.53**		

Table no. 3 shows that at the entire sample level the Economic component recorded a mean of importance (3.88 points) higher than the Environmental Component (3.53 points), which resulted also from the analysis of each item's mean. Testing the relationships between components and demographic variables, it can be noticed statistically significant differences between population's groups according to these characteristics (Sig. <0.05), with only one exception regarding the link between the Environmental Component and education. Although the importance given by people with secondary education to this component is higher than that given by those with higher education, the difference is not statistically significant (Sig.>0.05). This difference is in the same direction for the Economic Component, but in this case it is statistically significant.

Depending on income, people with low incomes give the highest importance to the Economic Component and those with average income are on the first place in the case of the Environmental Component. People with high incomes are on the last place for both components. Considering the age, people aged 36 to 45 give the Environmental Component the highest importance, while people over 45 years old consider the Economic Component more important. It is noteworthy that for each demographic variable, the groups formed gave a higher average importance to the economic component than the environmental one, with one exception. This is the case of people with high incomes, for which the environmental considerations are more important than the economic ones.

Taking into account the above results, the answer to the second research question reveals a high importance given to the economic factors in the intention of purchasing renewable energy systems and a lower importance of the environmental protection considerations. This confirms the third hypothesis of research, according to which the main motivation is of an economic nature. However, the motivation depends to a large extent on demographic factors such as education, age or income. In this context, information is crucial for promoting these systems, both at macroeconomic and microeconomic levels. Thus, it is confirmed a series of results presented in the literature that underline the need of marketing strategies meant to determine changings in the purchasing behavior of renewable energy systems (Lei, Yang and Jiayang, 2014, Moser, 2015, Testa, Cosic and Iraldo, 2016).

Conclusions

The article contributes to the literature by the novelty of the researched issue: identifying and analyzing the Romanians' opinions on increasing the energy efficiency of households

and their intentions of using energy based on renewable resources. Marketing data obtained by the authors who carried out the research confirm other results published in the specialty literature (Lei, Yang and Jiayang 2014; Moser, 2015; Aravena, Riquelme and Denny, 2016; Testa, Cosic and Iraldo, 2016; Nguyen, Lobo and Greenland, 2017; Hyysalo, Johnson and Juntunen, 2017; Olkkonen, Korjonen-Kuusipuro and Grönberg, 2017).

Starting from the research results, the main proposal for decision-makers is to carry out public information campaigns on the importance of using renewable energy-based systems, especially for the protection of the environment and the long-term wellbeing of society. This necessity is supported both by the low level of information available for the Romanian population and by other results of similar research published in the literature (Lei, Yang and Jiayang, 2014; Moser, 2015; Nguyen, Lobo and Greenland, 2017). In this respect, the idea of transforming consumers into prosumers becomes of real interest (Hyysalo, Johnson and Juntunen, 2017; Olkkonen, Korjonen-Kuusipuro and Grönberg, 2017), while the use of renewable energy involves its actual production in households by using solar panels, small wind turbines, etc. The importance of public information for the Romanian population becomes even stronger in the context of this research results, showing that inside regions with a high potential for using such systems, like South Muntenia Region or the South – West Oltenia Region, there were relatively small percentages regarding the intentions of purchasing renewable energy systems in the near future.

The overall conclusion of this paper emphasizes the importance of the research results for both the economic and the academic environment. In terms of economic environment, implementing information and promotional campaigns can help raise awareness on the importance of using renewable energy for sustainable development. Such campaigns, conducted at a national level, can also ensure the success of some macroeconomic programs and strategies in which significant amounts of money have been invested in the past or will be invested in the future. From an academic point of view, the inclusion of bioeconomics in the curricula is a major necessity, designed to create a high level of education in the field of environmental protection and the reduction of excessive consumption of non-renewable resources.

On the other hand, the main limitation of the research is the sample selection method, which was not done randomly and thus can lead to poor representativeness for the researched population. However, the authors appreciate that the large number of respondents and the balanced structure by development regions attenuate these inconveniences.

Future research should aim at a stronger deepening of population attitudes towards investing in such systems, including the use of qualitative methods to capture the perceived benefits of investors. The authors also intend to carry out quantitative marketing researches relevant at a national level, based on random sampling methods.

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