
Key measures in ensuring sustainable development in European higher education: recommendations for Romania

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Abstract

The aims of this paper are (1) to identify the European countries where the higher education area best fits the sustainable development concept, (2) to investigate the key measures that have proven to be efficient in these countries and finally (3) to formulate some policy recommendations that can lead to a sustainable development in higher education in Romania. Thus, this paper analyses the European higher education area in the context of sustainable development using a cluster analysis, taking into account variables which are consistent with the sustainable development concept and that cover a wide range of topics, such as: financing higher education, higher education attainment, gender inequality, social inclusion, higher education outcomes, environmental studies. It has been found that: (1) countries with the lowest unemployment and poverty rates are the most committed in supporting tertiary education: the highest tertiary educational attainment and financial aid to students as a percentage to the total public expenditure were observed in these countries; (2) the most relevant measures that have proven to be efficient in ensuring sustainability were both legislative as well as practical; (3) regarding Romania, some practical measures were proposed so that they best fit the country's sustainability needs. The results of this study may represent a valuable tool for policy makers in Romania, as they can learn, adapt best practices with regard to what has been accomplished in other European countries, and finally develop their own practices that can help Romania progress towards sustainable development through higher education.

Keywords: *higher education, sustainable development, cluster analysis*

JEL Classification: *I – Health, Education, and Welfare*

Introduction

In 1987 the concept of sustainable development was defined in the United Nations Report “Our common future” as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept

of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (United Nations 1987, p.37). As the report further emphasizes, the goals of economic and social development should be defined within the sustainability framework. At the same time, one of the areas of the Agenda 21 is reorienting education towards sustainable development. Chapter 36 of the Agenda 21 clearly states that "education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues"¹. As humanity is facing a range of global, social, economic, cultural and ecological changes which on the long term affect the survival of the human species, the Agenda 21 emphasizes that "it is critical to achieve environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development and for effective public participation in decision-making"².

Education and particularly higher education is mentioned in the World Summit Outcome as "a mean of poverty eradicating especially among women" (United Nations 2005, p.10). As the 2005-2014 is the Decade of Education for Sustainable Development³, an International Implementation Scheme was developed in 2006. The document outlines the characteristics of a high quality education for sustainable development (UNESCO 2006, p.5): "Interdisciplinary and holistic: learning for sustainable development embedded in the whole curriculum, not as a separate subject; Values-driven: sharing the values and principles underpinning sustainable development; Critical thinking and problem solving: leading to confidence in addressing the dilemmas and challenges of sustainable development; Multi-method: word, art, drama, debate, experience, different pedagogies for modelling processes; Participatory decision-making: learners participate in decisions on how they are to learn; Applicability: learning experiences are integrated in day to day personal and professional life; Locally relevant: addressing local as well as global issues, and using the language(s) which learners most commonly use".

Other international organizations have also committed themselves to sustainability in education, and particularly in higher education. Conceived in 1990 at an international conference in Talloires, France, the Talloires Declaration is the first official statement made by university administrators of a commitment to environmental sustainability in higher education.

1 <http://www.un-documents.net/a21-36.htm> accessed 5.05.2014

2 <http://www.un-documents.net/a21-36.htm> accessed 5.05.2014

3 <http://www.un-documents.net/a57r254.htm> accessed 1.05.2014

The Association of University Leaders for a Sustainable Future assured the secretariat of the declaration. The Talloire declaration is a ten points action plan towards sustainable development. The signatories commit themselves to¹: *“increase awareness of environmentally sustainable development, create an institutional culture of sustainability, educate for environmentally responsible citizenship, foster environmental literacy for all, practice institutional ecology, involve all stakeholders in interdisciplinary research and work with national and international organizations to promote a worldwide university effort toward a sustainable future”*.

The International Association of universities adopted the Kyoto Declaration on Sustainable Development in 1993. The association commits itself *“to urge universities world-wide to seek, establish and disseminate a clearer understanding of Sustainable Development”*². The association recommends the universities *“to promote sustainable consumption in its own campus, to encourage interdisciplinary research programs, to promote interdisciplinary expert networks, to promote the mobility of staff and students and to establish partnerships with other sectors of the society”*³.

The Association for the Advancement of Sustainability in Higher Education issued a call to action document following the Summit on Sustainability in the Curriculum held in San Diego in 2010. The paper highlights that *“integrating sustainability into the college and university is very challenging as unlike other issues related to sustainability curriculum change cannot be legislated”* (Association for the Advancement of Sustainability in Higher Education 2010, p.3).

In 2009 the presidents of the G8 universities attending the 2009 University Summit agreed that universities *“should foster sustainable and responsible development at a local as much as on a global level through new approaches within the educational and research system”* (G8 University Summit 2009, p.3).

A renewed commitment to sustainable practices in higher education was signed on the occasion of the United Nations Conference on Higher Education held between 20 and 22 June 2012, in Rio de Janeiro. The signatories engaged themselves *“to teach sustainable development concepts, encourage research on sustainable development issues, develop ecological campuses, and support sustainability efforts in the local communities, share results through international frameworks”* (United Nations 2012, p.44-45).

1 http://www.ulsf.org/programs_talloires_td.html accessed 1.05.2014

2 http://archive.www.iau-aiu.net/sd/sd_dkyoto.html accessed 5.05.2014

3 http://archive.www.iau-aiu.net/sd/sd_dkyoto.html accessed 5.05.2014

The first section of the paper describes the main documents concerning higher education in the sustainable development framework. The second section describes the methodology of the paper. In the third section the results of the research are presented.

Sustainable development in the European higher education

European Higher Education institutions recognized that universities should be oriented towards sustainable development since 1993 with the Copernicus University Charta. Signatories of the Charta engaged themselves *to incorporate an environmental perspective in all their work and encourage interdisciplinary, dissemination of knowledge, technology transfer and partnerships (Copernicus Alliance 1993, p.2).*

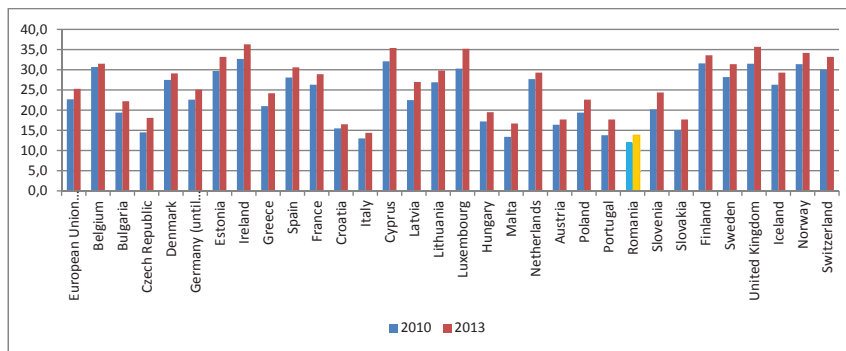
The European countries have further committed themselves to sustainable development with the adoption of the Europe 2020 Strategy. The strategy defines three priorities: *smart growth: (developing an economy based on knowledge and innovation); sustainable growth (promoting a more resource-efficient, greener and more competitive economy); inclusive growth (fostering a high-employment economy delivering social and territorial cohesion economy).* Also, the strategy proposes five targets for 2020: *75 % of the population aged 20-64 should be employed, 3% of the EU's GDP should be invested in R&D, the "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction, if the conditions are right), the share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree, 20 million less people should be at risk of poverty (European Commission 2010, p.3).*

Consistent with the Europe 2020 Strategy, The Rio +20 Treaty on Higher Education has been developed in 2012. The document underlines that higher education must transform itself in order to progress to sustainable development. Yet, *the transformation is a complex long term ambition and must be guided by vision and clarity of purpose; also, transformation requires fostering respect for and understanding different cultures, innovation and effective leadership (Copernicus Alliance 2012, p.3).*

As one can observe from figure 1, in all the European countries the population of 15-64 years old with tertiary education attainment as a percentage of the total 15-64 years old population has increased in 2013 compared to 2010. Romania is far below the average EU 27 and one with the lowest tertiary educational attainment.

Population 15-64 years old with tertiary education attainment as a percentage of the total 15-64 years old population

Figure 1



Source: Eurostat

Considering the social inclusion of women, analyzing the Eurostat data on tertiary education attainment among women and their poverty risk, the following could be concluded:

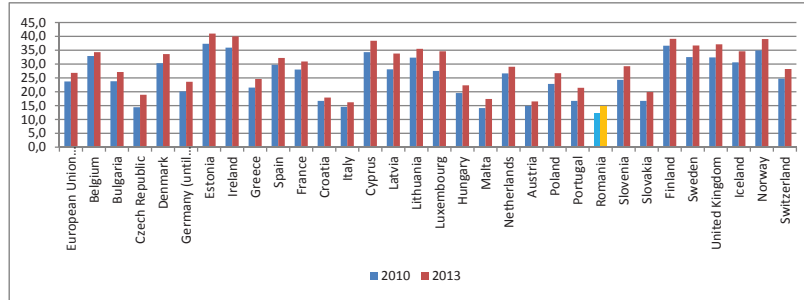
- the percentage of females with tertiary education has increased in all the European countries from 2010 to 2013, yet Romania is one of the countries with the lowest values for this indicator (figure 2);
- the female student population to the total student population remained approximately constant in most of the European countries, yet in Romania a slight decrease could be observed between 2010 and 2013 (figure 3);
- when analyzing *the poverty risk of tertiary educated females as percentage of all tertiary educated female one can observe that it is much lower than the poverty risk of females in general*; yet Romania is among the countries with the highest values in 2012 for both indicators; also, an increase of the poverty risk among tertiary educated females could be observed between 2010 and 2012 in this country (figures 4 and 5).

These trends are explained by the European policies concerning gender equality¹: equal treatment legislation; gender mainstreaming (integration of the gender perspective into all other policies); specific measures for the advancement of women.

1. <http://ec.europa.eu/justice/gender-equality/> accessed 18.08.2014, 10:22

Females with tertiary education attainment (percentage of all females)

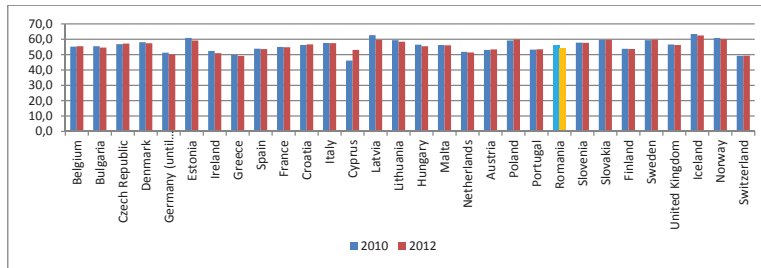
Figure 2



Source: Eurostat

Tertiary education participation – Women among students in ISCED 5-6 - as percentage of the total students at this level

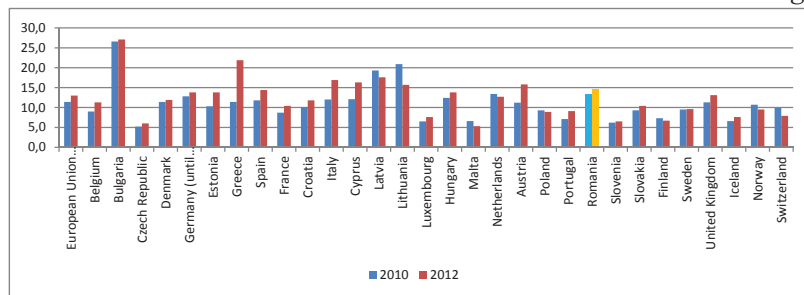
Figure 3



Source: Eurostat

People (18 years and over) at risk of poverty or social exclusion- tertiary education females as percentage of all tertiary education females

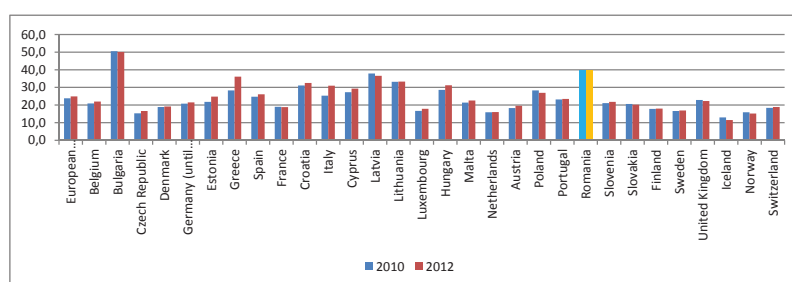
Figure 4



Source: Eurostat

People (18 years and over) at risk of poverty or social exclusion- females as percentage of all females,

Figure 5

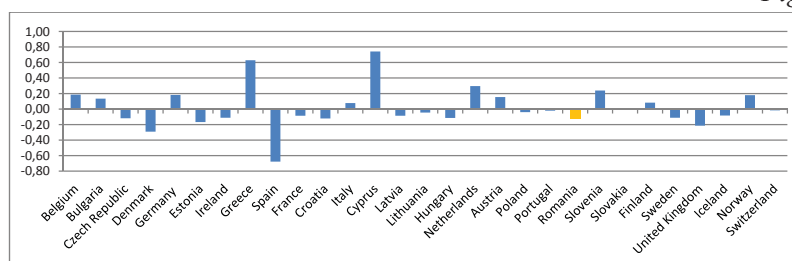


Source: Eurostat

In 2012 vs. 2010, in most of the European countries the number of tertiary students in environmental protection decreased (figure 6). In Romania, a slight decrease has been registered comparing to other European countries.

Figure 6: Tertiary students studying environmental protection percentage change 2012 comparing to 2010

Figure 6



Source: Eurostat

The financial aid to students has always been a sensitive point of the higher education area. Most recent available data on this issue are rather scarce and from 2011. As one can observe from figure 7, the financial aid to students as percentage of total public expenditure on education, at tertiary level of education (ISCED 5,6) increased only in Denmark, Netherlands, Ireland, Latvia, Poland and Romania.

Figure 7: Financial aid to students as percentage of total public expenditure on education, at tertiary level of education (ISCED 5,6)

Figure 7

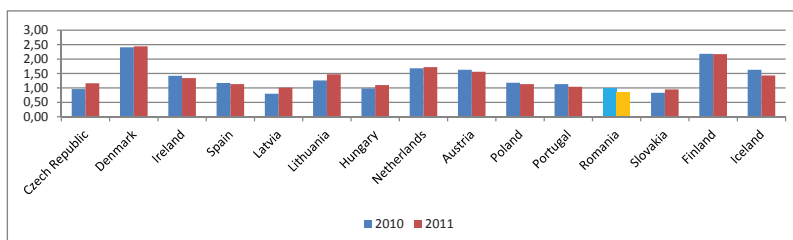


Source: Eurostat

As one can observe from figure 8, the total public expenditure on education at tertiary level as a percentage of the GDP decreased in most of the European countries. Romania is one of the countries with the lowest values for this indicator. Most recent data for this indicator are available only for a few countries.

Total public expenditure on education as percentage of GDP, at tertiary level of education (ISCED 5-6)

Figure 8



Source: Eurostat

Analyzing some output indicators of the higher education and sustainable development from a social perspective, it has resulted that:

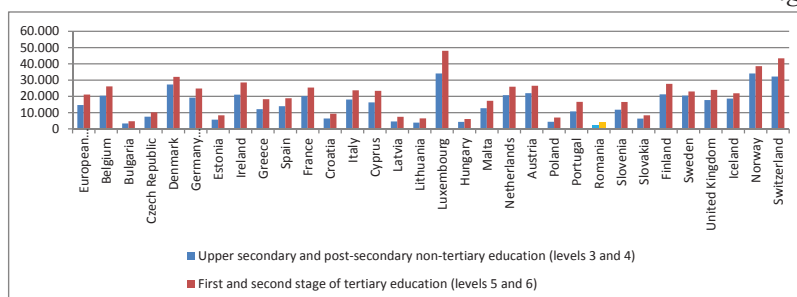
- the median equivalised net income (figure 9) is higher for the first and second stage of tertiary education graduates, than for the upper secondary and non tertiary graduates; Romania is among the countries with the lowest values for this indicator.

- the unemployment rate (figure 10) increased in 2013 compared to 2010 in almost all the European countries with the exception of Germany, Latvia, Lithuania, Malta and Norway; moreover, the unemployment rate was higher among upper secondary education (figure 11) than among tertiary education graduates (figure 12) in almost all the countries; in Romania the unemployment rate among upper secondary and non tertiary graduates decreased in 2013 compared to 2010, while the unemployment rate among the higher education graduates increased;
- considering percentage of people at risk of poverty (figure 13), only small oscillations among the European countries could be observed in 2012 compared to 2010; however, the percentage of people at risk of poverty and social exclusion who graduated tertiary education (figure 14) is much lower than the general rate; Romania is among the countries with the highest values for these indicators; moreover the risk of poverty among the tertiary graduates increased for this country in 2013 compared to 2010.

The increase in the unemployment and poverty rates is the direct result of the slow economic recovery that the European countries are facing. Yet, even in harsh economic conditions, economic literature shows that more educated people (especially higher education graduates) have a competitive advantage on the labour market (Mincer 1991, p.1 and Nunez and Livanos 2012, p.15)

Median equivalized net income by educational level, 2010

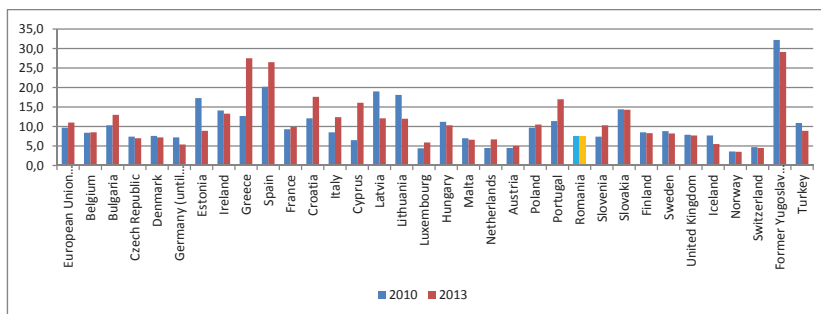
Figure 9



Source: Eurostat

Unemployment rate

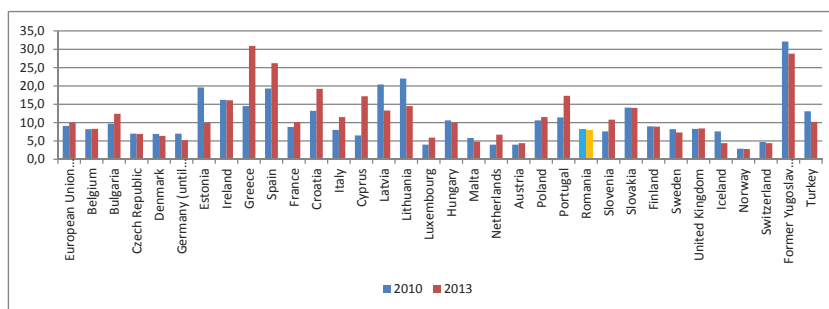
Figure 10



Source: Eurostat

Unemployment rate upper secondary education

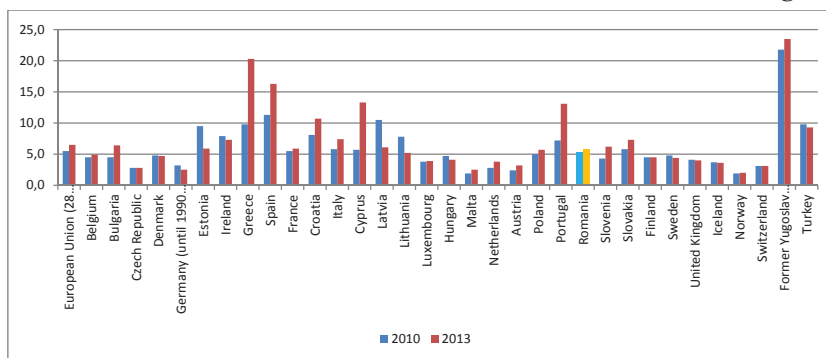
Figure 11



Source: Eurostat

Unemployment rate tertiary education

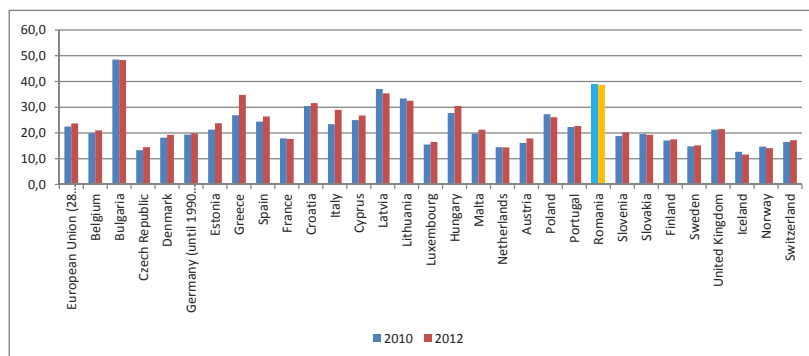
Figure 12



Source: Eurostat

People at risk of poverty and social exclusion

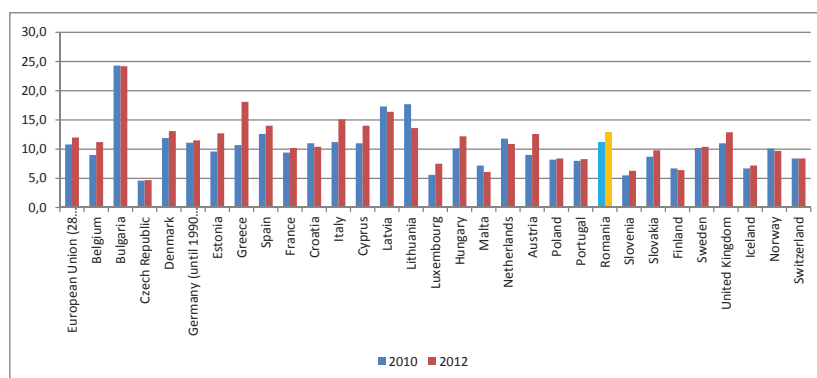
Figure 13



Source: Eurostat

People at risk of poverty and social exclusion tertiary education

Figure 14



Source: Eurostat

Methodology

In order to analyze the European higher education area in the context of the sustainable development, 14 relevant indicators were chosen:

- *Population with tertiary education attainment (as percentage of total population)* – this indicator is consistent with the European Strategy 2020, as one of the goals of the strategy is to increase tertiary education attainment;
- *Females with tertiary education attainment (% of all females); Tertiary education participation - Women among students in ISCED*

5-6 - as % of the total students at this level are two indicators that aim to measure the social inclusion of women. The first indicator measures the percentage of women with tertiary education attainment in the total female population; it provides a general idea about the importance of women's education in the respective country. The second indicator measures the female student population as percentage of the total student population.

- *People at risk of poverty or social exclusion-tertiary educated females* – tertiary education is considered by the United Nations a mean to reduce poverty and social exclusion especially among women;
- *Tertiary students studying environmental protection* – assuring highly qualified labor force in the field of environmental protection is crucial in order to achieve both the objectives of the sustainable development and Europe 2020 Strategy;
- *Financial aid to students as % of total public expenditure on education, at tertiary level of education (ISCED 5,6)* – is a social inclusion indicator consistent with the concept of sustainable development social dimension;
- *Total public expenditure on education as % of GDP, at tertiary level of education (ISCED 5,6)* – expresses each country's commitment to sustain tertiary education;
- *Median equivalised net income - tertiary education; Median equivalised net income - tertiary education versus secondary education; Unemployment rate; Unemployment rate-tertiary education; Unemployment rate-tertiary education versus upper secondary education; People at risk of poverty or social exclusion; People at risk of poverty or social exclusion-tertiary education* – are output indicators concerning both sustainable development and higher education from a social perspective.

All data come from the Eurostat portal. In order to assure the availability of data for as many European countries as possible, the author has chosen data from 2010. Next, a cluster analysis has been performed.

- The author has chosen Ward Hierarchical Clustering Method as it does not require the predict of the number of clusters;
- As the variables are expressed in different unit measures, the author has chosen to standardize them using the Z scores method, one of the most frequently used methods;

Research results

According to the dendrogram, three clusters have been formed: Cluster 1 (Denmark, Slovenia, Sweden, Iceland, Norway, Belgium, Finland, France, United Kingdom, Cyprus, Germany, Netherlands, Austria, Switzerland); Cluster 2 (Estonia, Spain, Latvia, Lithuania, Bulgaria, Ireland); Cluster 3 (Poland, Romania, Czech Republic, Malta, Croatia, Hungary, Portugal, Slovakia, Italy, Greece);

There are many differences among the three clusters considering the variables analyzed. Table 1 presents the means of each variable considering each cluster:

- The first cluster registered the highest value for the population with tertiary education attainment, while the lowest value was registered in the third cluster. Countries in the first cluster are the most supportive of the tertiary education as the highest total public expenditure on higher education as a percent of GDP is registered for this cluster; also the highest amount of the percentage of financial aid to students in the total public expenditure was registered for this cluster;
- Considering the female inclusion, the highest value for the Females with tertiary education attainment (percent of all females) and Women among students in ISCED 5-6 - as % of the total students at this level were registered for the second cluster; the third cluster accounted the highest value for the number of students studying in environmental field;
- The highest income for the higher education graduates is registered among the countries in the first cluster; yet, the highest difference between the annual income of tertiary graduates and the annual income of secondary graduates was observed in the second cluster;
- The highest unemployment rate (general and specific for the tertiary graduates) was observed for the second cluster; also, when comparing the unemployment rates for tertiary graduates with the unemployment rates for the secondary graduates, the highest difference was registered in the second cluster; the lowest values for these variables were registered for the first cluster;
- Considering the last three variables, the highest values for the People at risk of poverty or social exclusion, People at risk of poverty or social exclusion-tertiary education, People at risk of poverty or social exclusion-tertiary education females, the highest values were observed for the second cluster and the lowest values for the first cluster.

The research carried out has identified the main European countries where the higher education best fits the sustainable development concept as follows:

- from an outcome perspective: Denmark, Slovenia, Sweden, Iceland, Norway, Belgium, Finland, France, United Kingdom, Cyprus, Germany, the Netherlands, Austria and Switzerland are countries with the lowest unemployment poverty rates; they are the most committed in supporting tertiary education; the highest tertiary educational attainment and financial aid to students as a percentage to the total public expenditure were observed in these countries;
- from the perspective of ensuring the necessary human resources in order to achieve sustainable development: the highest amount of students in environmental sciences was observed countries like Poland, Romania, Czech Republic, Malta, Croatia, Hungary, Portugal, Slovakia, Italy, Greece;
- from the social inclusion of vulnerable groups perspective: the highest values for the female social inclusion indicators were registered in countries like Estonia, Spain, Latvia, Lithuania, Bulgaria, Ireland.

Considering the outcomes of higher education, in terms of low unemployment rates, low poverty risk and high wages (corresponding to the social dimension of the higher education), there are some factors in higher education that contribute to the system effectiveness:

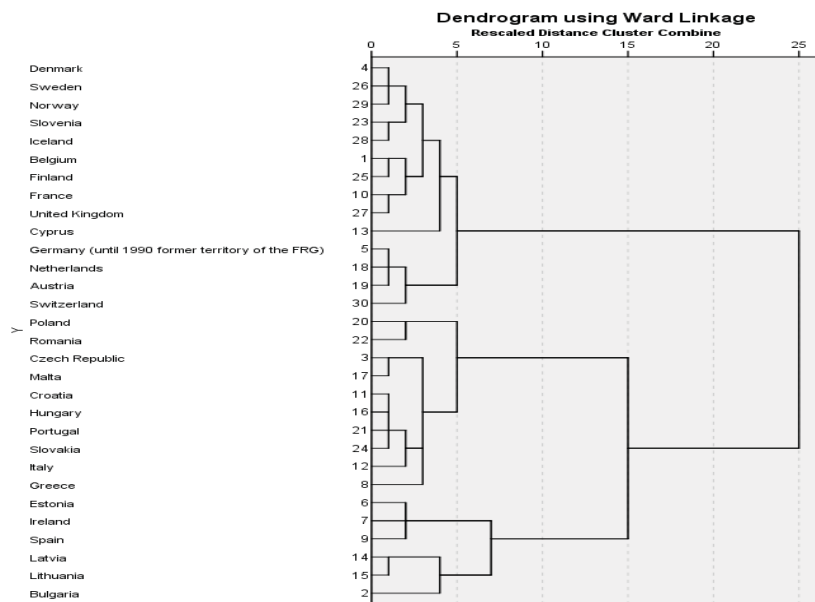
- (St. Aubyn et al. 2009, p.70 - 77) identified four factors for the case of the Netherlands: *staff policy* (autonomy to hire and dismiss academic staff, autonomy to set wages), *output flexibility* (autonomy to set course content, student-centered learning), *evaluation* (all study programmes are evaluated institutionally by an independent agency, but also by stakeholders, including students – whose evaluations are public – and labour market actors), *funding* (based on quality issues and research grants applications);
- (David 2010, p. 14-19,27) highlights the importance of applying the following principles in higher education (the implementation of these principles is also to be improved in the United Kingdom, where the research has been conducted): consistent policy frameworks; the academic staff should be involved continuously in research; informal learning is a very important part of the learning process; building learning networks in order to encourage students to interact with one another; higher education should encourage students to be independent and autonomous in their learning; the learning process

should be developed on a systemic basis considering what the student already knows; higher education should develop personal and academic skill of the students.

Considering gender equality and women empowering, effective policy measures come from the higher education area in Spain, as described by (Rice 2012, p.20): *publicly funded research projects are now required to incorporate a gender perspective in all areas; all universities and other research organizations must have Equity Plans that include incentives for improvement.*

Dendrogram

Figure 15



Source: designed by the author

Means by cluster

Table 1

Variable name	Variable label	Mean Cluster 1 (14 countries)	Mean Cluster 2 (6 countries)	Mean Cluster 3 (10 countries)
pop_tertiary	Population with tertiary education attainment	27.321428571	26.550000000	15.480000000
fem_tertiary	Females with tertiary education attainment (percent of all females)	28.792857143	31.183333333	16.920000000
env_tertiary	Tertiary students studying environmental protection	4009.642857143	4780.833333333	7653.600000000
fin_aid	Financial aid to students as % of total public expenditure on education, at tertiary level of education (ISCED 5, 6)	23.457142857	12.066666667	11.390000000
tertiary_gdp	Total public expenditure on education as % of GDP, at tertiary level of education (ISCED 5, 6)	1.685000000	1.081666667	.924000000
fem_stud	Tertiary education participation Women among students in ISCED 5-6 - as % of the total students at this level	55.364285714	56.750000000	56.270000000
income_tertiary	Median equivalised net income - tertiary education	27101.357142857	12386.333333333	12099.500000000
income_tertiary_vs_secondary	Median equivalised net income - tertiary education - percentage dif to secondary education	26.632299732	47.816702235	46.627149267
unemp_rate	Unemployment rate	6.900000000	16.500000000	10.200000000
unemp_rate_tertiary	Unemployment rate-tertiary education	3.950000000	8.583333333	5.650000000
unemp_rate_tertiary_vs_secondary	Unemployment rate-tertiary education vs secondary education	-2.742857143	-9.283333333	-4.700000000
poverty	People at risk of poverty or social exclusion	17.635714286	31.500000000	25.000000000
poverty_tertiary	People at risk of poverty or social exclusion-tertiary education	9.414285714	15.883333333	9.100000000
poverty_tertiary_females	People at risk of poverty or social exclusion-tertiary education females	10.007142857	17.033333333	9.680000000

Source: designed by the author

Conclusions and recommendations

The research carried out has identified three groups of countries based on the compatibility of their higher education systems to the sustainable development philosophy. To do so, a cluster analysis has been performed taking into account variables consistent with the sustainable development concept. Each cluster performed the best in one of the following areas subsequent to the sustainable development concept: effectiveness (Denmark, Slovenia, Sweden, Iceland, Norway, Belgium, Finland, France, United Kingdom, Cyprus, Germany, the Netherlands, Austria and Switzerland), social inclusion of vulnerable groups such as females (Estonia, Spain, Latvia, Lithuania, Bulgaria, Ireland) and ensuring the necessary human resources in order to achieve sustainable development through higher education (Poland, Romania, Czech Republic, Malta, Croatia, Hungary, Portugal, Slovakia, Italy, Greece) .

Regarding the most significant measures that have contributed to the achievement of sustainable development in higher education in the European countries, it has been found that consistent policy frameworks, university autonomy, continuous improvement of teaching methods and gender equality policies stood behind the achieved learning outcomes.

The results gained from the comparative analysis on European level showed the need for immediate measures in order to advance towards sustainable development through higher education in Romania.

Therefore the following measures may help Romania progress towards sustainability:

- a stable legislative framework should be established in order for universities to conceive their own strategies on medium and long term;
- in order to reduce unemployment and poverty risk among those higher educated, there is an urgent need to improve students' skills required by the labour market; thus, the identification of these requirements and the modernization of teaching methods accordingly, are necessary;
- periodical and public assessment of the educational programmes by the stakeholders including students and labour market actors: each university should collect data about students satisfaction on each course and study programme as well as they should track the graduates' performance on the labour market; also, employers should be asked to offer detailed feedback on fresh graduates as well as on trainees; the results of these assessments should be public in one web portal.

The results of this study may represent a starting point for future research, on identifying the most suitable ways for applying sustainability in higher education, from the perspective of the requirements defined by this model.

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