A Cross – Sectional Analysis of Environmetal Sustainability Practices

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Abstract

In 1970s and 1980s the concept of sustainability developed as a process of protection for the elements that social, economic and eceological systems need. During the Environment and Development Summit held in 1992, decisions were made about the works to protect and improve the environmental sustainability with the help of objective policies. By revealing sustainability specifically focuses on the social, economic and ecological target, Brountland report states that meeting Socia-Economic needs is limited to the carrying capacity of eco-system.

Environmental sustainability is divided into three categories. They are resource management, energy management and product sustainability. While, solid waste and water conservation compose the resource managament, energy managament includes energy conservation, renewable energy, GHG emission reduction, energy sufficient. Finally, product sustainability involves product transportation, supply chain audit, product stewardship and Life Cycle Program.

In this context, environmental sustainability index and environmental performance index were prepared by the universities of Yale and Colombia. With environmental sustainability index, it is intented to reach perfection in the current and future environmental qualities of the countries. This index, is a tool when aiming to be qualified and is an important mechanism for testing the environmental performance. As for environmental performance index, it has been developed by using result-oriented indicators.

In this study, the countries whose performances enter the scope of the environmental performance index were compared, 149 countries in 2008 and 163 countries in 2010 were included in this index.

Keywords: Sustainability, environmental performance index, environmental sustainability index, Turkey

1.INTRODUCTION

Dictionary meaning of the concept of sustainable is “today's needs without compromising the ability of future generations to meet their own needs met unless otherwise indicated”. The concept of sustainability in the final report in 1987 by the United Nations Commission on Environment and Development is defined as follows: "Humanity, without compromising the ability to respond to the needs of future generations, by providing the daily needs, has the ability to make development sustainable”.

The term “sustainability” was coined by the United Nations appointed Brundland Commission and later refined by the UN Commission on Environment and Development held in Rio de Janeiro (Blackburn, 2007). The best – known definition of sustainability, as established by the UN Commission on Environment and Development, states that “development is sustainable where it meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

The concept of sustainability on different topics in the discipline of economic stability, debt sustainability in order to be able to express the ability of being able to continue, such as sustainable growth around the macro-economic definitions are used extensively. However, the concept of sustainability in all areas, especially in the field of economics Brundland by the World Commission on Environment and Development Report, has expanded the definition of sustainable development.

Since the 1980s, the development of international environmental discussions of sustainable development, applied science, environmental and international policy areas examined as a multi-faceted concept that has become the focal point of development strategies (Carvalho, 2001: 62; Bakırtaş ve Bakırtaş, 2007: 223).

Sustainable Development, briefly, to meet the demands and needs of future generations without restricting the ability and facilities, can be expressed as the present needs are met.

This defines the extent of development mentioned above, under six headings summaries spreadable. These are can be expressed as the environment, the future, quality of life, justice, precautionary principles, and holistic thinking. In addition, there are 3 dimensions of the sustainability of the development which are indisputable and can not distinguish between each other (Arzu Özyol, http://hydra.com.tr/uploads/kutup9.pdf):

Social Dimension: Continuing education for the public "quality of life will provide increasing benefits for themselves and the whole of the next generations,

The Economic Dimension: Due to limited resources, these resources can improve people's quality of life and how the fairest way to determine what is the most effective way to distribute

The Environmental Dimension: Recycled or not, the use of any determination as to ensure the continuity of natural resource

In this context, one of the dimensions of the environmental dimension of sustainable development for environmental sustainability are discussed for the first time in the capital of Brazil, Rio De Janeiro on Environment and Development Summit held in 1992. In this summit, the objective of environmental sustainability is necessary for the protection and development policies, concluded that the aid. The most important work in this area of Environmental Sustainability Index (CSI) 's prepared. This index is prepared jointly by Yale University and Columbia University. Index has 21 indicators is entegrated to 76 data. This 21 quality indicators provide to compare five different subjects: the peripheral system, stress levels of this system, the human population sensitivity to environmental degradation, environmental stress and institutional capacity and global resposibility (Global Leaders, 2001:9).

The paper organized as follows. Section 2 discusses the theoretical background. Section 3 summarizes the literature.The methodology is presented in Section 4. The overall conclusion and result are in the final section.

2. Theoretical Background

Although sustainability is important for ensuring the future Quality of the global environment, it can also be viewed as a business opportunity, an investment in the future and a pathway to innovation and creative thinking (Satterfield et al. 2009; Hontou et al. 2006; Cowan et al. 2010).

Today business, now more sensitivity towards environmental activities as a cost item or to see the threat of competition as an oppurtunity rather than one have to see (Lee et al., 2006: 292). For this reason, environmental innovation can be stated as environmental risk education or more generally as a contribution to sustainable development goals, new ideas, attitudias, development and implemntation of products and process (Rennizgs, 2000: 322). Environmental product innovation in the production and even the destruction of the product until they begin to become waste throughout the product life cycle to eliminate or reduce the negative effects on the environment includes the innovative activities (Büyükkeklik et al., 2010: 375).

3. Literature

Author	Year	Method	Result
Robert Goodland and Herman Daly	1996	Distinguishing development from sustainability and from growth, the paper describes the concept of natural capital and uses the concept to present four alternative definitions of environmental sustainability.	The final section describes how one large development agency, the World Bank, is endeavoring to incorporate these new principle into its operaions.
Gregory Theyel	2000	There are discernible differences in the enviromental innovation and performance of US chemical firms that can be explained by differences in the management practices and characteristics of the firms.	Firms in the chemical industry and in other industries can learn from the leading firms in this research. Firms that do mak environmental management part of production management are likely to be leaders in innovation for pollution prevention and environmental performance.
Smita B. Brunnermeier and Mark A. Cohen	2003	Panel data models to study how environmental sustainability by Us manufacturing ındustries responded to changes in pollution abadement expenditures and regulatory enforcement during the period 1983 through 1992.	Environmental innovation responded to increases in pollution abatement expenditures. Also find some emprical evidence that environmental innovation is more likely to occur in industries that are internationally competitive.
Sergio et. al.	2003	This paper anayses and discusses the potentional role of evolutionary theories in environmental innovation with emphasis on sustainability.	The study concludes that eco – evolution is efficient when identifying non – optimal technological trajectories and sustainable options for innovation on the base of existent knowledge.
Allen S. Bellas and Nancy F.	2007	Following their introduction in the mid - 1970s, fabric filters, a new type of industrial	Anslysis indicates that there are spesific characteristics of

Nentl		scrubber, experineced aggressive growth, and by 1990, this new technology (EIA) form 767, using t tests, cross tabulations and binominal regression to identify the characteistics of those boilers, plants and utilities that installed fabric filters from the alte 1970s to 1990.	early adopters of fabric filter techonology such as the capacity and age of the associates boiler, the capacity and size of the utility, and whether the utility was privately or publicly owned.
David Hillier	2008	An opinion piece, that presents the view of four authors on the current state of the depate in this field.	There are those who believe that marketing and sustainability simply be reconciled, while there are others who argue that marketing can contribute to the development of sustainable consumption.
Dallas M. Cowan Et. Al.	2010	Benchmark analysis, They have collected information on the sustainability programs of the largest US companies in each of the 26 industrial sectors.	Thes have called product sustainability one in which toxicologist and environmental scientist can play a vital role helping to ensure that a manufactured item will indeed be considered acceptable for distrubition now

4. Methodology

Environmental Sustainability Index was developed for monitoring of environmental sustainability covering natural resources, past and present pollution levels, environmental management efforts, contributions and society for the protection of the global values. This index defines the sustainability of countries' capacity to improve the existing environmental quality (Yıkmaz, 2011: 73).

Variables to allow comparisons between countries in the index, percent change is usually determined. Some of them are diveded by GDP, imports of goods and services, to get avarage values. After getting the proper comparison of variables, for the missing data, forecasting and consolidation various transformations is applied to perform. In the first stage variables were examined for normally distribution.

2 stage way is used for the skewness problems.

If the value is larger than 2 variables are taken in natural logarithm. Next, if they are larger than 4 after the transformation .They all transformed to old values except the variables that have larger than 4.

Since at the normal distribution, observations are distributed symmetrically around mean value of skew is zero(0). Statistical methods to estimate the missing data (Markov Chain-Monte Carlo simulation model) were applied. However, some variables, the index of ecological and geographical factors are not within the scope of work because of missing data could not be estimated.

The results of distributions are truncated by "Winsorization" technique in order to prevent skewness because of the extreme values of the data. Priorities of the indicators vary by country, generally acceptable weights for the indicators is not known, equal weight was applied. Indicators are equally weighted variables in the form of the firms themselves. Preserves the relative locations of receiving countries in order to avoid differences in the scale of the z-scores were calculated. High values for the variables expressed in a high z-scores of environmental sustainability; (variable value-mean value) / standard deviation of the variables that environmental sustainability is for high-low values, (average of the variable-variable value) / standard deviation was calculated using the formula (WEF, 2005).

5. Results and Conclusion

It's emphasized that when Environmental Sustainability Index score is high, it's more likely to leave a healthier environment to the future generations. Upon looking into the results of the index,it's seen that none of the countries received high scores from 21 indicators. The results of the Environmental Sustainability Index show that, environmental performance is closely related to ,low population density, good governance the economic vitality (WEF, 2005).

Table 1. Countries in the years 2002 and 2005 Environmental Sustainability Index (ESI) Performance Comparison Chart

Country	ÇSE 2002	ÇSE 2002 Ranking	ÇSE 2005	ÇSE 2005 Ranking	Çse Point Difference	ÇSE as the Difference
Finland	73,9	1	75,1	1	1,2	0
Norway	73	2	73,4	2	0,4	0
Uruguay	66	6	71,8	3	5,8	3

Sweden	72,6	3	71,7	4	-0,9	-1
Iceland	63,9	8	70,8	5	6,9	3
Canada	70,6	4	64,4	6	-6,2	-2
Switzerland	66,5	5	63,7	7	-2,8	-2
Guyana	-	-	62,9	8	-	-
Austria	64,2	7	62,7	9	-1,5	-2
Argentina	61,5	15	62,7	10	1,2	5
Brazil	59,6	20	62,2	11	2,6	9
Gabon	54,9	36	61,7	12	6,8	24
Australia	60,3	16	61	13	0,7	3
New Zealand	59,9	19	61	14	1,1	5
Latvia	63	10	60,4	15	-2,6	-5
Peru	56,5	29	60,4	16	3,9	13
Paraguay	57,8	25	59,7	17	1,9	8
Costa Rica	63,2	9	59,6	18	-3,6	-9
Croatia	62,5	12	59,5	19	-3	-7
Bolivia	59,4	21	59,5	20	0,1	1
Irelan	54,8	38	59,2	21	4,4	17
Colombia	59,1	22	58,9	22	-0,2	0
Lithuania	57,2	27	58,9	23	1,7	4
Alabania	57,9	24	58,8	24	0,9	0

Central African Republic	54,1	43	58,7	25	4,6	18
Estonia	60	17	58,2	26	-1,8	-9
Denmark	56,2	31	58,2	27	2	4
Panama	60	18	57,7	28	-2,3	-10
Slovenia	58,8	23	57,5	29	-1,3	-6
Japan	48,6	78	57,3	30	8,7	48
Germany	52,5	50	57	31	4,5	19
Namibia	57,4	26	56,8	32	-0,6	-6
Russia	49,1	73	56,1	33	7	40
Bostwana	61,8	13	55,9	34	-5,9	-21
France	55,5	33	55,2	35	-0,3	-2
Papua New Guinea	51,8	52	55,2	36	3,4	16
Portugal	57,1	28	54,2	37	-2,9	-9
Malaysia	49,5	68	54	38	4,5	30
Congo	54,3	40	53,8	39	-0,5	1
Netherlands	55,4	34	53,7	40	-1,7	-6
Mali	47,1	85	53,7	41	6,6	44
Chile	55,1	35	53,6	42	-1,5	-7
Bhutan	56,3	30	53,5	43	-2,8	-13
Armenia	54,8	37	53,2	44	-1,6	-7

Unites States	53,2	45	53	45	-0,2	0
Slovakia	61,6	14	52,8	46	-8,8	-32
Belarus	52,8	49	52,8	47	0	2
Ghana	50,2	65	52,8	48	2,6	17
Myanmar	46,2	90	52,8	49	6,6	41
Laos	45,9	92	52,5	50	6,6	42
Ecuadar	56,2	32	52,4	51	-3,8	-19
Cuba	51,2	58	52,3	53	1,1	5
Hungary	62,7	11	52	54	-10,7	-43
Tunisia	50,8	61	51,8	55	1	6
Georgia	-	-	51,5	56	-	-
Uganda	48,7	77	51,3	57	2,6	20
Moldova	54,5	39	51,2	58	-3,3	-19
Zambia	49,5	69	51,1	59	1,6	10
Senegal	47,6	81	51,1	60	3,5	21
Bosnia-Hezzegovina	51,3	55	51	61	-0,3	-6
Israel	50,4	63	50,9	62	0,5	1
Tanzania	48,1	80	50,3	63	2,2	17
Nicaragua	51,8	51	50,2	64	-1,6	-13
Combined Kingdom	46,1	91	50,2	65	4,1	26

Madagascar	38,8	128	50,2	66	11,4	62
Greece	50,9	60	50,1	67	-0,8	-7
Italy	47,2	83	50,1	68	2,9	15
Cambodia	45,6	97	50,1	69	4,5	28
Mongolia	54,2	42	50	70	-4,2	-28
Bulgaria	49,3	71	50	71	0,7	0
Gambia	44,7	102	50	72	5,3	30
Thailand	51,6	54	49,8	73	-1,8	-19
Malawi	47,3	82	49,3	74	2	8
Spain	54,1	44	48,8	75	-5,3	-3,1
Indonesia	45,1	100	48,8	76	3,7	24
Kazakhstan	46,5	88	48,6	77	2,1	11
Guenia Bissau	38,8	127	48,6	78	9,8	49
Sri Lanka	51,3	57	48,5	79	-2,8	-22
Kyrgyzstan	51,3	56	48,4	80	-2,9	-24
Venezuela	53	48	48,1	81	-4,9	-33
Guinea	45,3	98	48,1	82	2,8	16
Oman	40,2	120	47,9	83	7,7	37
Jordan	51,7	53	47,8	84	-3,9	-31
Nepal	45,2	99	47,7	85	2,5	14
Benin	45,7	94	47,5	86	1,8	8

Honduras	53,1	47	47,4	87	-5,7	-40
Serbia and Montenegro	-	-	47,3	88	-	-88
Canary Islands	-	-	47,3	89	-	-
Macedonia	47,2	84	47,2	90	0	-6
Turkey	50,8	62	46,6	91	-4,2	-29
Czech Republic	50,2	64	46,6	92	-3,6	-28
Romenia	50	66	46,2	93	-3,8	-27
South Africa	48,7	76	46,2	94	-2,5	-18
Mexico	45,9	93	46,2	95	0,3	-2
Algeria	49,4	70	46	96	-3,4	-26
Burkina Faso	45	101	45,7	97	0,7	4
Azerbaijan	41,8	113	45,4	98	3,6	15
Nigeria	36,7	133	45,4	99	8,7	34
Kenya	46,3	89	45,3	100	-1	-11
India	41,6	116	45,2	101	3,6	15
Poland	46,7	87	45	102	-1,7	-15
Chad	45,7	95	45	103	-0,7	8
Niger	39,4	123	45	104	5,6	19
Mozambique	51,1	59	44,8	105	-6,3	-46
Morocco	49,1	72	44,8	106	-4,3	-34

Rwanda	40,6	119	44,8	107	4,2	12
Jamaica	40,1	121	44,7	108	4,6	13
Ukraine	35	136	44,7	109	9,7	27
United Arab Emirates	25,7	141	44,6	110	18,9	31
Togo	44,3	105	44,5	111	0,2	-6
Belgium	39,1	125	44,4	112	5,3	13
Bangladesh	46,9	86	44,1	113	-2,8	-27
Democratic Republic of Congo	43,3	109	44,1	114	0,8	-5
Guetemala	49,6	67	44	115	-5,6	-48
Egyptian	48,8	74	44	116	-4,8	-42
El Salvador	48,7	75	43,8	117	-4,9	-42
Syria	43,6	107	43,8	118	0,2	-11
Deminic Republic	48,4	79	43,7	119	-4,7	-40
Liberia	37,7	130	43,4	120	5,7	10
Sierra Leone	36,5	134	43,4	121	6,9	13
South Korea	35,9	135	43	122	7,1	13
Angola	42,4	110	42,9	123	0,5	-13

Resource: WEF 2005

142 countries in 2002 and 146 countries in 2005 were evaluated from the aspect of country index. All the countries except Guayana, Georgia, Ivory Coasts and Somalia were both in 2002 and 2005 country index.

In the table given the index average of all countries in 2002 was 49,7 and 49,9 in 2005. But when 2002 and 2005 index values are compared, a decrease in most of the countries has been seen. This situation indicates that environmental sustainability has decreased or it may be because of the difference in two years indicators.

However, significant changes in country rankings can be observed. For example, Madagascar ascends from being 128th to 66th , Japan from 78th to the 30th, Mali from 85th to 41st , Russia from 73rd to 33rd , Malaysia from 68th to the 38th order , but Zimbabwe descends from being 46th to 128th, Guatemala from 67th to 115th , Egypt from 74th to 116th, and Hungary from 11th to 54th. Turkey has 50,8 points in 2002 Index with an order of 62. In 2005 Turkey has 46,6 points and descends to the 91th order. Turkey is over the avarage in 2002 while it is under the avarage in 2005.

In this study we try to compare the two Environmental Sustainability Index in 2002 and 2005 for the world countries. This situation shows the index is very sensitive to the choice of indicator. Low-scoring countries in 2002 are Kuwait, United Arab Emirates, North Korea, Iraq and Saudi Arabia, while in the 2005 study, North Korea, Iraq, Taiwan, Turkmenistan and Uzbekistan, countries receive the lowest score The highest rated 5 countries in the 2002 Environmental Sustainability Index are: Finland, Norway, Sweden, Canada, Switzerland, while in 2005 they are: Finland, Norway, Uruguay, Sweden and Iceland. Common features of these countries have significant natural resources and population density is low.

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