Journal of Security and Sustainability Issues *www.lka.lt/index.php/lt/217049/*
2011, 1(2): 103–112
http://dx.doi.org/10.9770/jssi.2011.1.2(3)

SUSTAINABLE DEVELOPMENT AND HUMAN DEVELOPMENT INDEX

Renata Korsakienė[1], Ieva Breivytė[2]

[2]Vilnius Gediminas Technical University
Saulėtekio av. 11, LT-10223, Vilnius, Lithuania
E-mail: [1]renatakorsa@takas.lt; [2]ibreivyte@hotmail.com

Evelyn Wamboye[3]

Pennsylvania State University
College Place, DuBois, PA, 15801, USA
E-mail: [3]efw10@psu.edu

Received 10 June 2011; accepted 20 September 2011

Abstract. The scientific discussions in existing literature focusing on sustainable development are vast. The broad focus of sustainable development has raised the need to develop indicators which allow measuring the progress towards sustainability and evaluating policies intended to support sustainability. This research aims to analyse and determine the relationship between the Human Development Index (HDI) and some of the sustainable development indicators partly comprised in the Sustainable Society Index (SS1). Using data for the period of 2001-2010 from selected eleven EU countries, the goal of this paper to shed some light on the main shortages of the HDI as a measure of sustainable development. The findings of this research show that in most cases the HDI ignores sustainable development indicators, making it a partly fit measure and that there are no cases where the HDI can be described as an absolutely correct measure of sustainable development.

Keywords: Sustainable Development, Human Development Index, Sustainable Society Index, EU Countries.

Reference to this paper should be made as follows: Korsakienė, R.; Breivytė, I.; Wamboye, E. 2011. Sustainable development and Human Development Index, *Journal of Security and Sustainability Issues* 1(2): 103–112. http://dx.doi.org/10.9770/jssi.2011.1.2(3)

JEL Classifications: 01, 015, J0, J5, P5.

Introduction

Literature on sustainable development indicates the significance and importance of the field. Sustainable development represents a commitment to advancing human well-being with the added constraint that this development needs to take place within the ecological limits of the biosphere. The huge interest towards sustainable development has impacted the development of various measures. Hence, a variety of indexes and indicators have been proposed.

Despite the significant contribution of various measures, this research narrows the scope and focuses on the Human Development Index (HDI) proposed by the United Nations and its relationships with some of sustainable development indicators incorporated in the Sustainable Society Index. The HDI, which is almost universally accepted measurement of the countries' development, considers three aspects of development: health, knowledge and income. However, the HDI does not account for the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The measurement of the HDI has been chosen because it is a representative index of the analysed domain; it measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, access to

knowledge and decent standard of living. One would make an argument that since the HDI is a measure of development as a phenomenon, it should be closely positively related to sustainable development.

This paper is based on the data of eleven selected countries, ten of which joined the EU after the so called EU enlargement in 2004. One additional country is selected according to the highest HDI score within the EU in 2003-2010. The rest of the paper is organized as follows; part one explores the theoretical aspects of sustainable development; part two introduces sustainable development measurements, such as Human Development Index and Sustainable Society Index. Part three presents methodology, part four discusses the results of the research and part five concludes.

Concept of Sustainable Development

The main idea of sustainable development was introduced most influentially by the World Commission on Environment and Development (i.e., the Brundtland Commission) as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It embraces 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 concept of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (World Commission on Environment and Development, 1987). Additionally, the International Union for the Conservation of Nature states that "sustainable development is used to mean: improving the quality of human life whilst living within the carrying capacity of the ecosystems" (IUCN/UNEP/WWF 1991). On the other hand, Pearce (1993) points out that sustainable development is concerned with the development of a society where the costs of development are not transferred to future generations or at least an attempt is made to compensate for such costs. The interpretations of the concept provided in the early and mid-1980s was focused on the environmental and human development issues. Scholars point out that since the time of the Commission report; alternative definitions of sustainable development, sustainable economies and sustainable societies have been proposed (Gladwin et al., 1995).

The field of sustainable development can be divided into three main domains: environmental sustainability, which is environmental well-being, economic sustainability – economic well-being and social-political sustainability defined as human well-being. Notably, these three areas are intimately related and interdependent. The environmental well-being is primarily concerned with the preservation of the natural environment and resources, long-term maintenance of ecosystem components and functions for future generations, quality of policies ensuring the impact on the environment that is positive or at least damaging (Gilbert et al., 1996). Meanwhile, economic sustainability is concerned with economic growth solutions, identification of various strategies that make it possible to utilize available resources to best advantage and is most often described as the need to maintain a permanent income for humankind, generated from non-declining capital stocks (Spangenberg, 2005). Hence, economic sustainability occurs when development, which moves towards social and environmental sustainability, is financially feasible (Gilbert et al. 1996). Social-political sustainability is focused on the state of the civil society. It requires the cohesion of society and its ability to work towards common goals to be maintained (Gilbert et al., 1996). Hence, the needs for health and well-being, nutrition, shelter, education and cultural expression of individuals should be met.

The broad focus of sustainable development has raised the need to develop indicators which allow measuring the progress towards sustainability and evaluating policies intended to support sustainability. According to Pearce (1996), the difficulty is to determine what has to be done to achieve sustainable development. Notably, the proposals for such measures have existed for several years. The main indicators such as the Human Development Index, Environmental Sustainability Index, Environmental Performance Index, Commitment to Development Index, Index for Sustainable Economic Welfare, Genuine Progress Indicator, Ecological Footprint, Well-being of Nations, Millennium Development Indicators, Indicators for the EU Sustainable Development Strategy, CSD indicators are provided and analysed in the scientific literature (Van de Kerk and Manuel, 2008). On the other hand, new indicators and indexes are being developed. For instance, Hak et al. (2007) state that "the metrics used for the measurement of sustainability (involving the sustainability of environmental, social-political and economic domains, individually and in various combinations) are still evolving: they include indicators, benchmarks, audits, indexes and accounting, as well as assessment, appraisal and other

reporting systems". These insights allow conclusion that no single measurement is completely adequate. A lot of attempts were made in order to analyze success and failures of indicators' application, expose gaps in knowledge and identify research needs (Hak et al., 2007). Consequently, taking into account the assessment of various existing approaches, this paper will focus on the Human Development Index (HDI) and Sustainable Society Index (SSI).

Human Development Index and Sustainable Society Index

Discussions in the prevailing literature strive to distinguish economic development and growth. According to Seers (1979), the focus of development is the reduction of poverty, inequality and unemployment. However, other scholars such as Narayan et al., (2000) emphasize on the reduction of hunger, illiteracy, poor health, powerlessness, insecurity and the lack of access to the basic infrastructure as the basis of development. On the other hand, Sen (1999) indicates that social opportunities and protective security are both end and means of development. Hence, the definition of development is seen as much broader than just economic growth.

Notably, the need to measure development has been influenced by two dichotomies: the constituents versus the determinants of human well-being and current versus sustainable well-being. Dasgupta (2007) indicates that "the most well-known indices of social well-being – gross domestic product (GDP) per capita and the human development index (HDI) of the United Nations Development Programme (UNDP) – are measures of current well-being for all practical purposes".

The widely accepted measure of development – Gross National Product (GNP) defines the market value of all goods and services produced in one year by labour and property supplied by country's residents. Unlike GDP, it allocates production based on ownership. Notably, the application of GNP as an indicator of a country's development has gained a lot of criticism in the scientific literature. For instance, it has been indicated that countries with rising GNP per capita have quite as many political and social difficulties and problems as countries with falling GNP (Kabeer, 1994). However, although there was a broadly positive relationship between GNP per capita and levels of human development, the extent to which the increasing GNP led to improvement in human development varied significantly among the countries (Kabeer, 2003). Hence, GNP per capita is not a value-free measure of the market because the market itself is not neutral but a highly partial mechanism for assigning value. Lind (2004) has criticized GNP for focusing national attention narrowly on the economic growth at the expense of other aspects of development, such as health or education. According to Stiglitz (2006), GNP per capita has become deficient as a measure of long-term economic health in globalizing world which is resource driven.

The shortages of GNP per capita have impacted development of new measures. In 1990 the United Nations Development Program (UNDP) changed the development measurement and policy with the publication of its first annual Human Development Report (HDR) and the introduction of the HDI (2010). The concept of development provided by the UNDP has emphasized the enlargement of people's choices by enhancing their functioning and capabilities. The scholars indicate that the HDI embrace Sen's "capabilities" approach to understanding human well-being, which emphasizes the importance of ends over means (Stanton, 2007). Taking into consideration Sen's approach, the HDI comprise three important ends of development: access to health, education and goods. Notably, the HDI is especially well-suited to examine gender inequalities because the data for the HDI is collected not on a household level through household income and expenditure surveys but rather at the individual level through demographic surveys and population censuses (Anand and Sen, 1994).

Nowadays the HDI is used by scholars, politicians and the media to measure and compare the progress in human development between the countries over time (Harttgen and Klasen, 2010). Starting with the 2010 report, the HDI combines three dimensions: a long and healthy life (life expectancy at birth), a decent standard of living measured by Gross National Income (GNP) per capita (PPP US$) (the dollar value of a country's final income in a year divided by its population) and access to knowledge (expected years of schooling).

However, despite its popularity, the HDI has attracted a lot of criticism on a number of grounds, including failure to take into account any ecological considerations and not paying attention to development from a global perspective. It is argued that no meaningful development policies of a country can be built considering the HDI as a measure. Even

though in the first years of its introduction the HDI was widely appreciated as a useful policy tool, it was recognized early on that it is a measure of average achievements in human development. It can reflect neither distributional aspect of development, particularly the issue of inequality, nor deprivational aspect of development. The index has also been described as "redundant" and "reinvention of the wheel", measuring aspects of development that have already been exhaustively studied (McGillivray, 1991). Using simple statistical analysis, McGillivray (1991) questions both the composition of the HDI and even its usefulness as an index of development. The scholar concludes that the HDI is flawed in its composition and fails to provide insights into inter-country development level comparisons. Other scholars distinguish the fact that the HDI considers only average achievements and do not take into account the distribution of human development within a country or by population sub-groups as its one of the most serious weaknesses (Harttgen and Klasen, 2010). They claim that there are large inequalities within countries' population subgroups, which must be taken into account in order to have a better picture of the real human development situation. Some other common criticisms directed at the HDI are that it is a number producing a relative ranking which is useless; that it does not include moral and spiritual development (the question arises – how do you measure moral and spiritual development?) and that it adds little to the value of the individual measures composing it.

The Sustainable Society Index is seen as one of the recent attempts to measure sustainability, which encompass economic, environmental and human well-being. The SSI is presented by the Sustainable Society Foundation which calculates it every two years and publishes the results (Van de Kerk and Manuel 2008). Notably, the first two editions of the SSI in 2006 and 2008 were based on a framework of 22 indicators. The application of data from available public scores allowed to develop the SSI for 150 countries in 2006. Meanwhile, in 2008 the first of two-yearly updates were published with the results for 151 countries. The resulting SSI scores on a scale of 0 to 10 allow a quick comparison between the countries. According to the information provided by the Sustainable Society Foundation, in 2010 the SSI is comprised of 24 indicators that fall under 8 categories: Personal Development, Healthy Environment, Well-balanced Society, Sustainable Use of Resources, Basic Needs, Climate and Energy, Preparation for the Future, and Economy (SSF, 2011). All the indicators (and subsequently the categories and the overall index) are allocated a score on the scale from 0 to 10. An indicator scores 10 in the case of 100% sustainability. If there is no sustainability at all, the score for the indicator is 0. The advantages of the proposed index are transparency, its limited number of indicators and ease of use (Van de Kerk and Manuel, 2008). On the other hand, it comprises social, environmental, ecological and institutional aspects.

Methodology

The above discussions lead to the conclusion that sustainable development involves personal freedom, social opportunities, basic liberty, protective security, economic fulfilment, reducing deprivation and broadening choice and it is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Meanwhile, the HDI does not comprise some aspects of sustainability and neither does it take into account the indicators which are included into the SSI.

We categorize sustainable development measures into 3 broad indicators namely, economic, socio-political and environmental sustainability indicators. Economic sustainability indicators include adjusted net savings, unemployment, organic agriculture and public debt. Socio-political sustainability indicators include healthy life, gender gap index, population growth and income distribution. Environmental sustainability indicators on the other hand, include greenhouse gas emissions, energy consumption, electricity from renewable resources and organizations and sites with EMS. With the presumption that HDI does not include sustainable development measurements in its calculations, we test the following two hypotheses: first that the associations between HDI and the indicators of unemployment, public debt, population growth, income distribution, greenhouse gas emissions and final energy consumption are positive and second that the associations between the HDI and the indicators of adjusted net savings, organic agriculture, healthy life, gender equality, electricity generated from renewable resources and the EMS-registered organizations and sites are negative. The purpose of this research is to analyse and determine the relationship between the selected EU-27 countries' HDI score and the following indicators: Adjusted Net Savings, Employment, Organic Agriculture, Public Debt, Healthy

Life, Gender Equality, Income Distribution, Population Growth, Greenhouse Gas Emissions, Energy Consumption, Electricity Generated from Renewable Resources and Organisations and Sites with a Registered Environmental Management System.

The countries are selected based on the following criteria. A country must be an existing member of the European Union or became a part of the European Union during the so-called EU enlargement of 2004, which means that the country joined the EU on May 1st, 2004. One country have the highest HDI score within the European Union in 2003–2010 combined. Hence, Lithuania, Latvia, Estonia, Czech Republic, Cyprus, Hungary, Malta, Poland, Slovakia, Slovenia, and Ireland are selected for this research. This selection criterion serves two purposes. First it gives the study the basis for comparing all countries that became subject to the EU Constitution, common laws and regulations and economic, socio-political and environmental development at the same point in time. Second, by selecting a country with the highest combined HDI score of the recent years, enables us to determine whether a high HDI score positively associates with sustainable development. We use country level data for the period of 2001- 2010. The data sources are the European Commission, World Bank, United Nations, International Monetary Fund, World Fact Book, World Health Organisation, World Trade Organisation and World Economic Forum.

Results

According to the country level descriptive analysis, provided in the Figure 1, it can be observed that all the HDI scores have a similar pattern during the sample period of 2001–2010.

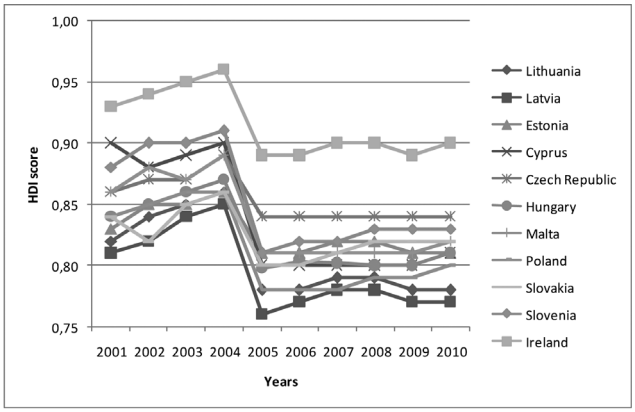

Figure 1. HDI Scores (Source: Human Development Reports, UNDP)

Note that the calculation method of the HDI changed during the sample period. Notably, the HDI score in the period of 2001–2004 is calculated according to the old method, while the HDI of the period 2005–2010 is calculated based on the new method. Taking into account the different calculations, it is possible to observe a decrease of the HDI scores of all countries in 2005 comparing to 2004. (The new calculation method for 2001–2004 is not available yet in the United Nations Human Development Report).

Judging from the figure presented above, overall, Ireland had relatively the highest HDI score during the sample period. An analysis of the sub group of countries that joined the EU on May 1st, 2004 shows that Czech Republic and Slovenia have comparatively the highest HDI scores. Meanwhile, Latvia, Lithuania and Poland have the lowest HDI scores relatively. As shown in figure 1, the increased HDI score in all the countries can be observed during the period of 2001–2004, while the 2004 to 2005 period shows a decrease for all countries. The general trend of the HDI score increase is observed during 2005–2008. The period of 2008–2010 indicates slight decreases or equal values for most of the countries. A slight increase in the HDI score from 2009 to 2010 can be observed for Ireland, Poland, Malta and Hungary.

Table 1 2, and 3 provides correlation coefficients for associations between HDI and the three categories of sustainable development measures. We define a correlation coefficient of seven and above as portraying a relatively strong relationship and a coefficient between three and seven as portraying relatively a weak relationship. Any correlation coefficient below three is considered as extremely weak relationship. Based on the magnitude and direction of the correlation coefficients, we make the following interpretations: First, strong positive associations imply that large values of the HDI tend to be associated with the large values of sustainable development measures and the small values of the HDI tend to be associated with the small values of sustainable development measures. Second, weak positive associations imply that the large values of the HDI tend to be very slightly and remotely associated with the large values of sustainable development measures. Third, the strong negative association mean that the large values of the HDI tend to be associated with the small values of sustainable development measures and vice versa.

Table 1 contains correlation coefficients of the HDI

and selected variables, representing sustainability at the country level. Economic sustainability comprises measurements such as Organic Agriculture, Adjusted Net Savings, Employment and Public Debt. The percentage of organic agriculture in the total agriculture of a country as a sustainable development measurement was chosen taking into account the fact that organic farming is an eco-friendly type of farming, bringing no damage to the environment, thus the costs of development are not transferred to the future generations, and therefore it is a part of sustainable development. Adjusted net savings (also called genuine savings) is a sustainability indicator building on the concepts of green national accounts. Adjusted net savings measure the true rate of savings in the economy after taking into account investments in human capital, depletion of natural resources and damage caused by pollution (World Bank, 2011).

The unemployed population is made up of persons above a specified age who are available to, but did not, furnish the supply of labour for the production of goods and services. When measured for a short reference period, it relates to all persons not in employment who would have accepted a suitable job or started an enterprise during the reference period if the opportunity arose and who had actively looked for ways to obtain a job or started an enterprise in the near past (International Labour Organization, 2011).

Public debt is an obligation of a government and it represents the liabilities of central government and other public bodies to individual creditors. It is a term for all the money owed at any given time by any branch of the government and should not be confused with external debt, which reflects the foreign currency liabilities of both the private and public sector and must be financed out of foreign exchange earnings (World Fact Book, 2011).

Table 1. Correlations coefficients of the HDI and Economic Sustainability Indicators

	Adjusted Net Savings	**Unemployment**	**Organic Agriculture**	**Public Debt**
Lithuania	-0.613	0.536	-0.811	0.144
Latvia	-0.557	0.186	-0.850	-0.121
Estonia	-0.413	0.281	-0.836	0.281
Cyprus	0.620	-0.438	-0.797	-0.040
Czech Republic	-0.811	0.600	-0.572	0.054
Hungary	-0.047	-0.759	-0.440	-0.377
Malta	-0.808	0.514	-0.428	N/A
Poland	-0.929	0.261	-0.813	-0.080
Slovakia	0.162	0.539	-0.595	-0.249
Slovenia	-0.738	0.462	-0.680	0.282
Ireland	0.373	-0.413	-0.824	-0.076

A closer look at the correlation coefficients provided in the Table 1 confirms that overall; there are no strong positive associations between HDI and Economic Sustainability Indicators. However, there are two weak positive association between HDI and Adjusted Net Savings category for Cyprus, Slovakia and Ireland; five between HDI and Unemployment category for Lithuania, Czech Republic, Malta, Slovakia and Slovenia. Conversely, there are no positive associations in Organic Agriculture and Public Debt categories. As seen from the table, there are altogether 14 extremely weak or no associations. Most of those associations are found in the Public Debt category. The strong negative correlation values are found in the Czech Republic, Malta, Poland and Slovenia in Adjusted Net Savings category, for Hungary in Unemployment category, for Lithuania, Latvia, Estonia, Cyprus and Ireland in Organic Agriculture category.

Table 2 contains correlation of the HDI and selected variables, representing sustainability at the country level. Notably, socio-political sustainability comprises such measurements as healthy life, gender equality, population growth and income distribution. The indicator of Healthy Life Years (HLY), indicating the number of years a person of a certain age can expect to live without disability, was chosen (European Health Expectancy Monitoring Unit, 2011) as a measure of healthy life. The HLY is identified as one of the most common health expectancies reported. Gender Equality was measured in terms of Gender Gap Index (GGI) sometimes referred to as Global Gender Gap Index (GGG Index). The Index benchmarks national gender gaps on economic, political, education and health based criteria and provide country rankings that allow for effective comparisons across regions and income groups and over time (World Economic Forum, 2011). On the other hand, the index was chosen taking into account basic underlying concepts: index focuses on measuring gaps rather than levels, it captures gaps in outcome variables rather than gaps in means or input variables, it ranks countries according to gender equality

rather than women's empowerment (Hausmann et al., 2010).

The calculation of population growth takes into account population, which counts all residents regardless of legal status or citizenship except for refugees not permanently settled in the country of asylum and who are generally considered part of the population of the country of origin (World Development Indicators, 2011). The income distribution represents how a nation's wealth is distributed amongst its population. The ratio of total income received by the 20 % of the population with the highest income (top quintile) to that received by the 20 % of the population with the lowest income (lowest quintile) was chosen. According to the Sustainable Society Foundation (2011), a low level of inequality among individuals and groups within a country is supposed to contribute to a stable society, whereas a high level of inequality provokes unrest or tensions in a society.

Table 2. Correlations coefficients of the HDI and Socio-Political Sustainability Indicators

	Healthy Life	GGI	Population Growth	Income Distribution
Lithuania	0.294	-0.405	0.669	0.233
Latvia	0.205	-0.570	-0.355	-0.164
Estonia	-0.256	-0.478	-0.829	0.773
Cyprus	0.792	-0.487	0.840	-0.688
Czech Republic	0.588	0.164	-0.714	0.114
Hungary	0.052	0.362	-0.819	-0.502
Malta	-0.767	N/A	0.220	0.091
Poland	0.828	0.083	-0.368	-0.212
Slovakia	-0.315	-0.366	-0.343	-0.362
Slovenia	0.411	-0.126	-0.492	-0.899
Ireland	0.144	-0.679	-0.057	0.278

Correlation coefficients presented in the Table 2 shows that the there are four strong positive associations. These strong positive associations can be observed for Cyprus and Poland in Healthy Life Years category, Cyprus in Population Growth category, and Estonia in Income Distribution category. There is no strong positive association in Gender Equality category, which is measured in terms of Gender Gap Index. There are two weak positive associations in Healthy Life category, for Czech Republic and Slovenia; one in Gender Gap Index category for Hungary; one in Population Growth for Lithuania; and none in Income Distribution category. As it is seen from the table, there are altogether 16 little or no associations, 14 weak negative associations, and 5 strong negative associations. The strong negative associations are for Malta in Healthy Life Years category, for Estonia, Czech Republic and Hungary in Population Growth category and for Slovenia in Income Distribution category.

Table 3 contains correlation coefficients of the HDI and selected variables, representing environmental sustainability at country level. Notably, environmental sustainability comprises such measurements as greenhouse gas emissions, energy consumption, electricity generated from renewable resources, and organizations and sites with a registered environmental management system.

Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself and by clouds. This property causes the greenhouse effect. Monitoring and reporting national emissions and removals of greenhouse gases is a requirement of the United Nations Framework Convention on Climate Change and the European Union Greenhouse Gas Monitoring Mechanism. Annual emissions of CO2, CH4, N2O, HFCs, PFCs, SF6 from individual European countries are provided by the European Environment Agency (2011).

Energy consumption is the use of energy as a source of heat or power or as a raw material input to a manufacturing process. It may also be defined as the amount of energy consumed in a process or system, or by an organization or society (Consumption of Energy, 2011). Notably, final energy consumption includes all energy delivered to the final consumer's door (in the industry, transport, households and other sectors) for all energy uses. It excludes deliveries for transformation and/or own use of the energy producing industries as well as network losses.

Renewable resources are those that are replenished through biogeochemical and physical cycles. Hence, electricity generated from renewable resource contributes significantly to sustainable development of a country. Organizations and sites with a registered environmental management system defined as the number of the Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts

and increase its operating efficiency. The European Commission started to collect the numbers of sites in addition to number of organizations in March 2004 to give a more accurate picture of the EMS development (Eurostat, 2011).

Table 3. Correlations coefficients of the HDI and Environmental Sustainability Indicators

	Greenhouse Gas Emissions	Energy Consumption	El. From Renew. Resource	Organisations and Sites with EMS
Lithuania	-0.724	-0.707	-0.673	---
Latvia	-0.692	-0.602	-0.0129	-0.419
Estonia	-0.161	-0.494	-0.627	-0.837
Cyprus	-0.875	-0.688	-0.496	-0.405
Czech Republic	0.093	0.045	-0.618	-0.668
Hungary	0.479	0.087	-0.845	-0.663
Malta	-0.637	0.044	---	-0.516
Poland	-0.782	-0.789	-0.834	-0.385
Slovakia	0.598	-0.338	-0.519	-0.423
Slovenia	-0.707	-0.536	0.280	-0.433
Ireland	-0.297	-0.679	-0.736	0.204

The correlation coefficients provided in the Table 3 shows that there are no strong positive associations in any category. However, there are two weak positive associations for Hungary and Slovakia. The majority of categories, such as Final Electricity Consumption, Electricity Generated from Renewable Resources, and Organizations and Sites with registered EMS categories have no positive association values, whether weak or strong. As it is seen from the table, there are 9 cases of little or no association, a total of 31 negative associations, 10 of which have strong negative associations. The strong negative correlation coefficients are for Hungary, Poland and Ireland in Electricity Generated from Renewable Resources category and for Estonia in Organizations and Sites with registered EMS category.

Conclusions

This research analyzed the relationship between the Human Development Index (HDI) and some of the sustainable development indicators comprised in the Sustainable Society Index using data from 11 selected European Union member countries for the period of 2001-2010. Based on the presumption that the HDI does not include sustainable development measurements in its calculations, we tested the following two hypotheses; first that the associations between HDI and the indicators of unemployment, public debt, population growth, income distribution, greenhouse gas emissions and final energy consumption are positive and second that the associations between the HDI and the indicators of adjusted net savings, organic agriculture, healthy life, gender equality, electricity generated from renewable resources and the EMS-registered organizations and sites are negative. Our findings show that in most cases HDI ignores sustainable development indicators; whether it is economic sustainability, socio-political sustainability or environmental sustainability. We also find that HDI is a partly fit indicator in some, and there are no cases where the HDI can be described as an absolutely correct indicator of sustainable development. The HDI's negative association with such extremely important sustainability indicators as organic agriculture, gender equality, percentage of electricity generated from renewable resources and the EMS registered organizations and sites demonstrate that the HDI is not appropriate measurement of contemporary development and does not comply with the concept of development in the 21st century.

These findings have very significant policy implications. For example, economic development can be viewed as the process of achieving an optimum level of health and well-being consisting of physical, biological, mental, emotional, social, educational, economic, and cultural components. This calls for a reconsideration of the HDI calculation method to incorporate sustainable development indicators.

Developing in a sustainable way is becoming a necessity and governments can no longer afford to rely on the policies that are based solely on the past and current needs. Navigating the sustainability transition however, requires good instruments to re-orient development. There are instruments that can help to set goals and targets, and to monitor and report on the progress. Such instruments are essential for effective sustainable development strategies and adaptive management and informing political discourse about economic, social and environmental goals. To initiate the sustainability transition, governments need to:

- Raise awareness of the sustainable development importance within communities.

• Restore confidence in markets and the institutions and companies that make them function. That will require improved regulation and more effective governance at all levels of political and business life.

• Re-establish healthy public finances as the basis for future sustainable economic growth.

• Look for ways to support new sources of growth through innovation, environmentally friendly strategies and the development of emerging economies.

• Encourage innovation and growth by ensuring that people of all ages can develop the skills to work productively.

References

1. Anand, S.; Sen, A.K. 1994. Human Development Index: Methodology and Measurement. New York: Human Development Report Office, Occasional Paper, 12.

2. Consumption of Energy. 2011. Eurostat. Available at: http://epp.eurostat.ec.europa.eu.

3. Dasgupta, P. 2007. Measuring Sustainable Development: Theory and Application. *Asian Development Review.* 24(1): 1-10.

4. European Health Expectancy Monitoring Unit. 2011. Available at: http://www.ehemu.eu/.

5. European Environment Agency. 2011. Available at: http://www.eea.europa.eu/

6. Gilbert, R.; Stevenson, D.; Girardet, H.; Stern, R. 1996. *Making Cities Work: The Role of Local Authorities in the Urban Environment*, London: Earthscan Publications Ltd.

7. Gladwin, T.; Kennelly, J.; Krause, T. 1995. Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *Academy of Management Review,* 20(4): 874-907.

8. Hak, T.; Moldan, B.; Dahl.; A.L. 2007. *Sustainability Indicators: A Scientific Assessment*, SCOPE 67. Island Press, London, p.15

9. Harttgen, K.; Klasen, S. 2010. A Household-Based Human Development Index, Human Development Research Paper. United Nations Development Programme.

10. Hausmann, Ricardo, Tyson, Laura D., Zahidi, Saadia. 2010. World Economic Forum, Gender Gap Report. Geneva, Switzerland.

11. IUCN/UNEP/WWF. 1991. *Caring for the Earth. A Strategy for Sustainable Living.* Gland, Switzerland.

12. International Labour Organization. 2011. Employment and Unemployment (Available at: www.ilo.org).

13. Kabeer, N. 1994. Reversed Realities: Gender Hierarchies in Development Thought, London: Verso, p.69-162.

14. Kabeer, N. 2003. Gender Mainstreaming in Poverty Eradication and the Millennium Development Goals: A Handbook for Policy-makers and other Stakeholders. Commonwealth Secretariat/IDRC/CIDA.

15. Lind, N.C. 2004. Some Thoughts on the Human Development Index, *Social Indicators Research*, 27(1): 89-101.

16. McGillivray, M. 1991. *The Human Development Index: yet another redundant composite development indicator?*, World Development, 19(10):1461–1468

17. Narayan, D.; Patel, R.; Schafft, K.; Rademacher, A.; Koch-Schulte, S. 2000. *Voices of the Poor: Can Anyone Hear Us?* A World Bank Publication, p. 360.

18. Pearce, D. 1993. *Economic Values and the Natural World*. London: Earthscan, p. 129.

19. Pearce, D. 1996. *Blueprint 3: Measuring Sustainable Development*. London: Earthscan, p. 224.

20. Sen, A. K. 1999. *Development as Freedom*. New York: Alfred A. Knopf.

21. Seers, D. 1979. *The Meaning of Development, with a Postscript*. In Seers, Nafziger, Cruise, O'Brien and Bernsten, p. 9-30.

22. Spangenberg, J. H. 2005. Economic Sustainability of the Economy: Concepts and Indicators. *International Journal of Sustainable Development*, 8(1-2): 47-64.

23. Stanton, E. A. 2007. *The Human Development Index: A History.* Political Economy Research Institute. Working Paper Series, 127. University of Massachusetts.

24. Stiglitz, J.E. 2006. Good Numbers Gone Bad. *Fortune* 154(7), p.30.

25. Sustainable Society Foundation. 2011. Available at: http://www.ssfindex.com/.

26. The World Bank. 2011. Adjusted Net Saving. Genuine Saving (Available at: www.worldbank.org).

27. The World Fact Book. 2011. Available at: www.cia.gov.

28. United Nations Development Programme (UNDP). 2010. *The Real Wealth of Nations: Pathways to Human Development.* P.4.

29. United Nations Development Programme (UNDP). 2011. Human Development Reports. Available at: www.undp.org.

30. Van de Kerk, G.; Manuel, A.R. 2008. A Comprehensive Index for a Sustainable Society: The SSI-the Sustainable Society Index. *Journal of Ecological Economics* 66(2-3): 228-242.

31. World-wide Governance Commission on Environment and Development (WCED). 1987. *Our Common Future.* Oxford: Oxford University Press, p. 43.

32. World Development Indicators. 2011. The World Bank. Available at: http://www.info.worldbank.org/governance/.

33. World Economic Forum. 2011. Available at: http://www.weforum.org.