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## Article

# Sustainable universities, from indifference to joint action: A panel data analysis

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**SUSTAINABLE UNIVERSITIES, FROM INDIFFERENCE TO JOINT ACTION –  
A PANEL DATA ANALYSIS**

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**Abstract**

The implementation of the sustainable development concept within academic environments is one of the top priorities of the national and international academic management. The aim of the article was the analysis of the weights of the five Universitas Indonesia GreenMetric criteria used to assess the academic sustainability level, which determine the final ranking score. The initial observance period was ten years but since the individual criteria weights were not included in the 2010-2013 reports, the analysis period was reduced to six years. The sample encompassed universities from Europe. This choice was determined by the fact that the highest ranked universities in the rankings used for the research were European universities. The selection included 58 universities from 18 countries. The data was processed through the Eviews software using the Ordinary Least Square method, with corrections for the fixed effects panel data. The results of the research confirm that the strength of the connection between the five criteria for assessing sustainability at the university level and the total score of hierarchy of sustainable universities is very high. The purpose of this paper is finding conclusions concerning the probability, for some universities included in this ranking system, of gradually adjusting their sustainability level through the most susceptible indicators by the human factor.

**Keywords:** sustainable university, evaluation criteria, ranking, score, regression equation, sustainability policy

**JEL Classification:** C23, I23, O18, Q57

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## Introduction

The transition to a sustainable environment where the sustainable practices are respected and applied can only be done through the human factor (individuals) intervention, which has to become a transforming stimulus for sustainability. "Individuals need knowledge, skills, values and attitudes to motivate them in order to contribute to the sustainable development", according to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2017). Individuals can only acquire these skills and competences (Rauch & Steiner, 2013) through appropriate education. "Education is therefore vital for sustainable development and its most important role is determining the learners to make informed decisions and act responsibly for the integrity of the environment, economic viability and a safe society for the current and future generations" (UNESCO, 2014c).

The in-depth analysis of sustainable practices in academia (Barth, 2015) suggests that the progress made from year to year by many universities around the world is insufficient to achieve a sustainable lifestyle.

According to the Talloires Declaration, "the universities educate the individuals most responsible for the development and organization of social institutions. Therefore, they have a vast duty to raise awareness, to be acquainted with the technologies and instruments required for the conception of a sustainable future." The Talloires Declaration is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research and public dissemination in universities and colleges. More than 350 university and college presidents from over 40 countries signed the declaration. They all committed to take the following actions: "Raising awareness of the need for sustainable development for the environment, creating an institutional culture of sustainability, providing education for responsible citizenship, promoting environmental literacy for all, practicing institutional ecology, involving all stakeholders, collaborating on interdisciplinary approaches, improving primary and secondary schools' capacities, extended service and national and international dissemination, support the movement." Only a sustainable university can appropriately shape the superior education and advanced research in sustainability and create sustainable leaders (Grecu, 2017) and social partnerships to meet the new sustainability challenges with first-class solutions (Andronie, et al., 2019). The universities' sustainability policies must encourage the environmentalism by promoting a vast sustainability agenda and good practices by the university management (Olaru, et al., 2011), reducing the environmental impact from the carbon footprint reduction to the efficient and effective administration of the natural resources.

A ranking of sustainable universities (UI GreenMetric World University Ranking) exists since 2010 (95 participants), produced by the University of Indonesia (UI) with help from various experts in educational policies, webometrics etc. In 2019, 780 universities from 83 countries participated to this ranking. Moreover, in the same year, eight Romanian universities were among the participants: The University of Medicine, Pharmacy, Science and Technology "George Emil Palade" of Târgu Mures – ranked 35<sup>th</sup> in European ranking, The Babes Bolyai University – ranked 111<sup>th</sup>, Politehnica University of Bucharest – ranked 132<sup>nd</sup>, Valahia University of Targoviste – ranked 135<sup>th</sup>, The University of Oradea – 156<sup>th</sup>, The University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca – 162<sup>nd</sup>, West University of Timisoara – 178<sup>th</sup>, The University of Galati – 218<sup>th</sup>. The criteria for the worldwide Universitas Indonesia GreenMetric ranking (UI GreenMetric), from its initiation in 2010 until 2019 are positioning and infrastructure, energy and climate change, water, transport, education and research. The total sustainability score was therefore granted based on these five criteria, with a coefficient of importance being assigned to each.

This paper confirms, through correlation and regression analysis, the strong correlation between the five sustainability criteria at university level and the total ranking score. The result was expectable since the University of Indonesia's model is accredited. Moreover, the regression coefficients levels are strongly correlated with the weights attributed to each of the five criteria by the authors of the UI GreenMetric model.

In their analysis, the authors answered the question raised within the paper's title and content: Is it possible for a university, which does not thoroughly fit in the concept of academic campus, to be included in the worldwide UI GreenMetric ranking? Moreover, is there any possibility of improving the sustainability score year over year, through the collective effort of the academic community, even under the assumption that some indicators of the "Positioning and infrastructure" criterion cannot further be significantly influenced? The research validates an affirmative response to the above questions.

The importance of the paper consists in providing proof, through correlation and regression analysis, that any endeavour undertaken by a university to improve the indicators of any sustainable development criteria contributes to the improvement of the UI GreenMetric score and ranking.

The paper comprises (Dinu, et al., 2017) four sections: the literature review, research methodology, analysis of the results and conclusions. Through this paper, the authors have estimated the influence that each of the five sustainability criteria at academic level exerts on the final ranking score.

## **1. Literature review**

The concept of sustainability was largely brought to the public attention in 1992, after the Rio de Janeiro Conference, organized by the United Nations, five years after the term was first mentioned in the "Our common future" report, issued by the World Commission on Environment and Development (WCED), also known as the Brundland Report (1987). Sustainable development was then defined as "development that seeks to meet the needs of the present, without compromising the possibility of future generations to meet their own needs." The sustainable university concept was born in 1990 when the president of the Tufts University of Boston, Jean Mayer, summoned 22 rectors in Talloires, France. At the gathering, the academics created and signed the Talloires Declaration, which includes 10 major points to be followed by responsible universities worldwide. Furthermore, the assembly identified a series of important actions, which universities had to support and promote for a transition to a sustainable society. The responsibility of higher education rests upon universities, which will train individuals to apply the sustainable practices in all fields.

The sustainable university is defined as "a higher education institution, as a whole or as a part, which addresses, implies and promotes, at regional or global level, the minimization of the negative effects on the environment, economy, society and health generated by the use of resources to fulfil its functions of teaching, research, partnership and administration in order to help society make the transition to sustainable lifestyles." (Velazquez, et al., 2006).

The academic institution must offer support to the students in their efforts to understand the motives for the degradation of the natural environment, natural resources depletion (Vadineanu, et al., 1999), increasing disparity between needs and resources etc., by adapting the curriculum to the requirements of sustainability (Godemann, 2006). As a

consequence, new disciplines would be created, such as: Environmental Economics, Nature Philosophy, Sustainable Agriculture, Environmental Knowledge, Renewable Energy Efficiency, Sustainable Academic Management etc.

Bockermann, Meyer, Omann and Spangenberg (2004) had concerns about sustainability modelling. "Modelling the results demonstrates that not a single measure is sufficient to reach such a solution, but that an intelligent combination of policy measures from different fields like economic, environmental, social and demographic policies is needed to achieve the transition to sustainable development."

The sustainable university model (Grecu and Ipiña, 2015) proposes three different approaches to a sustainable university. From an "internal approach, the focus is on the campus and the campus family; the community and the wider world are highlighted in the external approach, while the academic approach highlights the knowledge, skills, competencies and values that students acquire during their university life."

Mohammadalizadehkorde and Weaver (2018) were concerned about the topic "Universities as models of sustainability. Energy-consuming communities? Review of the selected literature". The authors of the article claim that "the sustainability and use of energy in higher education is largely correlated with environmental protection and is the responsibility of all stakeholders of the university, as members of society."

Universities can be considered "small cities" (Alshuwaikhat and Abubakar, 2008) because of the large number of people and complex activities that take place on campuses. Some campus activities generate serious direct and indirect environmental effects. The authors propose a framework for achieving campus sustainability, by integrating three strategies, namely: University Environmental Management System (EMS); public participation and social responsibility; promoting the concept of sustainability in teaching and research.

Castro and Jabbour's research verified the adherence of the sustainable activities of an Indian university to the variables recommended by Alshuwaikhat and Abubakar, in 2008. The authors concluded that there are still many opportunities for the analyzed universities to become more sustainable (Castro and Jabbour, 2013).

The theories and practices involved in developing a sustainable university in a systemic and institutional fashion are critically reviewed in the book "Sustainable University: Progress and Prospects". The paper (Sterling, et al., 2013) outlines not only the new directions and lines of research, but also offers practical advice for researchers, students and professionals in the fields of management, leadership, organizational change, strategy and curriculum development.

In the specialty literature, the effect of economic freedom on sustainable development has been studied (Mushtaq and Khan, 2018) starting from the sustainable development index, which was built for 58 countries with 39 variables, classified in economic, social and environmental dimensions, using the OLS panel, fixed effect and first difference. The method was applied for the period 2000-2015, and the results indicate that economic freedom has a positive impact on sustainable development. The research hypothesis starts from the authors' interest to analyze and determine the influence that the five criteria for evaluating the degree of sustainability at the university level exert on the final score of the GreenMetric UI ranking.

In conclusion, the responsibility of advanced scientific research in the field of the environment belongs to universities (Grecu, 2012), which through strategic projects and partnerships will ensure the transfer and implementation of new innovative discoveries in the real life, thus contributing to the construction of a sustainable society (Michelsen, 2015). All these rapid changes will put universities in the situation of rethinking their mission and vision in the short (Lukman and Glavic, 2007), medium and long-terms, knowing that universities around the world must provide learners, beside quality education, a good example regarding the implementation of the concept of sustainable development. "Providing a good example is not the main method of influencing others, but it is the only method" (Albert Einstein).

## **2. Research Methodology**

### **2.1. Description of the research approach**

The research plan was based on the interest of the authors of the article to analyse the intensity of influence that the five criteria for evaluating the degree of sustainability at university level, included in the GreenMetric UI system, exert on the final score of the ranking. The purpose of such an approach is to draw conclusions about the chance that some universities participating in this classification system will improve over time the degree of sustainability based on those indicators whose size can be significantly influenced by the human factor.

The idea of the research was triggered by the fact that, during our analysis of the multiannual ranking evolution within the GreenMetric UI system, we found some indicators related to the geographical positioning of the university campus (for example, the ratio between the surface of the open space and the total surface, the area of campus covered by forest, the area of campus covered with planted vegetation, etc.) for some institutions that can no longer be modified above a certain existing level, so the representativeness in the world competition will have to belong to the indicators generated by action and by the awareness of the need to create a sustainable society for the next generations.

The authors intend to continue the present approach within a research that will provide the necessary context to develop the awareness of the young students of the Academy of Economic Studies in Bucharest in the spirit of education and sustainable economy. The idea of the research also started from the fact that the Academy of Economic Studies does not respect the classic concept of university campus, which includes in the same area, constructions and facilities for education, research, housing, leisure etc.

In this context, the paper will answer the following questions:

- To what extent the Academy of Economic Studies can successfully participate in the World Ranking of the GreenMetric UI Universities?

- Could, in time, the institutional score change significantly in a favourable sense by promoting the principles of sustainability among the students?

The structural content of the sustainability assessment indicators at global level, as provided by the GreenMetric UI, is shown in table no. 1.

**Table no.1: Indicators for assessing the degree of sustainability at the university level**

|                                |   |
|--------------------------------|---|
| Positioning and infrastructure | The ratio between the surface of the open space and the total surface; The area of the campus covered with forest; The campus area covered with planted vegetation; The area of the campus for water absorption; The total area of the open space, divided by the total population of the campus; University budget allocated to sustainability.  |
| Energy and climate change      | Use of energy efficient appliances that replace conventional appliances; Smart Building implementation; Number of renewable energy sources on campus; Total electricity consumption in relation to the total campus population (kWh / person); The relationship between the renewable energy produced and the energy consumption; Elements for the implementation of green buildings, as reflected in the global construction and renovation policy; Greenhouse gas emission reduction program; The ratio between the total carbon footprint and the campus population. |
| Water                          | Implementation of the water conservation program; Implementation of the water recycling program; Use of water efficient appliances (water tap, washing toilet, etc.); Treatment of consumed water.  |
| Transport                      | The ratio of total vehicles (cars and motorcycles) to the total population on campus; Transfer service; Zero Emission Vehicles (ZEV) policy on campus; Proportion of zero emission vehicles (ZEV) divided by the total population on campus; The ratio between the parking area and the total campus area; Transportation program designed to limit or reduce the parking area on campus during the last 3 years; Number of transportation initiatives to reduce private vehicles on campus; The pedestrian road policy on campus.                                      |
| Education and research         | The ratio between the sustainability courses and the total of the courses / subjects; The relationship between sustainable research funding and total research funding; Number of academic publications on environment and sustainability published; Number of academic events related to environment and sustainability; Number of student organizations related to the environment and sustainability; Existence of a sustainability website run by the university; Existence of the published sustainability report.   |

*Source: UI Green Metric – World University Rankings 2019*

Starting from the hypothesis presented as a starting point in the scientific approach, at the end of the research some conclusions will be drawn, possible steps in the elaboration of a project focused on increasing the role of the young student in creating a sustainable university.

**2.2. OLS method analysis**

By analysing the UI GreenMetric classification criteria, the authors of the article came to the conclusion that the size of some indicators can be influenced more over time by certain circumstantial factors compared to the size of others, so there is the possibility that the OLS analysis will answer the question regarding the inclusion of the Academy of Economic Studies in Bucharest in the GreenMetric UI ranking and furthermore, that over time, the score of the sustainable universities will increase?

In order to obtain a regression equation, all the data included in the "World ranking of universities in the GreenMetric UI system" was initially collected, from the establishment of the classification system by the University of Indonesia (IU) in 2010 to 2019. The total score was established on the basis of the five criteria presented in the previous table: Positioning and infrastructure, Energy and climate change, Water, Transport, Education and research. Although the initial analysis period concerned 10 years, since in the period 2010-2013 the GreenMetric UI reports did not include the individual weights of the five criteria involved in the score calculation, the analysis period was restricted to six years, in order to make the available data volume relevant and homogenous from an informational point of view. The selected sample comprised the universities in Europe that opted to participate in the GreenMetric UI, from the total participating higher education institutions. The reason for the choice was determined by the fact that the top ranked universities in the rankings are European universities (Wageningen University & Research – Netherlands, University of Oxford – United Kingdom, University of California Davis – USA, University of Nottingham – United Kingdom, Nottingham Trent University – United Kingdom UK, UMWELT – Birkenfeld Campus – Germany, Leiden University – Netherlands, University of Groningen – Netherlands, University College Cork – Ireland, Bangor University – United Kingdom). 9 out of 10 top universities are from Europe. Moreover, since the sample must contain homogeneous and representative data over time, the authors have eliminated from the list the universities which were not included in the ranking for six consecutive years, respectively the period 2014-2019. The final sample tested with the OLS method included 58 universities from the following European states: Denmark, Finland, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, United Kingdom, Czech Republic, Romania, Russia, Slovenia, Spain, Turkey, Ukraine, Hungary. The universities were arranged alphabetically. The distribution of these universities, according to their countries of origin, is as follows (table no. 2):

**Table no. 2: Distribution of universities by country of origin**

| <b>Country</b> | <b>No.</b> | <b>Country</b> | <b>No.</b> | <b>Country</b> | <b>No.</b> |
|----------------|------------|----------------|------------|----------------|------------|
| Denmark        | 1          | Lithuania      | 2          | Russia         | 4          |
| Finland        | 2          | Netherlands    | 2          | Slovenia       | 1          |
| Germany        | 2          | Poland         | 1          | Spain          | 17         |
| Greece         | 3          | United Kingdom | 6          | Turkey         | 2          |
| Ireland        | 3          | Czech Republic | 1          | Ukraine        | 1          |
| Italy          | 5          | Romania        | 3          | Hungary        | 2          |



For the application of the OLS method, the following elements were taken into account (table no. 3):

**Table no. 3: The variables used in applying the OLS method**

| Numerical variables                     | Abbreviations          |
|---|------------------------|
| Total score of sustainable universities | SUSTAINABILITY_SCORE   |
| Positioning and infrastructure          | SETTING_INFRASTRUCTURE |
| Energy and climate change               | ENERGY_CLIMATE_CHANGE  |
| The water                               | WATER_USAGE            |
| Transport                               | TRANSPORATION          |
| Education and research                  | EDUCATION_RESEARCH     |

The OLS method studies how a dependent variable evolves according to the variation of one or more independent variables. The regression equation is expressed as follows:

$$y = a_0 + a_1 x_1 + a_2 x_2 + \dots + a_n x_n, \quad (1)$$

where:

$y$  – the dependent variable (the result);

$a_0$  – the free coefficient of the equation;

$a_1, a_2, \dots, a_n$  – the regression coefficients, which express the average modification of the endogenous characteristic  $y$  caused by the modification of the exogenous characteristic  $x_i$  with one unit, provided that the influence of the other factors in the mathematical model is taken into account and fixed at the average level;

$x_1, x_2, \dots, x_n$  – independent variables that influence the result.

When developing the multifactorial model, in order to determine the influence of the factors when modifying the resultant indicator, the following endogenous characteristic was examined:

$y$  – Total score of sustainable universities.

The model included the factors that have a significant influence on the total score of the sustainable universities, namely:

$x_1$  – Positioning and infrastructure;

$x_2$  – Energy and climate change;

$x_3$  – Water;

$x_4$  – Transport;

$x_5$  – Education and research.

In order to measure the intensity of the relationship between the dependent variable and the independent variables considered and to test the significance, the Pearson correlation coefficients were calculated, using the Eviews program (figure no. 1).

| CORRELATION            |                      |                        |                       |             |                |                    |
|------------------------|----------------------|------------------------|-----------------------|-------------|----------------|--------------------|
|                        | SUSTAINABILITY_SCORE | SETTING_INFRASTRUCTURE | ENERGY_CLIMATE_CHANGE | WATER_USAGE | TRANSPORTATION | EDUCATION_RESEARCH |
| SUSTAINABILITY_SCORE   | 1                    | 0.548717               | 0.820177              | 0.721862    | 0.81796        | 0.697341           |
| SETTING_INFRASTRUCTURE | 0.548717             | 1                      | 0.293337              | 0.195177    | 0.3813         | 0.476568           |
| ENERGY_CLIMATE_CHANGE  | 0.820177             | 0.293337               | 1                     | 0.670236    | 0.640389       | 0.433464           |
| WATER_USAGE            | 0.721862             | 0.195177               | 0.670236              | 1           | 0.553282       | 0.203554           |
| TRANSPORTATION         | 0.81796              | 0.3813                 | 0.640389              | 0.553282    | 1              | 0.502645           |
| EDUCATION_RESEARCH     | 0.697341             | 0.476568               | 0.433464              | 0.203554    | 0.502645       | 1                  |

Figure no. 1: Pearson correlation coefficients

Source: Developed by the authors in the Eviews program

Pearson correlation coefficients (figure no. 1) show a positive connection between the dependent variable and the independent variables used in applying the OLS method with different intensities (from large to very large). We can thus consider that the use of these independent variables is significant for the multifactorial model.

### 3. Analysis of research results

To determine the regression equation, the collected data was processed using the Eviews program, using the Ordinary Least Square (OLS) analysis method, with corrections for the fixed effects of panel data. The first step in developing a panel is to determine if the regression is a regular regression or is a panel type model. For this purpose, we use the Redundant Fixed Effects test (figure no.2). The probabilities associated with the two tests evaluating the common significance of cross-section effects (Cross-section F and Cross-section Chi-square) are 0.0000, which suggests that a null hypothesis that individual effects are redundant should be rejected, which means it is acceptable to include individual effects.

| Effects Test             | Statistic  | d.f.     | Prob.  |
|--------------------------|------------|----------|--------|
| Cross-section F          | 9.408130   | (57,280) | 0.0000 |
| Cross-section Chi-square | 372.341727 | 57       | 0.0000 |

Figure no. 2: The Redundant Fixed Effects test

Source: Developed by the authors in the Eviews program

The next step is to decide between fixed and random effects. In this respect, the Hausman test is used. Performing this test (figure no. 3) shows a probability associated with the chi-square test which is less than 0.05 (0.000). Therefore, the null hypothesis, according to which the random effects model is preferred over the fixed effects alternative, is rejected, which means that applying the OLS method with corrections for the fixed effects of panel data, is the most appropriate.

EViews - [Equation: UNTITLED Workfile: MODEL\_1::Pt\_views\]

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View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Correlated Random Effects - Hausman Test  
Equation: Untitled  
Test cross-section random effects

| Test Summary         | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 64.926124         | 5            | 0.0000 |

Cross-section random effects test comparisons:

| Variable                | Fixed    | Random   | Var(Diff.) | Prob.  |
|-------------------------|----------|----------|------------|--------|
| SETTING_INFRASTRUCTU... | 0.911425 | 0.927500 | 0.000604   | 0.5129 |
| ENERGY_CLIMATE_CHANGE   | 0.877309 | 0.931636 | 0.000356   | 0.0040 |
| WATER_USAGE             | 1.218603 | 1.403122 | 0.000864   | 0.0000 |
| TRANSPORTATION          | 1.151544 | 1.155895 | 0.000247   | 0.7818 |
| EDUCATION_RESEARCH      | 0.887502 | 0.940731 | 0.000198   | 0.0002 |

**Figure no. 3: The Hausman test**

*Source: Developed by the authors in the Eviews program*

Figure no. 4 presents the regression results.

EViews - [Equation: UNTITLED Workfile: MODEL\_1::Pt\_views\]

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Dependent Variable: SUSTAINABILITY\_SCORE  
Method: Panel Least Squares  
Date: 12/23/19 Time: 22:34  
Sample: 2014 2019  
Periods included: 6  
Cross-sections included: 58  
Total panel (balanced) observations: 348

| Variable                | Coefficient | Std. Error | t-Statistic | Prob.  |
|-------------------------|-------------|------------|-------------|--------|
| C                       | 1336.447    | 67.06774   | 19.92682    | 0.0000 |
| SETTING_INFRASTRUCTU... | 0.911425    | 0.064918   | 14.03958    | 0.0000 |
| ENERGY_CLIMATE_CHANGE   | 0.877309    | 0.057289   | 15.31375    | 0.0000 |
| WATER_USAGE             | 1.218603    | 0.078052   | 15.61270    | 0.0000 |
| TRANSPORTATION          | 1.151544    | 0.055771   | 20.64770    | 0.0000 |
| EDUCATION_RESEARCH      | 0.887502    | 0.042129   | 21.06627    | 0.0000 |

| Effects Specification                 |           |                       |          |
|---------------------------------------|-----------|-----------------------|----------|
| Cross-section fixed (dummy variables) |           |                       |          |
| R-squared                             | 0.986561  | Mean dependent var    | 5514.888 |
| Adjusted R-squared                    | 0.983637  | S.D. dependent var    | 1487.054 |
| S.E. of regression                    | 190.2192  | Akaike info criterion | 13.49659 |
| Sum squared resid                     | 10312257  | Schwarz criterion     | 14.19397 |
| Log likelihood                        | -2285.406 | Hannan-Quinn criter.  | 13.77423 |
| F-statistic                           | 337.4477  | Durbin-Watson stat    | 1.570117 |
| Prob(F-statistic)                     | 0.000000  |                       |          |

**Figure no. 4: Panel Least Squares method**

Source: Developed by the authors in the Eviews program

It can be observed that the R-squared is 98%, which means a very high correlation between the total score of the sustainable universities and the independent variables included in the model, while the p-value is less than 0.05 which confirms that the independent variables are statistically significant. The regression equation resulting from applying the OLS method, with corrections for the fixed effects of the panel data, has the following form:

Estimation Command:

```

=====
LS(CX=F) SUSTAINABILITY_SCORE C SETTING_INFRASTRUCTURE
ENERGY_CLIMATE_CHANGE WATER_USAGE TRANSPORTATION
EDUCATION_RESEARCH
    
```

Estimation Equation:

```

=====
SUSTAINABILITY_SCORE = C(1) + C(2)*SETTING_INFRASTRUCTURE +
C(3)*ENERGY_CLIMATE_CHANGE + C(4)*WATER_USAGE +
C(5)*TRANSPORTATION + C(6)*EDUCATION_RESEARCH + [CX=F]
    
```

Substituted Coefficients:

```

=====
SUSTAINABILITY_SCORE = 1336.44663791 +
0.911425252261*SETTING_INFRASTRUCTURE +
0.87730865281*ENERGY_CLIMATE_CHANGE + 1.21860327556*WATER_USAGE +
1.15154394729*TRANSPORTATION + 0.887501586294*EDUCATION_RESEARCH +
[CX=F]
    
```

**Figure no. 5: The regression equation**

Source: Developed by the authors in the Eviews program

The regression coefficients from the obtained equation (figure no. 5) show us an increase of the total Score of the sustainable universities with:

- 0.911425 points when the Positioning and Infrastructure evaluation criterion increases by one unit;
- 0.877309 points when the Energy and Climate Change evaluation criterion increases by one unit;
- 1.218603 points when the Water evaluation criterion increases by one unit;
- 1.151544 points when the Transport evaluation criterion increases by one unit;
- 0.887502 points when the Education and Research evaluation criterion increases by one unit.

Therefore, the Water evaluation criterion has the greatest influence on the total score of sustainable universities followed by Transport, Positioning and Infrastructure, Education and research and Energy and climate change.

### Conclusions

Starting from the hypothesis of the scientific approach, the authors can draw some conclusions, more specifically some possible steps in the elaboration of a project focused on increasing the role of the young student in creating a sustainable university.

The Water evaluation criterion has the greatest influence on the total score of sustainable universities. The structural content of this global sustainability assessment indicator, as stipulated by the GreenMetric UI, is as follows: implementation of the water conservation program, implementation of the water recycling program, use of efficient water appliances (water tap, washing the toilet etc.) and the treatment of the consumed water. The regression coefficient shows an increase of the total score of the sustainable universities by 1.218603 points, when the Water evaluation criterion increases by one unit.

The second evaluation criterion, by the correlation with the Total Score is the Transport evaluation criterion whose structural content is: the ratio between the total vehicles (cars and motorcycles) and the total population on campus, the transfer service, the Zero Vehicle Emissions (ZEV) policy in campus, the proportion of vehicles with zero emissions (ZEV) divided by the total population of the campus, the ratio between the parking area and the total area of the campus, transportation program meant to limit or reduce the parking area of the campus in the last 3 years, number of initiatives to reduce private vehicles on campus. The regression coefficient shows an increase of the total score of the sustainable universities by 1.151544 points, when the Transport evaluation criterion increases by a unit.

Positioning and infrastructure is the third criterion after establishing the correlation with the Total Score. Actions promoted in this regard should concern: the ratio between the area of the open space and the total area, the area of the campus covered with forest, the area of the campus covered with planted vegetation, the area of the campus for water absorption, the total area of the open space, divided by the total population of the campus, the university budget allocated to sustainability. The total score of sustainable universities shows an increase of 0.911425 points, when the Positioning and Infrastructure evaluation criterion increases by one unit.

The evaluation criterion on the fourth position is Education and research, and the measures taken must cover the following issues: the ratio between sustainability courses and the total of courses / disciplines, the ratio between the financing of sustainable research and the total funding of research, the number of academic publications on the environment and sustainability published, number of academic events related to environment and sustainability, number of student organizations related to environment and sustainability, existence of a sustainability website administered by the university, existence of the published sustainability report. The regression coefficient shows an increase of the total score of the sustainable universities by 0.887502 points, when the Education and research evaluation criterion increases by one unit.

The last evaluation criterion, close in value to the previous one, is Energy and climate change. The regression coefficient shows an increase of the total score of the sustainable universities by 0.877309 points, when the Energy and climate change evaluation criterion increases by one unit. The effort of the university that tends to become sustainable must be channelled towards: the use of energy efficient appliances that replace conventional appliances, the implementation of smart buildings, the number of renewable energy sources on campus, the total electricity consumption relative to the total campus population (kwh / person), the ratio between the renewable energy produced and the energy consumption, elements of implementation of the ecological buildings as reflected in the global policy of construction and renovation, the program for greenhouse gases emissions reduction, the ratio between the total footprint of carbon and the campus population.

For the authors, this paper is the starting point in the elaboration of a research project whose theme will refer to the main course of action that the Academy of Economic Studies of Bucharest will have to follow in order to improve certain categories of indicators specific to sustainable development in a way that, within a certain time horizon, it becomes a sustainable university integrated into the GreenMetric UI ranking, with a growing sustainability score. We propose:

- introducing and promoting the concept of "green building" by planting trees and green plants on the roofs of the university buildings located in the areas with maximum pollution, by preserving the buildings and respecting the European ecological standards;
- establishing a budget for sustainable development;
- acquiring special winter heating equipment, provided with a thermostat that limits the temperature to 23-25 degrees Celsius in the classrooms, in accordance with global policies to reduce global warming by overheating living spaces;
- publication of a sustainability report of the Bucharest University of Economic Studies, etc.

Using the example of universities with experience in the field of sustainability in adopting viable measures, it is desirable for each higher education institution to design and adopt sustainable development programs by working with local and governmental authorities.

The classification of a higher education institution in the category of sustainable universities is conditioned by initiative, organization, convergence in ideas and action, discipline and consistency in the achievement of sustainability indicators. As H.E. Luccock, "No one can whistle a symphony. It takes an orchestra to sing it."

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