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Sustainable Development and Life Satisfaction Relationship: A Cross Country Study

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Abstract

Achieving sustainable development goals depends on the impact of sustainability practices on social welfare as well as many other factors. Therefore, in this study, the relationship between the Sustainable Development Goals index of the countries and average life satisfaction in the countries is examined. As a result of the analysis conducted with the help of the data set containing data from 122 countries for 2016, it is found that there is a high positive correlation between sustainable development and life satisfaction, and in the estimation made by the Least Squares method, sustainable development index is found to have a significant and positive effect on life satisfaction. These results indicate that achieving sustainable development goals have a positive effect on the welfare of the society and that the acceptance of these sustainability practices by people can be easier in the light of this information.

Keywords: Sustainability, Development, Life Satisfaction, Cross Country

1. Happiness Economics And Sustainable Development

Maximization of the welfare of society is the primary objective of all economic policies and economic growth is seen as the main instrument for this purpose. However, even if economic growth increases the quality of life in industrialized countries, it is no longer a measure of well-being, as there are significant inconsistencies between economic indicators and other criteria. (Diener and Seligman, 2004: 2) Instead, economists develop new techniques for more direct measurement of welfare. Happiness economics comes into play at this point. The focus of happiness economics is happiness in terms of life satisfaction. (Veenhoven, 2017) Happiness economics is based on the data of happiness data reported by hundreds of thousands of people in countries and continents on the one hand, while also emphasizing the role of non-income factors affecting welfare; it is based on a broader concept of utility compared to the conventional economy. (Graham, 2005: 41)

In 1987, the United Nations Commission on the World Environment and Development has now published Common Future report, commonly known as the Brundtland report. The report includes one of the most widely used definitions of sustainable development: Sustainable development is the development that enables the present needs to be met without compromising the ability of future generations to meet their needs (Brundtland, 1987: 41). Accordingly, the basic idea in sustainable development is to achieve an improvement in the way that social welfare, defined as the sum of individual benefits, will not diminish over time. Many of the behavioral changes required for sustainable development have an impact on people's lives and welfare levels, making it difficult for individuals to accept it. Policies that encourage some of these changes will also be easier to implement if it also increases the welfare of individuals. (Verhofstadt et al., 2016: 80) Stiglitz et

al. (2009) also relates sustainability issues to the concept of subjective well-being, emphasizing the necessity of maintaining current levels of welfare for future generations. Therefore, this study examines the relationship between the success achieved in sustainable development practices and the average life satisfaction of the countries.

It is observed that similar studies on this subject generally focus on one or more elements of sustainable development such as environment, income inequality and health, but the relationship between a general sustainable development index and life satisfaction is not investigated commonly. Tella and MacCulloch (2008) study shows a positive correlation between happiness data, income level, welfare state and life expectancy and a negative correlation with the average working hours, environmental degradation (measured by SOx emissions), crime rate, trade openness, inflation and unemployment based on data of approximately 350.000 people living in OECD between 1975-1997.

Zidansek (2007) examined the correlation between environmental sustainability indices (ESI and EPI) and three different happiness scales. The first of these scales is the average happiness (m) between 1990 and 2000, the second is the inequality adjusted happiness (IAH) and the third is the happy life time (HLY). The estimation results show a strong correlation between environmental sustainability and happiness. The causal relationship between sustainability and happiness can be bi-directional: people who are happier both tend to be more interested in the environment, and people who live in a better environment tend to be happier.

Engelbrecht (2009) investigated the relationship between subjective well-being and natural capital at the macro level and tried to show that subjective well-being criteria should be included in the discussions on sustainable development. Using fifty-eight developed and developing countries' natural capital data from the World Bank Millennium Capital Assessment, he tested whether natural capital per capita is associated with subjective well-being. The bivariate regression indicates the existence of this relationship. This positive relationship continues even after the country-wide determinants of subjective well-being, such as GDP per capita, social capital, income distribution, unemployment, inflation, and regional dummy variables for the former Soviet Union and Latin America countries are added into regression. The findings reinforce the thesis that a "new welfare economy for sustainability" should be established by taking subjective welfare measures into account.

Bartolini and Sarracino (2018) estimate the relationship between individuals' current well-being and their expectations for future generations. If people are not interested in what is going to happen in the long term, whatever their expectations for the future should have a weak or meaningless effect on the present well-being. However, if people have a strong preference for future well-being, future expectations should strongly shape current welfare. This study finds that the expectation of the worst (best) for future generations has a very large negative (positive) effect on subjective well-being. This shows that the people's perceptions on living conditions of future generations are an important component of the present well-being of people.

2. Happiness And Sustainable Development Across Countries

The Commission Report on Economic Performance and Social Progress (2009), which reflects the growing interest in subjective well-being from both researchers and policy makers, suggested that national statistical institutions collect

and publish data on subjective well-being. (OECD, 2013: 21) Almost all OECD countries, in one or more of their surveys, generally include a life evaluation question, ranging from 0 to 10, about life satisfaction. (Helliwell et al., 2017: 10) However, there is currently not enough national statistics to perform inter-country evaluation. Instead, the World Values Survey is a resource that provides cross-country data on reported life satisfaction. This research provides the longest-term estimation of happiness among countries that include non-European countries. The World Values Survey gathers data from a series of representative national surveys covering nearly 100 countries, and the oldest data is based on 1981. Apart from the World Values Survey, there are a number of comparable country happiness data provided by the Gallup World Survey, which has been conducting surveys in a growing number of countries since 2005 and currently covers almost the entire world population. (Helliwell et al., 2017: 10)

The World Happiness Report is a well-known inter-country data source and research on life satisfaction. The source of the happiness scores in the World Happiness Report is the Gallup World Survey, a series of surveys in over 140 languages and in more than 160 countries, represented at the national level. The main question of life satisfaction in the questionnaire is as follows: "Please consider a staircase with a step starting from 0 to10 at the top. The upper part of the ladder represents the best possible life for you and the bottom of the ladder is the worst possible life for you. At which level of stairs do you feel right now?" This metaphor is also known as the Cantril ladder.

According to the 2016 World Happiness report, ten countries with the highest and lowest average life satisfactions are as in Table 1.

Table 1: Ten Countries with Lowest and Highest Life Satisfaction

Rank	Country	Life Satisfaction	Country	Life Satisfaction
1	Finland	7,66	Zimbabwe	3,74
2	Norway	7,60	Madagascar	3,66
3	Denmark	7,56	Guinea	3,60
4	Netherland	7,54	Botswana	3,50
5	Iceland	7,51	Malawi	3,48
6	Switzerland	7,46	Liberia	3,35
7	Sweden	7,37	Haiti	3,35
8	Australia	7,25	Rwanda	3,33
9	Canada	7,24	Tanzania	2,90
10	New Zeland	7,23	Central African Republic	2,69

First, the report states that there is consistency in how people evaluate their lives in different countries. Thus, a four-point difference between the top 10 and lowest 10 countries continues from year to year. (Helliwell et al., 2016: 19) Although the table shows the top 10 rankings of 2016, this ranking has not changed much from year to year. The top 10 countries in Table 1 are the top countries in the World Happiness Report 2015, but there have been some shifts as expected between the countries with very close average scores. The top 10 countries are small or medium-sized industrialized western countries, seven of which are located in Western Europe. Beyond the top ten, geography becomes more diverse; the second 10 includes countries from four of the ten global regions.

The 10 countries with the lowest average life evaluations are slightly different from those in 2015 because of the considerable changes in their

average scores, but still consist mostly of sub-Saharan African countries. Compared to the first 10 countries of the current ranking, there is a greater variance in score between the 10 countries at the bottom. In this group, the mean scores differ by more than one fourth of the group's average score (0.9 points). In countries of middle rank, year-to-year life satisfaction increases and decreases due to domestic economic or security crises or natural disasters, and the ranking can be changed.

While the distribution of happiness is reported by the World Happiness reports, the situation regarding sustainable development has started to be evaluated newly. At the UN Sustainable Development Summit held in 2015, Sustainable Development Goals (SDGs) were adopted with the signature of 193 countries. According to this, there are 17 main goals with 169 subheadings. These goals are listed below.

Goal 1. End all kinds of poverty, no matter where.

Goal 2. To end hunger, to ensure food safety, to improve nutrition and to support sustainable agriculture

Goal 3. Ensure that people live a healthy life and ensure everyone’s welfare at all ages

Goal 4. Providing quality education for all

Goal 5. Ensuring gender equality and strengthening the social position of women and girls

Goal 6. Ensure access to water and sanitary conditions for all, sustainable management of water and sanitary conditions

Goal 7. Provide accessible, reliable, sustainable and modern energy for all

Goal 8. Ensuring sustainable and inclusive economic development, full and productive employment, and decent work

Goal 9. Building durable infrastructure, promoting sustainable and inclusive industrialization and new discoveries

Goal 10. Reduce inequalities within and between countries

Goal 11. Embracing cities and human settlements, making everyone safe, strong and sustainable

Goal 12. Provide sustainable consumption and production

Goal 13. Take immediate action to combat climate change and its effects

Goal 14. To protect oceans, seas and marine resources for sustainable development and use them in a sustainable way

Goal 15. To protect, restore and ensure sustainable use of terrestrial ecosystems, to ensure sustainable use of forests, to combat desertification, to stop and to reverse the loss of productivity and to stop loss of biodiversity.

Goal 16. Promoting peaceful and embracing societies for sustainable development, ensuring access to justice for all, building effective, accountable and embracing institutions at all levels

Goal 17. Strengthen the means of implementation of global partnership for sustainable development and revitalize global partnership

Goals were determined by intergovernmental negotiations lasting more than three years. Although the SDGs have been agreed upon, now the focus is on identifying the monitoring and review political processes as well as the indicators and monitoring framework.

The number of methods and indicators used to measure sustainable development has increased rapidly in the last two decades. While many institutes have adopted sustainable development indicators (SDG) to monitor progress towards a sustainable society, many composite indicators

have been proposed in the academic literature. In order to support the implementation of the SDGs at local, national and global scales, the Association of Research institutes established under the name of SDSN (Sustainable Development Solutions Network) was established. In 2016, the SDSN and Bertelsmann Stiftung launched a new Sustainable Development Goal Index to monitor the progress of the SDG and ensure accountability. In order to assess where each country is in reaching the SDGs in 2016, the SDG Index has collected the available data for 149 countries and listed the countries according to their achievements of 17 goals. The table showing the averages of countries' life satisfaction with this ranking is as follows.

Table 2: Sustainable Development Goal Index Scores and Life Satisfaction Averages of the Countries

Rank	Country	Life satisfaction	SDG Index	Rank	Country	Life satisfaction	SDG Index
1	Sweden	7,37	84,53	66	Albania	4,51	60,77
2	Denmark	7,56	83,88	67	Mauritius	5,61	60,72
3	Norway	7,60	82,31	68	Panama	6,12	60,71
4	Finland	7,66	81,00	69	Ecuador	6,12	60,69
5	Switzerland	7,46	80,87	70	Tajikistan	5,10	60,17
6	Germany	6,87	80,52	71	Bosnia and Herzegovina	5,18	59,90
7	Austria	7,05	79,07	72	Paraguay	5,80	59,33
8	Netherlands	7,54	78,94	73	China	5,32	59,07
9	Iceland	7,51	78,41	74	Iran, Islamic Rep.	4,65	58,55
10	United Kingdom	6,82	78,14	75	Botswana	3,50	58,42
11	France	6,48	77,90	76	Peru	5,70	58,38
12	Belgium	6,95	77,43	77	Algeria	5,39	58,14
13	Canada	7,24	76,85	78	Mongolia	5,06	58,06
14	Ireland	7,04	76,75	79	Saudi Arabia	6,47	58,03
15	Czech Republic	6,74	76,73	80	Lebanon	5,27	57,99
16	Luxembourg	6,97	76,66	81	Vietnam	4,04	57,62
17	Slovenia	5,94	76,62	82	Bolivia	5,77	57,47
18	Japan	5,95	74,96	83	Nicaragua	6,01	57,39
19	Singapore	6,03	74,61	84	Colombia	6,23	57,21
20	Australia	7,25	74,53	85	Dominican Republic	5,24	57,11
21	Estonia	5,65	74,48	86	Gabon	4,83	56,21
22	New Zealand	7,23	74,04	87	El Salvador	6,14	55,64
23	Belarus	5,18	73,50	88	Philippines	5,43	55,54
24	Hungary	5,45	73,37	89	Indonesia	5,14	54,38
25	United States	6,80	72,71	90	South Africa	4,77	53,78
26	Slovak Republic	5,99	72,70	91	Kuwait	5,95	52,54
27	Korea, Rep.	5,97	72,67	92	Honduras	5,65	51,78
28	Latvia	5,94	72,49	93	Nepal	5,10	51,53
29	Israel	7,16	72,29	94	Ghana	4,51	51,41
30	Spain	6,32	72,21	95	Iraq	4,41	50,87
31	Lithuania	5,87	72,10	96	Guatemala	6,36	50,01
32	Malta	6,59	71,95	97	Zimbabwe	3,74	48,63
33	Bulgaria	4,84	71,80	98	India	4,18	48,39

34	Portugal	5,45	71,49	99	Congo, Rep.	4,52	47,19
35	Italy	5,95	70,90	100	Cameroon	4,82	46,33
36	Croatia	5,21	70,71	101	Lesotho	3,81	45,95
37	Greece	5,30	69,90	102	Senegal	4,59	45,84
38	Poland	6,16	69,81	103	Pakistan	5,55	45,71
39	Serbia	5,75	68,30	104	Myanmar	4,62	44,50
40	Uruguay	6,17	68,02	105	Bangladesh	4,56	44,42
41	Romania	5,97	67,51	106	Cambodia	4,46	44,37
42	Chile	6,58	67,18	107	Kenya	4,40	44,04
43	Argentina	6,43	66,82	108	Rwanda	3,33	43,99
44	Moldova	5,58	66,60	109	Uganda	4,23	43,62
45	Cyprus	5,79	66,53	110	Ethiopia	4,30	43,06
46	Ukraine	4,03	66,39	111	Tanzania	2,90	43,01
47	Russian Federation	5,85	66,36	112	Togo	3,88	40,85
48	Turkey	5,33	66,12	113	Benin	4,01	39,98
49	Armenia	4,33	65,41	114	Malawi	3,48	39,77
50	Tunisia	4,52	65,06	115	Mauritania	4,47	39,60
51	Brazil	6,37	64,44	116	Zambia	4,35	38,40
52	Costa Rica	7,14	64,24	117	Mali	4,02	38,22
53	Kazakhstan	5,53	63,85	118	Yemen, Rep.	5,06	37,31
54	United Arab Emirates	6,83	63,58	119	Sierra Leone	4,73	36,92
55	Mexico	6,82	63,37	120	Afghanistan	4,22	36,50
56	Georgia	4,45	63,28	121	Madagascar	3,66	36,23
57	Macedonia, FYR	5,35	62,76	122	Nigeria	5,22	36,06
58	Jordan	5,27	62,73	123	Guinea	3,60	35,93
59	Montenegro	5,30	62,47	124	Burkina Faso	4,21	35,63
60	Thailand	6,07	62,17	125	Haiti	3,35	34,40
61	Venezuela, RB	5,89	61,82	126	Chad	4,03	31,79
62	Morocco	5,39	61,62	127	Niger	4,23	31,42
63	Azerbaijan	5,30	61,34	128	Congo, Dem. Rep.	4,12	31,29
64	Egypt, Arab Rep.	4,56	60,88	129	Liberia	3,35	30,49
65	Kyrgyz Republic	4,86	60,85	130	Central African Republic	2,69	26,10

http://www.sdgindex.org/

While OECD countries are trying to meet goals for inequality, sustainable consumption, climate change and ecosystems, many developing countries are facing major challenges in providing basic social services and infrastructure access to their communities. While East and South Asia are leaving behind many other developing regions, they have problems in realizing the health and education goals. High levels of inequality are among the most urgent issues for Latin America and the Caribbean. Sub-Saharan Africa, the world's poorest region, has been experiencing major challenges in improving the poverty, hunger and health in almost all SDGs, despite significant progress in recent years. (SDG, 2017; p.12-13) Table 3 shows the top and bottom 10 rankings of the sustainable development goal index.

Table 3: Highest and Lowest Ten Countries Based on SDG Index

Rank	Country	SDG Index	Country	SDG Index
1	Sweden	84,53	Madagascar	36,23
2	Denmark	83,88	Nigeria	36,06
3	Norway	82,31	Guinea	35,93
4	Finland	81,00	Burkina Faso	35,63
5	Switzerland	80,87	Haiti	34,40
6	Germany	80,52	Chad	31,79
7	Austria	79,07	Niger	31,42
8	Netherlands	78,94	Congo, Dem. Rep.	31,29
9	Iceland	78,41	Liberia	30,49
10	United Kingdom	78,14	Central African Republic	26,10

As can be seen from the table showing the top 10 in the ranking of the sustainable development goal index, the countries closest to realizing the targets are not the largest economies, but small, developed countries. Germany and the UK are the only G7 countries in the top ten. The United States ranked 25th in the index, while the Russian Federation and China ranked 47th and 76th, respectively. Poor and developing countries are clearly at the end of the list because they have difficulty in fulfilling the first eight goals in the SDG Index.

When we look at the table showing the top and bottom 10 rows in the list made according to the World Happiness Report life satisfaction data, we can see that most of them are in the same rankings with the countries in the SDG index list. Sweden, Denmark, Norway Finland, Switzerland, the Netherlands and Iceland are both countries that show the best performance in SDGs and life satisfaction, while Madagascar, Guinea, Liberia, Haiti and the Central African Republic fail to achieve both the goals of sustainable development and life satisfaction. From this point of view, the graph we have created to see if there is a relationship between the SDG index and life satisfaction averages of all countries is given below.

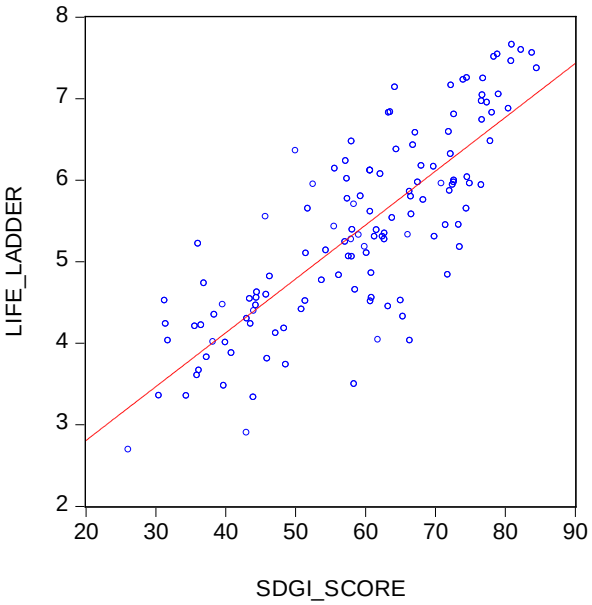

Fig 1 Life Satisfaction and SDG Index (2016)

The graph shows life satisfaction and SDG index matches for each country, and the distribution of points in the chart indicates a positive correlation between these two variables. The average life satisfaction of the countries with higher SDG index scores is also higher in the chart. This may be due to the fact that countries with a high level of life satisfaction are more successful in achieving sustainable development goals, or those living in countries that are closer to sustainable development goals can be more satisfied with the lives. When the correlation between these two variables is calculated, we see that it is as high as 0,81. When we look at sustainable development targets, it is

natural to achieve these goals to increase the welfare of people living in a country. From this point of view, we can say that this correlation supports the idea that the practices for sustainable development have the potential to increase the welfare of the society.

3. Data And Analysis

Although there is a high correlation between the average life satisfaction and SDG index across the countries, in order to see whether this relationship continues, the estimation process is carried out with the least squares method together with the other important variables explaining life satisfaction. Since many of the explanatory variables in the literature, such as health, education and environmental factors are included in the calculation of the SDG index, GDP per capita and the country's average level of freedom are used as other explanatory variables. Life satisfaction, GDP per capita and freedom data are taken from the Gallup World Survey data used in the preparation of the World Happiness 2016 report. The SDG index was taken from the 2016 SDG index data prepared by the Sustainable Development Solutions Network (SDSN). Descriptive statistics of the variables are given in Table 4.

Table 4: Descriptive Statistics

Variable	Mean	Std. Deviation	Max	Min	No of observation
Life_satisfaction	5,3993	1,1604	7,6598	2,6931	130
GDP	9,2809	1,1946	11,4593	6,6329	125
Freedom	0,7625	0,1275	0,9578	0,3035	127
SDG	58,4095	13,7965	84,5294	26,1024	149

While dependent variable "Life_satisfaction" data is available for 130 countries for 2016, GDP per capita is available for 125 countries, "Freedom" for 127 countries and SDG index is available for 149 countries. Therefore estimation is carried out for 122 countries which data exists for all variables. The model used in estimation is below.

$$Life\_satisfaction_i = a_0 + a_1\ GDP_i + a_2\ Freedom_i + a_3\ SDG_i + \varepsilon_i$$

Estimation results are summarized in Table 5.

Table 5: OLS Estimation Results

Dependent variable	**Life_satisfaction**	
No of observations	**122**	
Variable	**Coefficient**	**t stat**
C	-1.6978*	-2.99
GDP	0.4118*	4.02
Freedom	2.2564*	4.89
SDG	0.0266*	3.05
*significant at % 99 confidence level		
R2	0,74	

Estimation results show that per capita income, freedom in society, and SDG index together explain 74% of inter-country differences in life satisfaction. The GDP per capita and the average level of freedom in society has a positive and significant effect on the average life satisfaction in the country as in previous studies. Although these primary variables are included in the model, the effect of SDG index on life satisfaction is still positive and significant. These results show that average life satisfaction levels in countries are increasing as countries approaching to realize sustainable development targets. Accordingly, the only way to increase social welfare is not economic growth. Life satisfaction is expected to be higher in societies where people feel free and are close to achieving sustainable development goals.

4. Conclusion and Discussion

The index of sustainable development targets is an important tool for the implementation of sustainable development around the world as a

criterion of countries' success in achieving the targets set in the subjects of hunger, income inequality, health, education, environment etc. The fact that a certain level of social welfare can be sustained not only for the present but also for the next generations depends on the achievement of these targets by all countries. However, in order to achieve these objectives, it is necessary to determine the effect of these on the life satisfaction of the people. This study aims to do this by examining the relationship between the level of sustainable development goals and the average level of life satisfaction in countries. In this regard, the concepts and techniques developed in the happiness economics are utilized. In conclusion, while in parallel to findings of Helliwell et al. (2017), the per capita income and social freedom level are the most important determinants of life satisfaction in the country, the impact of the where country stands on sustainable development has a significant impact on life satisfaction.

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