sciendo

*Proceedings of the 5th International Conference on Economics and Social Sciences (2022), ISSN 2704-6524, pp. 333-342*

**The 5th International Conference on Economics and Social Sciences**
**Fostering recovery through metaverse business modelling**
**June 16-17, 2022**
**Bucharest University of Economic Studies, Romania**

# Triggering Factors for Engaging Consumers as Key Players in the Economic System in the Zero-carbon Global Economy

Anișoara MIRCEA (NEIS)[1*], Adrian TANȚĂU[2]

DOI: 10.24789788367405072-030

## Abstract

*The fact that the world has become aware of climate change and that once temperatures rise above a certain level there is no way back to normal has not been a success for politicians, academics, or scientists. The current article explores the triggering factors which enable the involvement of final consumers as main actors of the economic system to the zero-carbon global economy. This study is intended to capture, analyze and present results on the perceptions of ordinary citizens on what they know and can do about climate change. Today, scientific literature exists, plenty of business studies or high education programs related to zero-carbon economy. Mainly, the companies are guided about the steps to follow to measure the Corporate Carbon Footprint, the Product Carbon Footprint, climate reporting, and the path to become climate neutral, reduce or avoid their emissions. The method foreseen is based on questionnaire. The main research question is how we should address each citizen as a final consumer to concentrate on the energy saving measures, energy efficiency, self-supply of green energy, own carbon footprint, advantages, disadvantages, and financing possibilities in the region/area where he lives. The results show that incorporating the carbon neutral principle in formal and adult education, presenting the regional specifics and the local strategy, providing easy-to-use carbon emission tools, communicating on transparent platforms, the technologies, financing facilities are factors which may have a higher impact on consumers, encourage and motivate people to participate in climate protection. The findings of the study contribute to the understanding of main factors that influence the consumers to reduce their impact on climate change and contribute to a zero-carbon global economy.*

**Keywords:** carbon footprint, climate change, final customer, global warming, green energy, net-zero carbon economy, sustainable products and services.

**JEL Classification:** D12, E91, Q01, Q42.

[1] Bucharest University of Economic Studies, Bucharest, Romania, mirceaanisoara21@stud.ase.ro.
[2] Bucharest University of Economic Studies, Bucharest, Romania, adrian.tantau@fabiz.ase.ro.
* Corresponding author.

## 1. Introduction

Our society's biggest challenge to stop the global warming caused mainly by the increase of the carbon dioxide levels is amplified these days by the war in Europe having the consequence of increased prices of the energy, food limitations in poor countries, and redirecting funds for military expenses. If focusing on sustainable energy consumption used to be an abstract fancy requirement, the actual crisis in Ukraine shows us that it is even economically a must to go for green energy, with all its positive consequences.

Considering the "Habit 2: Begin With The End In Mind" (Covey, 1989), which says "to determine the projection in the future on what is considered to be the final expectation", it is in our perspective that the final-customer will mainly choose to use and invest with priority in sustainable energy and in any kind of products and services produced sustainable if we want to stop the global warming.

This is the reason to choose as the main objective for this article to identify if the final customer has the knowledge (education) and the instruments to be able to become one of the main actors in our ambitious net-zero carbon global economy.

## 2. Problem Statement

The idea for this research came from a practical situation: the challenge of installing a new heating system for a renovated house in Romania. Being confronted with a variety of offers for different products or installation services, the questions arose: where to start, what really suits the house in this region, where to get this information, who can advise which is the best option from an economic and sustainable point of view? The problem is whether it is an individual question or much more general and usually concerns the end customers.

Looking at the existing regulation, checking the literature, and a plenty of studies, they conducted to the conclusion that the companies and countries are the ones addressed to measure the Corporate Carbon Footprint, the Product Carbon Footprint, provide climate reporting and the path to become climate neutral, reduce or avoid their emissions. The main regulations and protocols are referring to the companies and countries: the Kyoto Protocol (1997) which encourage both countries and private companies to reduce emissions; the Paris Agreement (United Nations Climate Change, 2015) which aims to limit the rise in global temperatures below 1.5°C and defines how countries submit their plans for climate action known as nationally determined contributions (NDCs) and the long-term low greenhouse gas emission development strategies (LT-LEDS)).

The end customer, the ordinary citizen, is not directly involved in defining this process or deciding which path to take.

Certainly, politicians are supposed to represent him, and they in turn work to enact regulations and control their application; companies are the ones that offer sustainable products and services, banks and financial organisations that ensure funding, and so on. But citizens are nowhere directly involved. Do citizens feel that

they are well educated/informed/prepared to choose sustainable products and services? Such a dilemma is what the current paper will try to bring to light.

There are complex studies and the analysis of some related to the final consumer revealed technical concepts such as "Consumer Behaviour in the Electricity Field", which analyses behavioural on energy consumption (Tantau et al., 2021), sociological ones like "relation between the cultural dimensions of Hofstede's model and the consumption of renewable energies" placing emphasis on cultural characteristics and the need to define renewable energy projects based on cultural values of the customers (Pelau, Pop, 2018). Some authors "recognise the need for the scientific community, conservation practitioners, and climate change advocators to combine objective with subjective arguments to overcome their barrier of engaging people with climate change" (Gallardo et al., 2017) and others state that "Knowledge isn't only power" but can also mean survival when it comes to climate change (Rood, 2022).

Back to the question: Why do people not want to act to protect nature and the future of their children? A look at Maslow's motivational model (McLeod, 2018) shows that the people with the main deficiency needs fulfilled will be less motivated to act, while the ones where the self-actualization needs are reached are the ones ready to proceed in a sustainable way. Remaining within the psychological perspective, the study of Walsh (2011) where his model conducts to values chain framework redefinition to consider that "self-actualization and sustainable development are one and the same".

Education is one of the main self-actualization needs, a reason why we will cite the study from Australia: "Education for sustainability in business education programs: a question of value" (Sidiropoulos, 2014), which provides a very good analysis of the importance of sustainability in the tertiary business education system. In the fourth chapter of her research paper, Prof. Sidiropoulos presents the gradual inclusion of sustainability topics in Economics with the effect on the environment and society, in Marketing and the importance of creating green products, creating brand image and brand value based on ethical behaviour and the importance of volunteering activities and "doing good" for the community and the environment.

We have identified psychological and sociological models, technical concepts and projects, the importance of education, but a concept of how exactly the final consumer/citizen is directly involved in sustainable activities is not easily found in the consulted studies.

The need for education in the sense of sustainable development was identified, but only for a small group of consumers, i.e. those participating in some form of education (Ntona et al., 2015).

## 3. Research Questions / Aims of the Research

The current paper serves to get a first overview of what *ordinary citizens* know about sustainable products or services, their carbon footprint, or the reasons why we should take action against global warming. The survey used was not designed to be 100% scientific, and the degree of representativeness is not necessarily significant.

The questionnaire is not intended to be answered by people who are qualified in the field of sustainable and/or green energy. What is the questionnaire and its results? It is an x-ray of what people in our local area think about the carbon footprint, green energy, and related education, climate change mitigation/adaption or carbon emissions. We believe the answers are just a starting point for our future work to understand the reasons why end-users are not adopting new sustainable technologies. Surely, the next steps will be research papers, which will bring much more scientific and solid documentation to find motivational factors for each of us as end consumers to think and act sustainably.

Our world today is working more and more with modern concepts like people-planet-profit, and there is a move away from separation, competition and conflict, which are being replaced by unity, connection, and collaboration. The best example of unity, connection, and collaboration comes from the IT sector and is the way companies have started to work with Microsoft 365, where everything is in the cloud, everyone participates in projects, is connected online from anywhere via the Internet and contributes to the projects they are involved in.

The main research question is what pain points we should approach in order to identify the triggers that can be used to encourage and motivate every citizen in their role as end consumer to participate in climate protection and achieve a zero-net carbon target.

The hypotheses we started from are:

(1) If people are better educated, then they know a lot more about climate, carbon footprint, global warming, and what they should do to prevent it.

(2) If people live in urban areas, then they have more access to information and will do more to protect the climate.

(3) If there is a defined strategy at central/local level, then residents will try to follow it and contribute to climate protection.

## 4. Research Methods

The research method is the survey method, a quantitative research method for data collection.

The instrument of the survey method is the online questionnaire with 21 questions, 10 of them are closed-ended questions, 10 mixed, and the last one is an open-ended question. The addressed questions are structured on following categories: 11 multiple choice questions, 8 rating scale questions, 15-point Likert scale question and one final open question used to collect critic or missing ideas.

To obtain responses to the questionnaire, the target group is 150 people and the collection data method used is a combination of “snowball sampling” and "haphazard sampling”.

We chose this method because the questionnaire is a quick, efficient, and inexpensive way to collect large amounts of information from many people. The respondents can answer whenever they find time, they are not bound by a time limit, but a major disadvantage is that they can postpone or forget to answer.

## 5. Findings

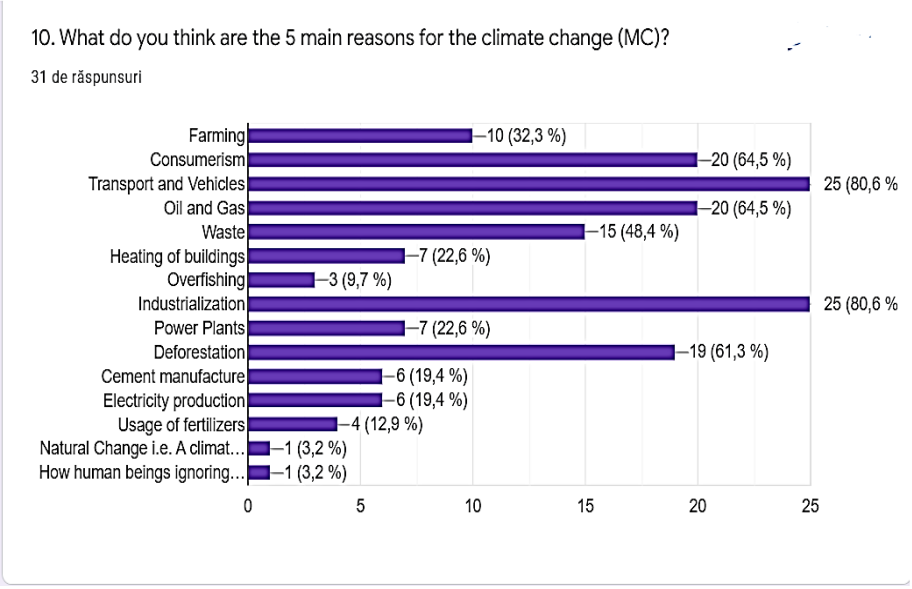
Even though the number of the respondents was quite small (31), they are represented mainly by high educated people (90% bachelor, master, or PhD). There are 52% women and 48% men in the majority from Europe (58% East and central Europe, 36% from West Europe). From the age perspective, we had 48% in the category 31-45 years, 39% in the category 46-59 years, 10% are 18-30 years old, and 3% from the category over 60.

We did a correlation between the answers provided by the respondents by different questions to identify and comment on the validation or invalidation of the hypothesis we wanted to check.

(1) If humans are better educated then they should know a lot more about climate, carbon footprint, global warming and what they should do to prevent it

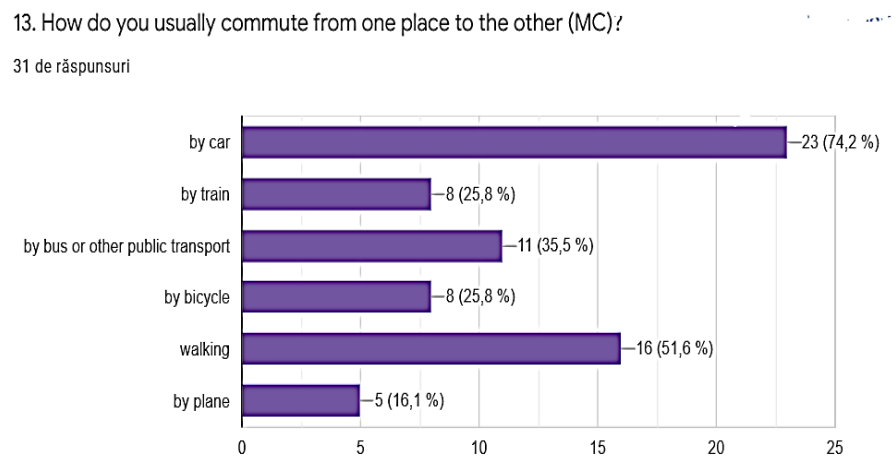
This hypothesis was invalidated as the respondents, even they are identifying the main reasons for climate change (Figure 1), they do not know how to calculate their carbon footprint (71% - Figure 3); the participants identify as one of main reasons for climate change the transport and vehicles, but they continue to commute mainly by car from one location to other (74%). For sure, it can be determined by a bad infrastructure, but without having any measurements tools for the final consumers are the consequences not tangible. It is important to note that end-users did not rank electricity generation among the top 5 causes of climate change, even though we use the most fossil fuels to generate electricity.

**Figure 1. Climate Change reasons identified by questionnaire participants**



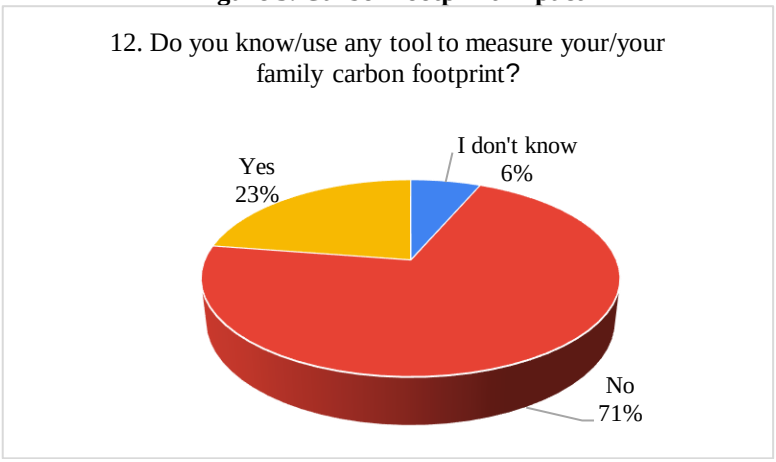

*Source:* Graph produced with Google Forms (not editable).

**Figure 2. Transportation used by respondents**




*Source:* Graph produced with Google Forms (not editable).

**Figure 3. Carbon footprint impact**



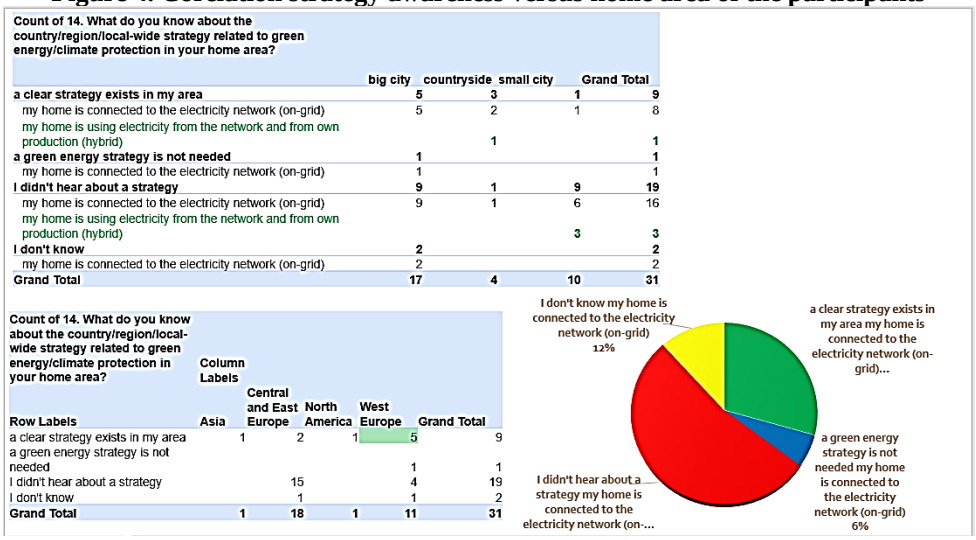

*Source:* Graph produced with Excel based on the answers of the participants.

(2) If people live in urban areas, then they have more access to information and will do more to protect the climate

The invalidated hypothesis as shown in Figure 4 shows that people in small towns or in the countryside use hybrid electricity most often, even if they do not know the climate protection strategy of the local authorities.

People in big cities are partly aware of their cities' strategy, but use hybrid electricity less.

**Figure 4. Corelation strategy awareness versus home area of the participants**



| Count of 14. What do you know about the country/region/local-wide strategy related to green energy/climate protection in your home area? | big city | countryside | small city | Grand Total |
|---|---|---|---|---|
| **a clear strategy exists in my area** | **5** | **3** | **1** | **9** |
| my home is connected to the electricity network (on-grid) | 5 | 2 | 1 | 8 |
| my home is using electricity from the network and from own production (hybrid) | | **1** | | **1** |
| **a green energy strategy is not needed** | **1** | | | **1** |
| my home is connected to the electricity network (on-grid) | 1 | | | 1 |
| **I didn't hear about a strategy** | **9** | **1** | **9** | **19** |
| my home is connected to the electricity network (on-grid) | 9 | 1 | 6 | 16 |
| my home is using electricity from the network and from own production (hybrid) | | | **3** | **3** |
| **I don't know** | **2** | | | **2** |
| my home is connected to the electricity network (on-grid) | 2 | | | 2 |
| **Grand Total** | **17** | **4** | **10** | **31** |

| Count of 14. What do you know about the country/region/local-wide strategy related to green energy/climate protection in your home area? | Column Labels | | | | |
|---|---|---|---|---|---|
| Row Labels | Asia | Central and East Europe | North America | West Europe | Grand Total |
| a clear strategy exists in my area | 1 | 2 | 1 | 5 | 9 |
| a green energy strategy is not needed | | | | 1 | 1 |
| I didn't hear about a strategy | | 15 | | 4 | 19 |
| I don't know | | 1 | | 1 | 2 |
| **Grand Total** | **1** | **18** | **1** | **11** | **31** |

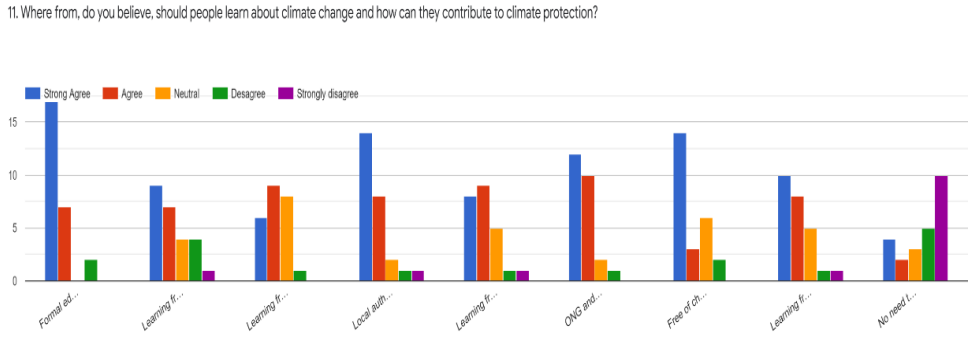


*Source:* Graph produced with Excel based on the answers of the participants.

(3) If there is a defined strategy at the central/local level, then residents will try to follow it.

Validated hypothesis just in case the strategy is properly communicated. This is visible in the answers the participants were giving to the question where people should the people learn about climate change and protection (Figure 5). Traditional education systems, local authorities, and free of charge learning platforms are in top as strong agreement. Interesting is the information that people are not expecting climate protection to be legally enforced, and even more clear is the importance the people are giving to non-profit organizations and universities (24 answers having strong and agree selected).

**Figure 5. Learning sources related climate change and protection**





*Source:* Graph produced with Google Forms (not editable).

**Figure 6. Legend in the order of appearance (from left to right)**

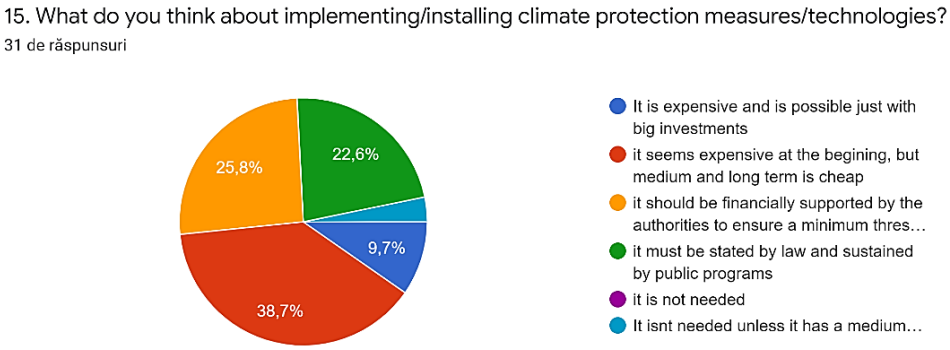
**1. Formal education (School, University, etc) (I.)**
2. Learning from the job (mandatory trainings to be delivered by employers)
3. Learning from our kids after they learn it in the school (reverse mentoring)
**4. Local authorities informing programs (II.)**
5.Learning from programs of big companies (free of charge)
**6. ONG and Universities Informing programs (teaching, training, storytelling, discussion, and directed research)**
**7. Free of charge learning platforms (III.)**
8.Learning from architects, constructors, plumbers and other professions crucial to climate protection
**9.No need to learn about it. Climate protection should be legally enforced**

*Source:* Graph produced with Excel based on the answers of the participants.

In Figure 7 we observe that 38,7% of the final consumers are aware of the advantages of sustainable energy, 25,8% see the important role of the financial help from the authorities, and there is a 22,6% regulation need when it comes to installation of sustainable technologies.

It can be concluded that the final customer expects a certain control of installed technologies so that people do not buy inefficient solutions, even though they are green because this would be a costly and inefficient investment for all parties in the medium and long term. The same conclusion comes from related incentives which the people are interested to obtain (depending on the defined strategy).

**Figure 7. Climate protection technologies**




*Source:* Graph produced with Google Forms (not editable).

## 6. Conclusions

Communication should be appropriate and tailored to each type of consumer, and there should be programmes that are better presented and aligned with local, regional, or country strategies. It is not enough to educate people and communicate them the strategy if there is no visibility of what it brings for them. Important is to target people who have an impact on carbon emissions (it will not be the same to talk about electricity savings with the shepherd who uses a lamp or with an end-consumer having a fully digitised house).

The return on investment, the advantages, and disadvantages of switching to sustainable energy, but especially the consequences of not doing so, should be presented to people, especially those who have the financial resources to decide to make investments in sustainable energy.

It does not matter the level of training, the area/region, the level of salary of the final consumer, the important thing is that everyone can participate according to their power, eventually on a voluntary basis for the ones with reduced revenues.

Important is to give the people the instruments to measure their carbon footprint, to have the platforms to monitor and compare their results with similar end-consumers in the same or different regions, and to teach/educate them to use all these tools.

It must add value to the life of the final consumer. To have accurate and complete information on all aspects involved (activities to be done, professionals and regulation authorities that can be contacted, advantages, and disadvantages of switching to sustainable energy, the impacts and savings produced, and positive and negative consequences).

Universities and non-profit organizations are expected to play a big role in this information and communication process.

## References

[1] Covey, S. (1989). *The seven habits of highly effective people*. New York: Simon and Schuster.

[2] Gallardo, I., Veronica, M. (2017). *People's understandings, perceptions of, and emotions towards climate change.* p 162, Doctor of Philosophy (PhD) thesis, University of Kent, https://kar.kent.ac.uk/66946/, consulted on 30.01.2022.

[3] Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22 (1998); 2303 U.N.T.S. 148; U.N. Doc FCCC/CP/1997/7/Add.1, https://unfccc.int/resource/docs/convkp/kpeng.pdf.

[4] McLeod, S. (2018). Maslow's Hierarchy of Needs, p. 8, https://canadacollege.edu/dreamers/docs/Maslows-Hierarchy-of-Needs.pdf.

[5] Ntona, E., Arabatzis, G., Kyriakopoulos, G.L. (2015). Energy saving: Views and attitudes of students in secondary education, *Renewable and Sustainable Energy Reviews*, 46, pp. 1-15, ISSN 1364-0321, https://doi.org/10.1016/j.rser.2015.02.033, https://www.sciencedirect.com/science/article/pii/S1364032115001215.

[6] Pelau, C., Pop, N.Al. (2018). *Implications for the energy policy derived from the relation between the cultural dimensions of Hofstede's model and the consumption of renewable energies*, Energy Policy, 2018, pp.160-168, ISSN 0301-4215, https://doi.org/10.1016/j.enpol.2018.03.042.

[7] Rood, R.B. (Ricky) (2022). Article: *Knowledge isn't only power*, 20.05.2022, https://michigantoday.umich.edu/2022/05/20/knowledge-isnt-only-power/.

[8] Sidiropoulos, E. (2014). *Education for sustainability in business education programs: a question of value, Journal of Cleaner Production*, Vol. 85, pp. 472-487, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2013.10.040.

[9] Tantau, A., Puskás-Tompos, A., Stanciu, C., Fratila, L., Curmei, C. (2021). Key Factors Which Contribute to the Participation of Consumers in Demand Response Programs and Enable the Proliferation of Renewable Energy Sources. *Energies*, 14, p. 8273, doi: 10.3390/en14248273.

[10] United Nations Climate Change, *The Paris Agreement* (2015), https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

[11] Walsh, P.R. (2011). Creating a "values" chain for sustainable development in developing nations: where Maslow meets Porter. *Environ Dev Sustain*, 13, p. 789, https://doi.org/ 10.1007/s10668-011-9291-y.