IHS
Making cities work

IHS is the international institute of urban management of Erasmus University Rotterdam

MSc Programme in Urban Management and Development

Rotterdam, The Netherlands

September 2015

People, Planet, Prosperity: A study on the sustainable development factors affecting happiness of countries

Name: Annielyn Canaria Rivera

Supervisor: Dr. Ronald S. Wall

Co-Supervisor: Monserrat Budding-Polo Ballinas, MSc.

Urban Competitiveness and Resilience

UMD 11

MASTER'S PROGRAMME IN URBAN MANAGEMENT AND DEVELOPMENT

(October 2014 – September 2015)

People, Planet, Prosperity: A study on the sustainable development factors affecting happiness of countries

Annielyn Canaria Rivera
Philippines

Supervisors:
Dr. Ronald S. Wall
Monserrat Budding-Polo Ballinas, MSc.

UMD 11 Report number: 832
Rotterdam, September 2015

Summary

The emergence of happiness economics has resulted in the increased interest to use happiness as an indicator for national development and as a basis for formulating country policies. As such, governments of the United Kingdom, France, Germany, United Arab Emirates, and China have expressed interest in using national happiness as a prime goal for policy. The same is done by the United Nations General Assembly which encouraged countries to pursue measures to reflect the importance of pursuing happiness and well-being in development.

Likewise, sustainable development has taken a major turn in the development sphere. This 2015, UN Member States will be adopting the Sustainable Development Goals (SDGs) which will expand and continue the efforts started in the Millennium Development goals set to expire in the same year. The SDGs, which contain 17 goals and 100 indicators, aim to achieve multidimensional development in various areas such as dignity, people, planet, partnership, justice, and prosperity for present and future generations. A key improvement in the SDGs is the inclusion of measures of evaluative well-being as one of the indicators to capture a reflective assessment of an individual's overall satisfaction with life.

One of the hindrances in achieving sustainable development and increasing happiness levels of citizens is the limited resources of governments. Likewise, there is also an emerging need to determine if sustainable development goals on economic growth, social inclusion, and environmental sustainability really reflect the well-being and happiness of citizens of countries. However, the challenge still prevails on how countries can maximize resources to achieve greater happiness and at the same time achieve sustainable development for present and future generations. The objectives of this research, therefore, is to explore the sustainable development factors, focusing on people, planet, and prosperity indicators and how these factors relate to happiness levels of countries. The research also studied how sustainable development indicators affect the happiness of different income groups and regional clusters as there are more similarities in terms of happiness and development levels across these groups. This becomes even more important as the determinants of happiness for one income group or region is not the same for all income groups or regions.

In order to conduct the research, the list of indicators on sustainable development from the proposed 2015 Sustainable Development (SD) Goals as well as the approved list of SD indicators by the UN Commission on Sustainable Development (CSD) were utilized. The data for the indicators came from various sources such as the World Bank Data Bank, World Health Organization database, UN Stats, Organization for Economic Co-operation and Development (OECD), Human Development Report, reports on the progress of the Millennium Development Goals, and the International Disaster Database. On the other hand, the research used the time-series rankings of Gallup World Poll which show life-satisfaction levels of over 150 countries all over the world for the past 10 years (2005-2014). A total of 4 income groups, 4 regions and 159 countries were included in the research.

In order to answer the research questions, this explanatory research used survey as a research strategy and the approach utilized was quantitative analysis and statistical modelling. Specifically, fixed effect regression model was used to identify the significant sustainable development indicators affecting happiness at the global level and including analysis at income and regional levels.

The descriptive section of the results focused on the changes in life satisfaction of countries, income groups, and regional clusters over the ten-year period. Economic, social, and environmental factors affecting happiness were also analyzed through fixed-effect regression

analysis in the explanatory section of the research. Finally, the sustainable development factors affecting happiness of countries, income groups, and regional clusters are also presented.

The results showed that sustainable development indicators such as GDP per capita, government expenditure on health, renewable electricity production, age dependency ratio, and self-employment have significant effects on the life satisfaction of countries at the global level. The results also show that other sustainable development indicators such as renewable electricity production have a negative effect on the happiness of citizens across different levels of analysis. In addition, the results reflect the huge difference in terms of sustainable development indicators which are significant at different levels of analysis. As such, the sustainable development indicators which are significant varies across income groups and across regions as well.

Overall, the results also show that while GDP per capita is a strong determinant of happiness, countries should also consider other indicators such as increasing health expenditure, reducing unemployment, and creating an encouraging environment for self-employment, to further increase life satisfaction. The results likewise reinforce the idea that prescribing one policy at the global level may not be effective across countries. The differences in the sustainable development indicators affecting happiness at different income groups and regions suggest that in order to consider well-being as a prime goal for policy, there is a need to consider differences in the determinants of well-being across these groups.

In addition, indicators for sustainable consumption and production such as carbon dioxide emissions and renewable electricity production which have a negative effect on life satisfaction that what is expected will require different policy interventions. The study does not suggest that countries turn their back to sustainable consumption and production, rather it shows that enforcing sustainable means of production and consumption will go at the cost of life satisfaction of people, at least temporarily. As sustainable development is also anchored on a holistic and forward-looking view of development, pushing for sustainable means of livelihood even if it means sacrificing albeit temporarily the happiness of present citizens will add to the happiness of future generations in the long run if it improves environmental quality, uplifts living conditions of people, and reduces poverty.

Keywords

Happiness, Life Satisfaction, Sustainable Development, Happiness Economics

Acknowledgements

I would like to express my heartfelt gratitude to my supervisors, Dr. Ronald Wall, Monserrat Budding-Polo Ballinas, and Dr. Spyridon Stavropoulos for their unwavering support and valuable insights. The knowledge and guidance you have willingly imparted on us is deeply appreciated. A special thanks is also extended to Dr. Frank Van Oort, IHS Academic Director and professor at Erasmus School of Economics, for sharing his valuable insights for the improvement of this research.

I would also like to take this opportunity to thank the people who have made my stay here in the Netherlands a truly memorable experience. First, my sincere appreciation to my Star Magic family who has been my constant support group throughout my stay in the Netherlands. Likewise, my deepest gratitude to the Filipino students in Erasmus Universiteit Rotterdam for their companionship and guidance. I would also like to extend my appreciation to Laura, Brisy, and their family for treating me as part of their wonderful family. And lastly, I would like to thank the Filipino community in Rotterdam for welcoming us into their group.

I would also like to extend my utmost appreciation to my UCR classmates, most especially my groupmates, who had been my extended family and support system while here in Rotterdam.

A sincere appreciation as well to World Bank for their financial support and to my NEDA colleagues for fully supporting me in pursuing this Master's program.

I further extend my wholehearted appreciation for my family for their unending support and encouragement and for always being my constant source of inspiration and motivation. Likewise, I am deeply grateful to my friends back in the Philippines for all the love and for always believing in me.

Finally, my immense appreciation to the Lord Almighty who has made all things possible.

Abbreviations

ESI	Environmental Sustainability Index
GDP	Gross Domestic Product
GNH	Gross National Happiness
GNI	Gross National Income
GNP	Gross National Product
GWP	Gallup World Poll
HDI	Human Development Index
MDGs	Millennium Development Goals
OECD	Organisation of Economic Co-operation and Development
SD	Sustainable Development
SDGs	Sustainable Development Goals
UN	United Nations
UNCSD	United Nations Commission on Sustainable Development
UN DESA	United Nations Department of Economics and Social Affairs
UNDP	United Nations Development Program
WIP	Well-being and Progress Index

Table of Contents

Summary ..... **ii**

Keywords ..... **iii**

Acknowledgements ..... **iv**

Abbreviations ..... **v**

List of Tables ..... **viii**

List of Figures ..... **viii**

Chapter 1: Introduction **1**

1.1 Background 1
1.2 Problem Statement 2
1.3 Research Objectives 2
1.4 Provisional Research Question(s) 3
1.5 Significance of the Study 3
1.6 Scope and Limitations 3

Chapter 2: Literature Review **5**

2.1 State of the Art of the Theories/Concepts of the Study 5
2.1.1 Theories on Development 5
2.1.1.1 Linear Stages Theories 6
2.1.1.2 Structural-Change Models 7
2.1.1.3 The International-Dependence Revolution 8
2.1.1.4 The Neoclassical Counterrevolution: Market Fundamentalism 9
2.1.2 The Transition from Purely Economic Growth 10
2.1.2.1 Sustainable Development 11
2.1.2.2 Human Development 13
2.1.2.3 The Emergence of Happiness Economics 14
2.1.3 Happiness and Development 15
2.1.3.1 Quality of Life and Well-Being 15
2.1.3.2 Measuring Well-Being 15
2.1.3.3 Life Satisfaction and Happiness 16
2.1.3.4 Studies on Happiness and Sustainable Development 18
2.2 Summary and Lessons Learned from Literature 19
2.3 Conceptual Framework 20

Chapter 3. Research Design and Methods **23**

3.1 Introduction 23
3.2 Operationalization: Concepts, Variables, and Indicators 23
3.3 Analytical Framework 25
3.4 Research Strategy, Approach and Data Collection Methods 27
3.5 Geographic Scope and Collection 28
3.6 Validity and Reliability 29

Chapter 4: Research Findings **30**

4.1 Life Satisfaction across Years 30
4.2 Economic Factors Affecting Life Satisfaction 40
4.2.1 GDP per Capita 42
4.2.2 Inflation 44
4.2.3 Gross Capital Formation 45
4.2.4 Health Expenditure 45
4.3 Social Factors Affecting Life Satisfaction 47
4.3.1 Age Dependency Ratio 49

4.3.2 Self-employment and Unemployment 50
4.3.3 Life Expectancy at Birth 51
4.4 Environmental Factors Affecting Life Satisfaction 52
4.4.1 Carbon Dioxide Emissions 54
4.4.2 Electricity Production from Renewable Sources 55
4.4.3 Urban Environment 57
4.5 Sustainable Development Indicators 60
4.5.1 Global Level 60
4.5.2 Income Groups 61
4.5.3 Regional Level 63
4.5.4 Lessons Learned 64

Chapter 5: Conclusions and Recommendations 66

5.1 Major Findings and Answering the Research Questions 66
5.1.1 Answer to Research Sub Question 1 66
5.1.2 Answer to Research Sub Question 2 67
5.1.3 Answer to Research Sub Question 3 68
5.2 Lessons Learned 69
5.3 Recommendations 71

Bibliography 73

Annexes 78

Annex 1. Detailed list of indicators 78
Annex 2. Results of Statistical Tests 80
Annex 3. List of countries by income group and regional cluster 81
Annex 4. Descriptive Statistics of the Variables 84
Annex 5. Fixed-Effects Regression Results for Prosperity Variables with Population Density as Control Variable 85
Annex 6. Fixed-Effects Regression Results for People Variables with Population Density as Control Variable 87
Annex 7. Fixed-Effects Regression Results for Planet Variables with Population Density as Control Variable 89
Annex 8. Fixed-Effects Regression Results for Sustainable Development Variables with Population Density as Control Variable 91

List of Tables

Table 1. Economic Indicators determining Life Satisfaction across Income Groups 41
Table 2. Economic Indicators determining Life Satisfaction across Regions 42
Table 3. List of Countries with Highest and Lowest GDP per Capita 44
Table 4. List of Countries with Highest Life Ladder 44
Table 5. Social Factors Affecting Life Satisfaction across Income Groups 48
Table 6. Social Factors Affecting Life Satisfaction across Regions 49
Table 7. Environmental Indicators Affecting Life Satisfaction of Income Groups 53
Table 8. Environmental Indicators Affecting Life Satisfaction of Regions 54
Table 9. Sustainable Development Indicators Affecting Life Satisfaction of Income Groups 61
Table 10. Sustainable Development Indicators Affecting Life Satisfaction at Regional Level 64
Table 11. Sustainable Development Factors Affecting Happiness of Income Groups 68
Table 12. Sustainable Development Factors Affecting Happiness of Regional Clusters 68

List of Figures

Figure 1. Development Theories from 1950s-1960s 6
Figure 2. Institutional Framework for Sustainable Development 12
Figure 3. Translation of Millennium Development Goals to Sustainable Development Goals 13
Figure 4. Conceptual Framework 22
Figure 5. Sustainable Development Indicators 24
Figure 6. Life Satisfaction Indicator 25
Figure 7. Analytical Framework 26
Figure 8. Life Satisfaction Maps from 2005 to 2014 31
Figure 9. Distribution of Life Satisfaction across Countries 36
Figure 10. Life Ladder of Income Groups from 2005 to 2014 37
Figure 11. Life Ladder of Regions from 2005 to 2014 38
Figure 12. Life Satisfaction of Selected Countries in Africa, America, Asia, and Europe 39
Figure 13. Scatter Graph of Average Life Ladder and GDP per Capita from 2005 to 2014 43
Figure 14. Map of Life Satisfaction and Health Expenditure 46
Figure 15. Average Age Dependency Ratio for 2005-2014 50
Figure 16. Map of Life Satisfaction and Life Expectancy 52
Figure 17. Scatter Graph of Average Carbon Dioxide Emissions and Income from 2005-2014 55
Figure 18. Renewable Electricity Production of Happy Countries from 2005-2014 57
Figure 19. Map of Life Satisfaction and Urbanization 59
Figure 20. Scatter Graph of Life Satisfaction and Ecological Footprint 60
Figure 21. Average Self-employment of Happy Countries 62
Figure 22. Social, Economic, and Environmental Factors Affecting Life Satisfaction at the Global Level 66

Chapter 1: Introduction

1.1 Background

Happiness economics is an emerging concept. The recently published 2015 World Happiness Report showed how happiness can be effectively used to assess the development of nations (Helliwell, Layard, et al., 2015). Aside from the World Happiness Report, researches from the Gallup World Poll and World Values Survey also show happiness ranking of countries all over the world. And as a result of the emerging importance of happiness economics, countries have started placing focus on using happiness as an indicator for national development and as a basis for formulating country policies. Recently, the governments of the United Kingdom, France, Germany, United Arab Emirates, and likewise China have stated interest in pursuing National Happiness as a prime goal of policy (Frey and Gallus, 2013). In addition, the United Nations (UN) General Assembly encouraged countries to undertake additional measures to better capture the importance of the pursuit of happiness and well-being in development with an end view of guiding public policies (Happiness: towards a holistic approach to development, 2011). This initiative has already been done a long time ago by the Kingdom of Bhutan which created the Gross National Happiness (GNH) index that focuses on maximizing GNH rather than Gross Domestic Product (GDP) to better reflect their understanding of progress and development (Braun, 2011).

While happiness is the degree to which an individual judges the overall quality of his/her own life-as-a-whole favorably, we must understand how well-being varies across different national contexts to be able to increase life satisfaction (Veenhoven, 2012, Bonini, 2008). Hence, the study of happiness economics is important in providing evidence on the extent to which living conditions are adverse or favorable to people (Stutzer and Frey, 2012).

Aside from happiness economics, countries have also exerted efforts to improve living conditions of its people through sustainable development strategies. Sustainable development recognizes that growth must be both inclusive and environmentally sound to reduce poverty and build a shared prosperity for today's population while continuing to meet the needs of future generations. Sustainable development is efficient with resources and carefully planned to deliver both immediate and long-term benefits for people, planet, and prosperity (World Bank, 2015). Past global conferences such as the Rio+20, the UN Habitat II, and the UN Summit on the Millennium Development Goals have highlighted the need to pursue strategies toward sustainable development. These conferences have also served as venues to showcase commitments from countries to introduce innovative strategic actions and to continue efforts toward achieving sustainable development. In the recent Rio+20 Summit, the UN Member States called for the creation of Sustainable Development Goals (SDGs). The SDGs, which expand on the Millennium Development Goals (MDGs) set to expire this 2015, are expected to be adopted by heads of state at the UN Summit in September 2015 (Helliwell, Layard, et al., 2015). One of the key improvements of the proposed SDGs is the inclusion of the indicator on subjective well-being to measure the progress towards the achievement of SDGs.

As sustainable development is anchored on three pillars of economic growth, social development, and environmental protection, it is only imperative to study how various sustainable development indicators on people (social development), planet (environmental sustainability), and prosperity (economic growth) not only help in achieving sustainable development among countries but also help in increasing happiness levels of countries. While there is a growing appetite for research on the determinants of happiness and well-being as a means for identifying policies for furthering national progress, there is also a need to

understand what sustainable development factors affect happiness of countries and how can we use these factors to introduce policies that will have a two-fold effect in increasing happiness levels as well as in contributing to sustainable development of countries given the limited resources of governments.

1.2 Problem Statement

The limited resources of governments pose as a hindrance in achieving sustainable development goals and increasing happiness levels of citizens. And as such, it is important to determine the development factors that have a two-tier effect on sustainable development and happiness. In addition, it becomes even more a challenge as there is now a worldwide pressure to prescribe policies that address people's welfare and well-being. In addition, with the proposed Sustainable Development Goals to be launched in September 2015, there is also an emerging need to determine if sustainable development indicators really reflect the well-being and happiness of citizens of countries.

Although it is widely known that on the average, persons living in rich countries are happier than those living in poor countries, it is important to consider the various sustainable development factors affecting the general happiness of countries to be able to achieve inclusive growth (Deaton, 2008, Frey and Stutzer, 2002). While understanding of happiness already shows that greater happiness for a greater number is possible, there is also a growing support for the idea that governments should aim at creating greater happiness (Bentham, 1789, Veenhoven, 2009). However, the challenge still prevails on how countries can maximize resources to achieve greater happiness and at the same time achieve sustainable development for present and future generations.

Studying the differences on the sustainable development indicators that affect the happiness of income groups and regional clusters are also important as there are more similarities in terms of happiness and development levels of countries within income groups or regions. This becomes even more important as the determinants of happiness for one income group or region is not the same for all income groups or regions. Hence, it is also essential to look at how the determinants of happiness vary across these groups. Ultimately, there is a need to study what sustainable development policies must be prioritized by governments and regional clusters to maximize happiness and how these can be further translated into national-level development and physical planning of countries.

1.3 Research Objectives

The research focuses on studying to what extent does sustainable development factors not only contribute to the achievement of sustainable development goals but also in increasing happiness levels of countries. The objective of this research, therefore, is to explore the sustainable development factors, focusing on people, planet, and prosperity indicators and how these factors relate to happiness levels of countries as well as different income and regional groups. Exploring these factors will help in understanding what make countries happy. As there is now a rising worldwide demand to prescribe policies that are more closely aligned with what really matters to people, this research will help in choosing sustainable development policies that can increase happiness levels of people in countries as well as help in prescribing policies at the regional level. Likewise, given the limited resources of governments, prioritizing government efforts based on significant people, planet and prosperity indicators will help

toward maximizing happiness and at the same time, achieving sustainable development for present and future generations. In addition, the outcome of the research will be useful in prioritizing these indicators in national-level development and physical planning of countries.

1.4 Provisional Research Question(s)

Main Research Question:

What are the sustainable development factors that affect the happiness of countries?

Sub Questions:

1. Which social, economic, and environmental factors affect happiness at the global level?

2. What is the difference in the sustainable development factors affecting the happiness of different income groups at the global level?

3. What is the difference in the sustainable development factors that affect the happiness of regional clusters of countries such as in Africa, America, Asia and the Pacific, and Europe?

1.5 Significance of the Study

The study aims to contribute to general knowledge by helping countries prioritize measures to improve sustainable development and at the same time, increase happiness levels of countries. The study will also contribute to the general knowledge of happiness economics.

Specifically, the research will help in identifying which people, planet and prosperity factors have a significant effect on the happiness of people in countries and different clusters such as income groups and geographic regions. The need to explore these sustainable development factors to explain why some countries, income groups, and regional clusters are happier than others will greatly help in identifying country- and regional-level policies and strategies aimed at increasing happiness of its citizens. The need to study the differences across income and regional levels may also shed light on how determinants of happiness vary across these groups. At the same time, the outcome of this study could help in prioritizing the resources of governments and could also help in the national development and physical planning of countries.

1.6 Scope and Limitations

This research will focus on studying the relationship between sustainable development indicators and happiness. The study will use the list of indicators on sustainable development from the proposed 2015 Sustainable Development (SD) Goals as well as the approved list of SD indicators by the UN Commission on Sustainable Development (CSD). The proposed 2015 SD Goals was formulated after the Rio+20 Conference in 2012 and will be launched in September 2015. The SD goals contains 17 goals on various themes and will replace the Millennium Development Goals set to expire on the same year (Sustainable Development Solutions Network, 2015). Last reviewed and revised in 2007, the list of sustainable

development indicators from UN CSD include indicators on different themes such as poverty, governance, health, education, land, biodiversity, economic development, and consumption and production patterns (UN Department of Economic and Social Affairs, 2007).

Due to data restrictions at the city level, the research will use the time-series rankings of Gallup World Poll which shows life-satisfaction levels of over 150 countries from all over the world for the past 10 years (2005-2014). A study will also be done to see how happiness varies across regions and income groups. At the same time, the study will also include specific country-level assessment for people, planet, and prosperity to give a closer look on how sustainable development indicators affect some countries.

Since the study will include multi-level country analysis, this research does not take into account the differences among countries such as those in culture, the language used in asking life satisfaction questions in the Gallup World Poll as well as differences on how the countries view life satisfaction or happiness. In addition, it does not consider the differences in the political climate and existing policies already in place in countries that may affect the results of the analysis of the research. Likewise, the research will include comparisons among geographic regions across the world to determine if there is a difference in the sustainable development indicators affecting happiness of regions specifically those in Africa, America (including both North and South America), Asia and the Pacific (including Australia and New Zealand), and Europe. In addition, analysis at the income level will be done to see differences in the determinants of life satisfaction between low, middle, and high income economies.

Another limitation of the study would be in identifying the causal relationship between happiness and the sustainable development indicators. However, the research may also include finding out other intermediate and intervening factors that may influence the relationship between sustainable development and happiness.

Chapter 2: Literature Review

The researcher reviewed relevant existing literature to find out what has been established about the concepts of this research. The first part of the review provides and reflects arguments and statements raised regarding relevant theories as well as concepts and ideas surrounding them. Definitions from the perspective of various authors are also provided to clarify these concepts and ideas.

The last part provides a conceptual framework for the relationships of the concepts raised in the study.

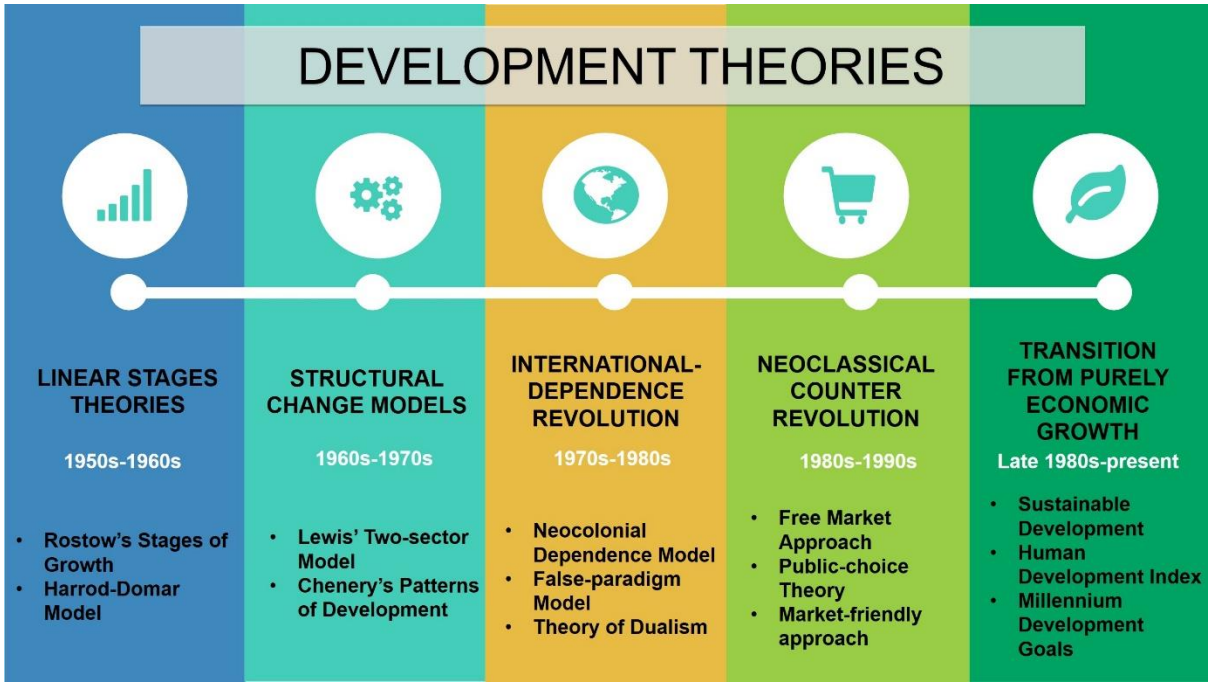
2.1 State of the Art of the Theories/Concepts of the Study

2.1.1 Theories on Development

In strictly economic terms, development has traditionally meant achieving continuous rates of growth of income per capita to allow a nation to expand its output at a rate faster than the growth rate of its population (Todaro and Smith, 2012). Hence, the central aim of economic development in its simplest form is to increase the wealth of a nation. Before 1970s, rapid economic growth has been considered a good proxy for other attributes of development as measured by an annual increase in gross national product (GNP) or the gross domestic product (GDP) (Todaro and Smith, 2012, Dang and Pheng, 2015). GNP is measured through the total income earned by a nation's permanent residents. It is different from GDP which is the market value of all final goods and services produced within a country in a given period of time including income that citizens of a certain country earn abroad and excluding income that foreigners in a country earn. GDP is a widely used economic measure as it is thought to be the best single measure of a society's economic well-being (Mankiw, Gans, et al., 2012).

The classic post-World War II literature on economic development has been dominated by four major and sometimes competing strands of thought: (a) the linear stages of growth model, (b) the structural-change models, (c) the international-dependence revolution, and (d) the neoclassical, free-market counterrevolution (Todaro and Smith, 2012). These four models will be discussed in detail in the succeeding sections.

Figure 1. Development Theories from 1950s-1960s



Source: Author, 2015. Based on (Todaro and Smith, 2012, Dang and Pheng, 2015)

2.1.1.1 Linear Stages Theories

Theorists of the 1950s and 1960s viewed the process of development as a series of successive stages of economic growth through which all countries must pass. Because population was increasing, emphasis was placed on increasing gross domestic product which was considered as the ultimate measure of economic growth at that time (Meier, 2000).

One of the most important theories in this time is by Walt W. Rostow. In Rostow's stages of growth, the transition from underdevelopment or traditional society to development is described in terms of a series of steps or stages through which all countries must proceed. Building on the historical pattern of the developed countries, Rostow claimed that the transition from underdevelopment to development would pass through five stages which are: (a) the traditional society, (b) the preconditions for take-off, (c) the take-off, (d) the drive to maturity, and (e) the age of high mass consumption. The decisive stage in the model is the take-off through which developing countries are expected to transit from an underdeveloped to a developed state. One of the principal strategies necessary for a country to take-off was the mobilization of domestic and foreign savings in order to generate sufficient investments to accelerate economic growth. Increasing the rate of investment is considered to be essential step to induce per capita growth (Todaro and Smith, 2012, Dang and Pheng, 2015).

In addition, a similar model, the Harrod-Domar growth model emphasized that the prime mover of the economy is investments (Ghatak, 2003). The principal strategies of development in this model were commonly used by developing countries especially in the early post-war years where every country needs capital which are generated from savings in order to create investments. In this model, if domestic savings were not sufficient, foreign savings would then be mobilized (Dang and Pheng, 2015).

However, the main constraint to development in using the linear stages theories is the relatively low level of new capital formation in most poor countries. Since both theories rely that a

percentage of the national income must be saved and then invested, countries usually rely on private foreign investments or foreign aid to fill the "savings gap". The capital constraint then led to become a rationale and an opportunistic tool for justifying massive transfers of capital and technical assistance from developed to less developed nations which then meant that instead of developing, most developing countries were acquiring massive debts (Todaro and Smith, 2012).

Another key weakness of these models is in assuming that development is a linear process and that a single criterion suffices for achieving development for all countries (Adelman, 2000). Every economy is assumed to have the same necessary conditions and would pass through the same phasing, stage by stage. However, the economic growth path which historically had been followed by the more developed countries is not the only one pathway. In addition, countries have different economic conditions and may require different strategies in order to develop. Ultimately, the development process of countries is actually highly nonlinear (Chenery, 1960). Economies may miss stages, or become locked in one particular stage, or even regress depending on numerous factors (Todaro and Smith, 2012).

2.1.1.2 Structural-Change Models

Structural-change theories focused on transforming underdeveloped economies from domestic economic structures heavily reliant on traditional subsistence agriculture to a more modern, more urbanized, and more industrially diverse manufacturing and service economies. Two well-known examples of this approach are the "Two-sector Surplus Labor" model of W. Arthur Lewis and the "Patterns of Development" empirical analysis of Hollis B. Chenery and his coauthors (Todaro and Smith, 2012).

The Two-sector Surplus Labor model or the Lewis' Two-sector model became the general theory of development in emerging nations with labor surplus during 1960s and early 1970s, and is still applied especially in studying the recent growth of China and labor markets in other developing countries. In the Lewis model, the underdeveloped economy consists of two sectors: a rural agricultural sector with surplus labor which can be withdrawn without any loss of output, and a modern urban industrial sector into which labor from the subsistence sector is gradually transferred due to higher wage rate in the industrial sector. The primary focus of the model is the process of labor transfer, the growth of output and employment in the modern sector as well as the transformation from agricultural to industrial economy (Todaro and Smith, 2012).

Like the earlier Lewis model, the "Patterns of Development" focuses on the sequential processes through which the economic, industrial, and institutional structure of an underdeveloped economy is transformed from traditional agriculture to permit new industries as engine of economic growth. In addition to the accumulation of physical and human capital, a set of interrelated changes in the economic structure are required for the transition of a country from a traditional economic system to a modern one. These structural changes involve economic functions such as the transformation of production and changes in the composition of consumer demand, international trade, and resource use as well as changes in socioeconomic factors such as urbanization and the growth and distribution of a country's population (Todaro and Smith, 2012).

However, both models assume that development is an identifiable process of growth and change whose main features are again similar in all countries. These models do not recognize the differences such as a country's resource endowment and size, its government policies and

objectives, the availability of external capital and technology, and the international trade environment that can arise among countries which will ultimately affect the pace and pattern of development. In addition, the key assumptions of these models are again heavily based from the historical experience of economic growth in the West and likewise do not fit the institutional and economic realities of most contemporary developing countries (Todaro and Smith, 2012).

By focusing on the pattern of development rather than theory, the structural change models may also mislead policy-makers. Since the reallocation of labor from the agricultural sector to the industrial sector is considered the engine of economic growth, many developing countries implemented policies that often promoted industry, and in the long-run, neglected agriculture (Dang and Pheng, 2015).

Criticisms of these models were reinforced by the fact that poverty was still prevalent in many developing countries. After following the pattern recommended by structural change economists in the late 1960s, the attention of policy-makers began to shift towards an emphasis on human capital, i.e. education and health (Meier, 2000).

2.1.1.3 The International-Dependence Revolution

During the 1970s and early 1980s, international-dependence models gained increasing support as a result of growing disillusionment with both linear stages and structural-change models. The international-dependence models view developing countries as affected by institutional, political, and economic rigidities, both domestic and international, and caught up in a dependence and dominance relationship with developed countries and multinational corporations (Todaro and Smith, 2012, Dang and Pheng, 2015).

The first major stream of international-dependence theories is the neocolonial dependence model which is an indirect product of Marxist thinking. It attributes the existence and perpetuation of underdevelopment due to the historical evolution of a highly unequal international capitalist system of rich country–poor country relations (Todaro and Smith, 2012). The model postulates that poor countries are dependent on the developed countries for market and capital. However, developing countries received a very small portion of the benefits that the dependent relationship brought about while developed countries can exploit the resources of developing countries through getting cheap supply of food and raw materials. Meanwhile, poor countries are unable to control the imposition of value added to the products traded between themselves and the developed countries. The growth of international capitalism and multinational corporations caused poor countries to be further exploited and become more dependent on the developed countries. The dependence model therefore argues that poor countries could not expect sustained growth from that dependence (Dang and Pheng, 2015).

A second and less radical international-dependence approach to development is the false-paradigm model which attributes underdevelopment to faulty and inappropriate advice provided by well-meaning but often uninformed, biased, and ethnocentric international "expert" advisers from developed-country assistance agencies and multinational donor organizations. These experts offer complex but ultimately misleading and inapplicable models of development that often lead to unsuitable or incorrect policies. In addition, leading university intellectuals, trade unionists, high-level government economists, and other civil servants all get their training in developed countries where they are unwittingly served an unhealthy dose of alien concepts and elegant but inapplicable theoretical models which they cannot apply to developing countries (Todaro and Smith, 2012).

Lastly, the notion of dualism represents a world of dual societies, of rich nations and poor nations, and in the developing countries, pockets of wealth within broad areas of poverty. Dualism is a concept widely discussed in development economics which represents the existence and persistence of large and even increasing differences between rich and poor nations as well as rich and poor people on various levels (Todaro and Smith, 2012).

Following the international dependence theories, it is presumed that to achieve development, developing countries should therefore end the dependence by breaking up their relationships with the developed world, as well as by closing their doors on the developed countries (Dang and Pheng, 2015). Instead, dependence, false-paradigm, and dualism theorists place more emphasis on international power imbalances and on the needed important economic, political, and institutional reforms, both domestic and worldwide (Todaro and Smith, 2012).

2.1.1.4 The Neoclassical Counterrevolution: Market Fundamentalism

In the 1980s, neoclassical counter-revolution economists used three approaches: (a) the Free-market approach, (b) the New Political Economy approach, and (c) the Market-friendly approach, to counter the international dependence model. Whereas dependence theorists saw underdevelopment as an externally induced phenomenon, neoclassical theorists saw the problem as an internally-induced phenomenon of developing countries. In contrast with the international dependence model, these approaches mainly argued that underdevelopment is not the result of the predatory activities of the developed countries and the international agencies, but was rather caused by the domestic issues arising from heavy state intervention such as poor resource allocation, government-induced price distortions, lack of economic incentives, inefficiency, and corruption that pervade the economies of developing nations. The neoliberals argue that to be able to achieve economic efficiency and growth, it is necessary to promote free trade and permit competitive free markets to flourish. Hence, policies of liberalization, stabilization, and privatization became the central elements of the national development agenda for neoclassical counterrevolution (Meier, 2000, Todaro and Smith, 2012, Dang and Pheng, 2015).

One of the three approaches, the Free-market approach argues that markets alone are efficient as producers are knowledgeable on what to produce and how to produce it efficiently while products and other factor prices reflect the accurate scarcity values of goods and resources (Todaro and Smith, 2012).

The second approach, the Public-choice theory, also known as the New Political Economy approach, goes even further to argue that governments cannot do anything right. The said theory assumes that politicians, bureaucrats, citizens, and states act solely from a self-interested perspective and hence are using their own power and the authority for their own selfish ends (Todaro and Smith, 2012).

Lastly, the market-friendly approach is associated with the 1990s writings of the World Bank economists which recognizes that there are many imperfections in developing country product and factor markets and that governments do have a key role to play in facilitating the operation of markets through “nonselective” and market-friendly interventions such as investing in physical and social infrastructure, health care facilities, and educational institutions as well as through providing a suitable climate for private enterprise (Todaro and Smith, 2012).

2.1.2 The Transition from Purely Economic Growth

With few exceptions such as the international-dependence theories in the 1970s, development was nearly always seen as an economic phenomenon in which gains in the overall and per capita Gross National Income (GNI) and GDP would either "trickle down" to the masses in the form of jobs and other economic opportunities or create the necessary conditions for the wider distribution of the economic and social benefits. Problems of poverty, discrimination, unemployment, and income distribution were considered of secondary importance to economic growth (Todaro and Smith, 2012).

The experience of the 1950s and 1960s, when many developing nations did reach their economic growth targets but the quality of life of people remained for the most part unchanged, signaled that something was very wrong with the definition of development (Todaro and Smith, 2012). While GDP is extensively used to measure a country's development performance, it is not a perfect measure of well-being. Because GDP uses market prices to value goods and services, it excludes the value of almost all activity that takes place outside of markets. Furthermore, other things such as the quality of environment and health of people, distribution of income as well as leisure which contribute to a good life are left out of GDP (Mankiw, Gans, et al., 2012). In addition, as nations aim to maximize income growth, environmental considerations were left to languish on the sidelines and the standard of living was often allowed to slide. Likewise, large inequalities between classes, regions, and genders were ignored and poverty was tolerated more than it should have been in the rush to generate maximum growth (Basu, 2000).

The same case happened in 1960s and 1970s when a number of developing countries experienced relatively high rates of growth of per capita income but showed little or no improvement or even an actual decline in employment, equality, and income of poor populations. By the earlier growth definition, these countries were developing, but in terms of poverty, equality, and employment, they were not. Therefore, during the 1970s, economic development came to be redefined in terms of the reduction or alleviation of poverty, inequality, and unemployment within the context of a growing economy (Todaro and Smith, 2012).

The view that income and wealth are not ends in themselves but instruments for purposes other than economic growth goes back at least as far as Aristotle (Todaro and Smith, 2012). Amartya Sen (1999) argues that the "capability to function" is what really matters for status as a poor or non-poor person. He likewise noted that economic growth cannot be sensibly treated as an end in itself and that development has to be more concerned with enhancing people's lives and freedom (Sen, 1999).

Development must therefore be conceived as a multidimensional process involving major changes in social structures, attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of poverty. Development, in this essence, must represent the whole range of change tuned to the diverse basic needs and evolving aspirations of individuals and social groups within that system, moves away from a condition of life widely perceived as unsatisfactory towards a situation or condition of life regarded as materially and spiritually better (Todaro and Smith, 2012).

2.1.2.1 Sustainable Development

The experience of the 1950s and 1960s has shown that increase in GDP would not necessarily result in a better quality of life for a nation's population. Measures of development have exclusively been based on material wealth and did not capture improvements in welfare such as better health care, education, and adequate housing for large parts of the poor population (Dang and Pheng, 2015). As such, there have been attempts to build indicators that measure the standard of living and quality of life with focus on the quantitative and qualitative aspects of health, education, environment, and material well-being (Berenger and Verdier-Chouchane, 2007).

The exclusion of environmental costs from the computations of development indicators is a major factor in the historical absence of environmental considerations from development economics. Environmental quality matters and is affected by economic development. Thus, environmental degradation can also detract the pace of economic development by imposing high costs on developing countries through health-related expenses and by reducing the productivity of resources. It is clear that some market failures lead to too much environmental degradation. The interaction between poverty and environmental degradation can likewise lead to a self-destructing process in which as a result of ignorance or economic necessity, communities may inadvertently destroy or exhaust the resources on which they depend upon for survival. As the future growth and overall quality of life is likewise dependent on the quality of the environment, rising pressures on environmental resources in developing countries can also have severe impacts on self-sufficiency, income distribution, as well as future growth potential. And as such, to destroy the natural resource base of a country indiscriminately in the pursuit of short-term economic goals penalizes both present and, especially, future generations. It was then that in the 1960s that environmental economists became concerned about how the long-term neglect of the environmental assets will threaten the durability of economic growth (Pearce and Turner, 1990). Hence, environmentalism drew international attention and it became very important that the long-term implications of environmental quality be considered in economic analysis through environmental accounting (Todaro and Smith, 2012).

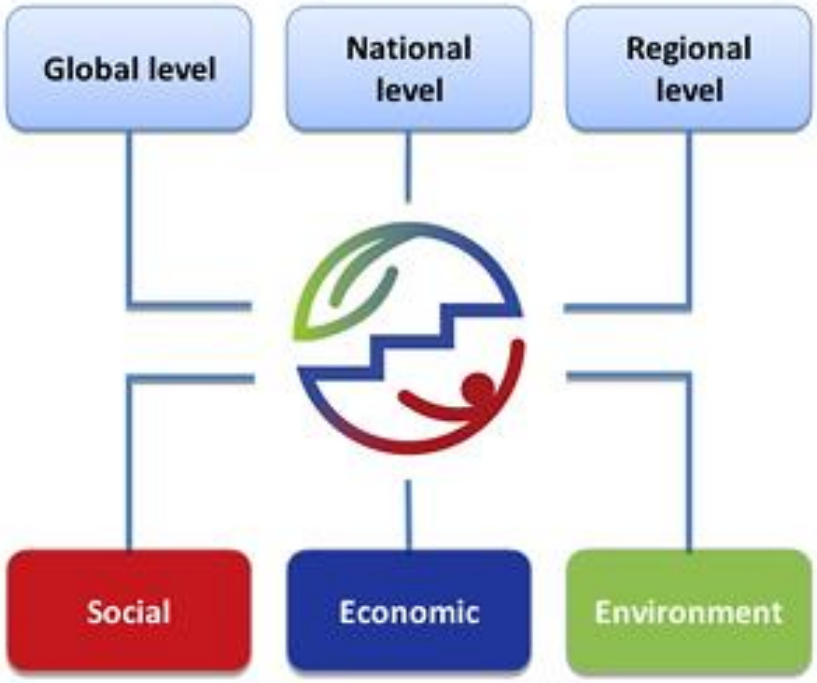
The term sustainable development became popular in 1987 when it was defined in *Our Common Future* by the Brundtland Commission, formally the World Commission on Environment and Development, as "progress that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). Sustainable development therefore involves maximizing the net benefits of economic development, subject to maintaining the services and quality of natural resources over time (Pearce and Turner, 1990). The term sustainability likewise reflects the need for careful balance between economic growth and environmental preservation (Todaro and Smith, 2012).

The concept of sustainable development does imply limits—not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources as well as the ability of the biosphere to absorb the effects of human activities (World Commission on Environment and Development, 1987).

Similarly, there were three quite distinct ideas about what should be developed: people, economy, and society. Much of the early literature focused on economic development, with productive sectors providing employment, desired consumption, and wealth. But more recently, attention has shifted to human development which highlighted emphasis on values and goals such as increased life expectancy, education, equity, and opportunity. Finally, the Board on Sustainable Development also identified calls to develop society that emphasized the values of security and well-being of national states, regions, and institutions as well as the

social capital of relationships and community ties (Kates, Parris, et al., 2005). Today, sustainable development aims to improve the quality of life in a comprehensive manner, including economic prosperity, social equity and environmental protection (Dang and Pheng, 2015).

Figure 2. Institutional Framework for Sustainable Development



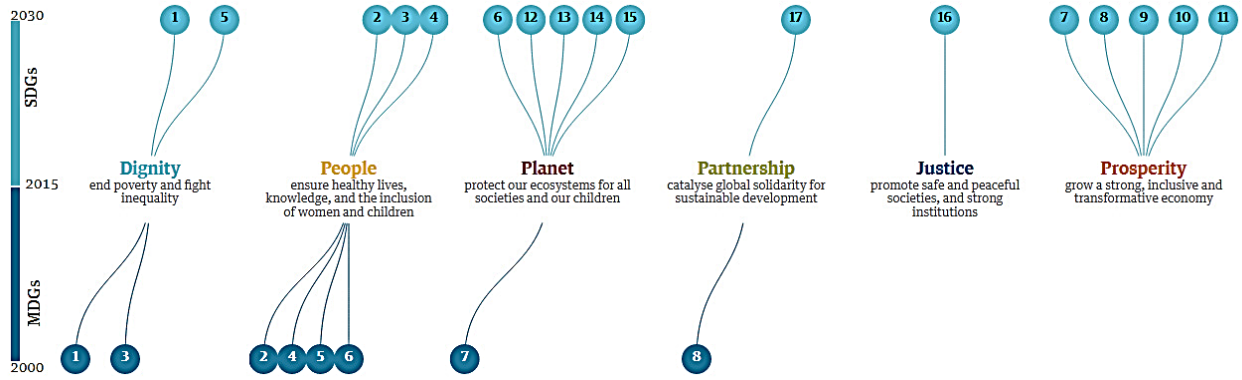
Source: (UN Department of Economic and Social Affairs, 2011)

The Johannesburg Declaration created a collective responsibility to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable development—economic development, social development and environmental protection—at local, national, regional and global levels (United Nations, 2002). In doing so, the World Summit addressed concerns over the framework of environment and development, wherein development was widely viewed solely as economic development. One of the successes of sustainable development has been its ability to serve as a grand compromise between those who are concerned with nature and environment, those who value economic development, and those who are committed to improving the human condition (Kates, Parris, et al., 2005).

Ever since, sustainable development has evolved a core set of guiding principles and values based on the Brundtland Commission's standard definition (Kates, Parris, et al., 2005). After the Millennium Development Goals which is set to end in 2015, a summit of heads of state will adopt the Sustainable Development Goals (SDGs) on September 2015. The SDG contains 17 goals and 100 indicators which will also serve as a report card to measure progress towards sustainable development as well as to help ensure the accountability of all stakeholders for achieving the SDGs. Indicators will be the backbone of monitoring progress towards the achievement of sustainable development at various local, national, regional, and global levels (Sustainable Development Solutions Network, 2015). One key improvement of the SDGs is also to be able to include measures of evaluative well-being as one of the indicators to capture a reflective assessment of an individual's overall satisfaction with life.

The figure below shows how the proposed sustainable development goals answer various concerns on dignity (alleviating poverty and achieving empowerment), people (social development), planet (environmental protection), partnership (global partnership), justice, and prosperity (economic development). The figure also shows how the existing MDGs will be integrated in the proposed SDGs.

Figure 3. Translation of Millennium Development Goals to Sustainable Development Goals



Source: (Galatsidas, A., 19 January 2015)

2.1.2.2 Human Development

As countries moved from using only economic indicators as a measure for development, the Human Development Index became the most widely used measure to compare socioeconomic development of countries. The Human Development Index (HDI) was presented in the annual series of Human Development Reports by the United Nations Development Program (UNDP). The highlight of these reports, which were initiated in 1990, is the construction and refinement of the said Index. The HDI attempts to rank all countries on a scale of 0 (lowest human development) to 1 (highest human development) based on three goals of development. These are: (a) longevity as measured by life expectancy at birth, (b) knowledge as measured by a weighted average of adult literacy (two-thirds) and gross school enrollment ratio (one-third), and (c) standard of living as measured by real per capita gross domestic product adjusted for the differing purchasing power parity of each country's currency to reflect cost of living and for the assumption of diminishing marginal utility of income. One major advantage of the HDI is that it shows that a country can do better than what might be expected at a low level of income and that substantial income gains can still accomplish relatively little in human development. Further, the HDI points out that disparities in income are greater than discrepancies in other indicators of development, at least health and education. Moreover, the HDI reminds us that by development we clearly mean broad human development, not just in terms of higher income (Todaro and Smith, 2012).

In September 2000, the 189 member countries of the United Nations adopted eight Millennium Development Goals (MDGs) and committed themselves in making substantial progress toward the eradication of poverty and achieving other human development goals by the end of 2015. They acknowledge the multidimensional nature of development and poverty alleviation which meant that an end to poverty requires more than just increasing incomes of the poor. The eight

goals are: (a) to eradicate extreme poverty and hunger; (b) to achieve universal primary education; (c) to promote gender equality and empower women; (d) to reduce child mortality; (e) to improve maternal health; (f) to combat HIV/AIDS, malaria, and other diseases; (g) to ensure environmental sustainability; and (h) to develop a global partnership for development. The goals are then assigned specific targets deemed achievable by 2015 based on the pace of past international development achievements (Todaro and Smith, 2012).

In the 1990s, economists increasingly recognized that it was the quality of life that determines whether people are developing or not. A broader perspective of the development goals is hence necessary as reflected in the World Bank's Development Report which presents that the key challenge of development is to improve the quality of life (World Bank, 1991). Especially, in the world's poor countries, a better quality of life generally calls for higher incomes, however, it involves much more that increasing income of people. It encompasses various aspects such as better education, higher standards of health and nutrition, less poverty, a cleaner environment, more equality of opportunity, greater individual freedom, and a richer cultural life (Dang and Pheng, 2015).

2.1.2.3 The Emergence of Happiness Economics

For a long time, economics has used income as a suitable although incomplete measure for human welfare (Frey, 2008). However, it was reasonably pointed out that the quality of life of a country should not only be equated with its GNP or GDP (Headey and Wearing, 1992). It was then that the need to capture a more holistic measure for human well-being paved the way for happiness economics.

The emergence of happiness economics as an area in economics developed as a strongly empirical endeavor. One can argue that measures of happiness are not worse than other measures commonly used in economics, such as imports, exports, income or GDP (Frey and Gallus, 2013). Happiness economics emerged through the need to directly measure individuals' well-being. Hence, a large part of happiness research aims to explore the factors that determine subjective well-being. Likewise, the study of happiness also provides indication on the extent to which living environments are adverse or favorable to people. It is therefore motivated by the drive to understand the factors influencing individual well-being in order to improve human life (Stutzer and Frey, 2012). In order to achieve greater happiness, there is obviously a need to understand what conditions affect people's happiness and well-being, and by how much (Layard, 2005).

Hence, economists have explored the empirical relationships across countries and over time between subjective well-being, happiness and factors such as income (D'Acci, 2010, Todaro and Smith, 2012). Numerous studies have focused on national level measurements of welfare and studied how well these measurements reflect individual views of well-being with the objective to understand which of the national level indicators best reflect the average life satisfaction of a country's citizens (Bonini, 2008). Studies show happiness measures validate the importance of economic development in the developing world, whether the objective is solely happiness or expanded human capabilities (Todaro and Smith, 2012). While it is important to consider the crucial role of wealth in determining living conditions and the quality of life, development must also go much beyond the accumulation of wealth and the growth of GNP and other income-related variables. Without ignoring the importance of economic growth, there is a need to look well beyond economic drivers (Sen, 1999). GDP, on its own, while important is not adequate to describe the well-being of a country.

2.1.3 Happiness and Development

2.1.3.1 Quality of Life and Well-Being

The concept of quality of life usually refers to the degree to which a person's life is desirable or undesirable, often with an emphasis on external components, such as environmental factors and income (Diener, 2006). On the other hand, it is differentiated from human "well-being" which Sen defines as being well, in the basic sense of being healthy, well nourished, well clothed, literate, and long-lived and more broadly, being able to take part in the life of the community, being mobile, and having freedom of choice in what one can become and can do (Todaro and Smith, 2012).

Literatures often differentiate subjective well-being which is based on subjective experience from quality of life which is often expressed as more ''objective'' and describes the circumstances of a person's life rather than his or her reaction to those circumstances (Diener, 2006). In his acclaimed 2009 book 'The Idea of Justice', Sen suggests that subjective well-being is a kind of psychological state of being, a functioning that could be pursued alongside other functionings such as health and dignity (Todaro and Smith, 2012). In addition, "reported subjective well-being" is also used as a scientific term in psychology for an individual's evaluation of the extent to which he or she experiences positive and negative affect, happiness, or satisfaction with life (Frey, 2008).

The concept of measuring quality of life in economics emerged in the 1950's through the use of multi-dimensional inventories which involved questions on subjective satisfactions as well as on objective qualities, such as 'health' and 'activity'. On the other hand, in the 1960's, the similar composite scales were then labeled with the terms 'well-being' and 'life-satisfaction' (Veenhoven, 1996).

Policy makers are particularly interested in societal conditions for happiness and this has prompted comparative research on happiness in nations. This line of research started in the early 1960s with Cantril's (1965) influential book, 'The Pattern of Human Concerns'. Now, 40 years later, happiness economics has developed into a main stream of research (Veenhoven, 2007).

While in the 1970s, urged by social scientists, the United States Government, the United Kingdom Government, the Organisation of Economic Co-operation and Development (OECD) and various other national and international organizations became interested in developing and using social indicators which would serve the same function in monitoring progress or regress in social policy areas as economic indicators do for economic policy. The idea was that governments would measure trends in social conditions—in health, housing, leisure, the environment and so forth—in the same way as they already measure economic trends (Headey and Wearing, 1992).

2.1.3.2 Measuring Well-Being

The first social indicators to be developed were so-called 'objective' indicators. It was then pointed out that as well as knowing about the objective conditions under which people live, there is also a need to know how satisfied or dissatisfied people are with government programs and services, with aspects of their personal lives and indeed with their lives-as-a-whole. This line of argument led to the development of subjective social indicators based on sample surveys. Since then measuring subjective well-being has gathered momentum. Specifically, measuring subjective well-being includes various types of assessments, both positive and negative, that people make of their lives. It includes reflective cognitive evaluations, such as

life satisfaction and work satisfaction, interest and engagement, and affective reactions to life events. Thus, subjective well-being is an umbrella term for the different valuations people make regarding their lives, the events happening to them, their bodies and minds, and the conditions in which they live (Diener, 2006).

Hence, the analysis of well-being continues to gather momentum as governments have shown an increasing preference for a combination of both economic and non-economic factors when gauging national performance (Aslam and Corrado, 2012). In addition, understanding whether and how individual life satisfaction varies across countries is important because if the goal of development is to increase well-being, there is then a need to identify the causes of well-being in different national and regional contexts (Bonini, 2008).

Governments should establish the conditions enabling individuals to become happy. Evidently, governments of United Kingdom, France, Germany, and China have stated the need to pursue National Happiness as a prime goal of policy. The same had already been done a long time ago by the Kingdom of Bhutan and is likewise enshrined in the constitution of the United States. It only shows the need to introduce the valuable and important results of happiness research into the political process (Frey and Gallus, 2013).

Given that some countries are considering the improvement of well-being and life satisfaction as the most basic objective of national development, there is a need to know whether the national level indicators that measure development progress are actually related to individual well-being (Bonini, 2008). A good example that has attracted considerable attention would be the government of Bhutan's initiative to use "gross national happiness" rather than gross national income as its measure of development progress and more recently to quantify it (Todaro and Smith, 2012).

In addition, happiness research shows that reported subjective well-being is a better measure of individual welfare (Frey, 2008). Hence, a challenging agenda laid down by recent trends is to design scientific ways of measuring human well-being (Diener and Suh, 1997).

Although Sen mentions that what people say makes them happy and satisfied is at best only a rough guide to what people value in life, happiness research adds new perspectives to the multidimensional meaning of development (Todaro and Smith, 2012).

National economic measures have stronger conceptual foundations and are more methodologically sophisticated, since they are based on over 50 years of development and extensive government support. Although the well-being indicators have yet to be developed in the same way, the current measures do offer interesting insights that cannot be provided by measures of economic growth (Diener, 2006) Furthermore, with the emergence of happiness research, public policy can create conditions that appear conductive to happiness, such as freedom, while therapy and education can foster personal characteristics such as independence (Veenhoven, 2010).

2.1.3.3 Life Satisfaction and Happiness

Happiness has several meanings in popular discourse, as well as in the scholarly literature. For example, happiness can mean a general positive mood, a global evaluation of life satisfaction, living a good life, or the causes that make people happy (Diener, 2006). The word 'happiness' is used in various ways. In a sense, it is an umbrella term for all that is good. The word is also used in the more specific meaning of subjective appreciation of life (Frey, 2008, Veenhoven, 1996, Veenhoven, 2007).

Veenhoven (2010) specifically referred enduring satisfaction with one's life-as-a-whole as 'life-satisfaction', which is also commonly denoted to as 'happiness'. In this meaning, happiness is often used interchangeably with terms such as 'wellbeing' or 'quality of life' and represents both individual and social welfare (Diener, 2006).

However, some authors made a clear distinction between these concepts. Headey and Wearing (1992) mentioned that well-being has two sub-dimensions: life satisfaction or happiness, and positive affect. The said authors used life satisfaction and positive affect as two distinct aspects which form part of well-being. In addition, Amartya Sen (1999) stressed that happiness is part of human well-being and greater happiness may in itself expand an individual's capability to function. He argued that utility in the sense of happiness should be included in the list of some important functionings significant to a person's well-being.

Hence, we define happiness using Veenhoven's definition as the degree to which an individual judges the overall quality of his/her own life-as-a whole favorably. In other words, happiness deals with how much one likes the life one leads (Veenhoven, 1989). Happiness is the overall appreciation of one's life-as-a-whole.

Much of that enlightened thought on happiness is reflected in Jeremy Bentham's (1789) 'Introduction to morals and legislation'. He argued that the moral quality of action should be judged by its consequences on human happiness and in that line, people should aim at the 'greatest happiness for the greatest number'. Bentham defined happiness in terms of psychological experience, as 'the sum of pleasures and pains' (Veenhoven, 2010).

Life satisfaction represents a report of how a respondent evaluates or appraises his or her life taken as a whole. It is intended to represent a broad, reflective evaluation that a person makes of his or her life (Diener, 2006) It is normally measured in representative surveys by asking the question: ''Taken overall, how satisfied are you with the life you lead?'' (Frey and Gallus, 2013).

Veenhoven (2010) highlighted that life-satisfaction becomes the most suitable policy goal as it signals the degree to which human needs are being met. Happiness ranks high in such studies, typically together with 'health' which is also an indicator of human thriving. If one opts for one particular end-value, happiness is a good candidate. If not, happiness qualifies at least as a core value (Veenhoven, 2010).

In Veenhoven's study, he also proved that happiness for a greater number is possible. At the same time, enduring happiness for a great number of people is also possible. At best there is assumed an upper limit to happiness, analogous to the ceiling of longevity. While in theory the pursuit of greater of happiness for a greater number can involve means that are morally unacceptable, the practice appears not to be the case (Veenhoven, 2010).

Bentham (1789) highlighted the need to create all the happiness people are able to create and remove all the misery people are able to eliminate. With this principle, he proposed that all laws and all actions should aim at creating the greatest possible happiness. The author likewise noted that a society is good in so far as its citizens are happy. Thus, a law is good if it increases the happiness of the citizens and decreases their unhappiness; if it does not, it is bad. The same is true for the rules of morality – they should be designed to increase our overall happiness. Indeed, any decision, public or private, should be judged by its effect on the happiness of all those affected by it, each person counted equally. This is the principle of the Greatest Happiness: the right action is the one that produces the greatest overall happiness for most number of people (Layard, 2005).

2.1.3.4 Studies on Happiness and Sustainable Development

One of the strong correlates of happiness or satisfaction is that it increases with a country's average income (Todaro and Smith, 2012). Numerous studies also show that increases in income are related with increases in well-being although this effect is shown to diminish as income increases (Diener and Suh, 1997, Veenhoven, 1989, Bonini, 2008).

On the other hand, Easterlin (1973) claimed that in all societies, more money for the individual typically means more individual happiness. But raising the income of all does not increase the happiness of all. This relation provides a classic case of the logical fallacy of composition which means that what is true for the individual is not true for society as a whole (Easterlin, 1973).

The observed condition in the United States counters with current opinion, which holds that Americans have become richer, but no happier. This so-called 'Easterlin paradox' pervades the economic discourse on happiness but does not fit the latest data (Veenhoven, 2007).

However, numerous studies have tested the Easterlin Paradox and proven that the economic prosperity of a country has an effect to the happiness of its citizens (Deaton, 2008, Stevenson and Wolfers, 2008, Veenhoven, 1989).

Early research found that the relationship between income and happiness holds within countries, but not between them (Easterlin, 1973). However, more recent research (Deaton, 2008, Stevenson and Wolfers, 2008) found a closer association between happiness and income, suggesting that people with high incomes are happier than those with lower incomes, both in absolute and in relative terms (Florida, Mellander, et al., 2013).

Other research shows that the significant relationship between income and happiness is seen only up to an average income of roughly $10,000 to $20,000 per capita. Once incomes grow to this point, most citizens have usually escaped extreme poverty (Todaro and Smith, 2012).

Not surprisingly, studies show that financial security is not the only one factor affecting happiness. Richard Layard (2005) identified seven factors that affect average national happiness: family relationships, financial situation, work, community and friends, health, personal freedom, and personal values.

In terms of education and happiness, the direct effect of education in determining well-being is uncertain since education often results in improved social relationships and higher incomes which in turn enhance well-being, although it has been found to have small significant effects on well-being (Bonini, 2008, Diener and Suh, 1997).

In addition, another study found that education has a small but positive contribution to subjective well-being in adults, accounting for 1–3% of the variance. Layard (2005) likewise found that education has a small (but significant) direct effect on happiness and that it also affects happiness indirectly by raising personal income. Intelligence appears to be unrelated to happiness, at least 'school-intelligence' as measured by common IQ tests (Layard, 2005, Florida, Mellander, et al., 2013).

Research findings also show that good health is an important requirement and that mental health is more critical to happiness than physical health. This pattern of relationship is universal (Veenhoven, 2010).

Another theory holds that we are naturally born either happy or unhappy and that policy interventions can change little as far as happiness is concerned. A collective variant of this theory is that happiness is a national character trait, such as for instance, Russians are

chronically unhappy because of a cultural tradition of melancholy. This theory was also disproven through a follow-up of individuals which showed marked changes over the long-term and trend studies of citizens in Russia, where happiness dropped dramatically in the late 1990s after the Rubel crisis (Veenhoven, 2010).

Much of the recent correlates of average happiness are part of the 'modernity' syndrome. Hence, similar patterns occur if we consider further indicators of modernity, such as urbanization, industrialization, informatization, and individualization. The more modern the country, the happier its citizens are (Veenhoven, 2005).

Studies on development factors affecting happiness are also gaining attention. A study by Bonini (2008) used three universal indicators to study the relationship between development and happiness. The indicators used in the research are: Gross Domestic Product (GDP) per capita, the Human Development Index (HDI), and an Environmental Sustainability Index (ESI). The study showed that neither HDI nor ESI provide a significantly better indicator of life satisfaction than GDP per capita. This means that alternative measures of development must incorporate a broader range of factors to promote and monitor improvements in well-being across countries. This finding indicates that perhaps universal measurements of development are inappropriate and indicators need to be developed to meet the needs of individual nations and regions (Bonini, 2008).

In addition, the New Economics Foundation formed a Happy Planet Index which measures the extent to which countries deliver long, happy, sustainable lives for the people that live in them. The Index uses global data on life expectancy, experienced well-being and ecological footprint as indicators to calculate the index (New Economics Foundation, 2015).

Another study by D'Acci (2010) uses the Well-being and Progress Index (WIP) which combines health well-being, economic well-being, happiness, human progress, and cultural progress in measuring the well-being of a country.

Development will drive us toward a greater level of well-being and progress, which must include richness, but also ethics, environment, education, science, equality, and human rights. In fact, it is now becoming both a theoretical and empirical discussion to think of the concepts of well-being and progress in a more holistic way (Todaro and Smith, 2012).

2.2 Summary and Lessons Learned from Literature

From the literature, it was shown that development started as a purely economic activity manifested with increases in GDP. However, as post-World War II experiences have shown, it was not enough to address other concerns such as poverty, inequality, unemployment, lack of education and health facilities, and inadequate housing. Likewise, the literature has shown that the precondition for development is different among countries. Hence, the need to achieve a multidimensional view of development lead to the incorporation of other measures such as human development and environmental sustainability. The concept of sustainable development emerged as a progress that meets the present without compromising the ability of future generations to meet their own needs. Sustainable development initially focused on the interdependent and mutually reinforcing pillars of economic development, social development, and environmental protection. With the Sustainable Development Goals to be launched on September 2015, sustainable development has evolved an additional core set of principles which includes security, well-being, global partnerships, and institutional development. The indicators in the SDGs will be the backbone towards monitoring the achievement of sustainable development at local, national, regional, and global levels.

The transition from purely economic growth also necessitated the inclusion of well-being as a measure of development. Happiness economics initially emerged as a purely objective endeavour with the quality of life aimed to measure objective qualities such as health and education. However, the need to measure how satisfied or dissatisfied people are with their lives lead to the development of subjective well-being. Hence, the analysis of well-being continued to gather momentum as governments of United Kingdom, France, Germany and China have stated the need to consider happiness when gauging national performance. This initiative has been done a long time ago by the Kingdom of Bhutan which used Gross National Happiness as a measure for development.

The concept of happiness has emerged as a global term for life satisfaction or the evaluation to which an individual is satisfied or dissatisfied with the life one leads. It is a subjective measure of well-being in contrast with the objectively measured, quality of life which emphasizes external components such as environment and income.

The literatures cited above also showed that happiness is a good indicator of human thriving along with other indicators such as health, education, and income. It was also shown that happiness for a greater number is possible and that happiness becomes a suitable policy goal as it measures the degree to which human needs are being met.

And as such, numerous studies have emerged on the determinants of happiness. One of the strong correlates of happiness or life satisfaction is income and studies have shown that economic prosperity of a country has an effect on the happiness of its citizens. In addition, education also proved to have small significant effect on happiness. Likewise, health, both mental and physical, is a good determinant for happiness of people.

In addition, studies on development factors affecting happiness have gained momentum. For example, studying the relationship between three universal indicators (GDP, HDI, and ESI) have shown that neither HDI nor ESI proved to be a significantly better indicator for well-being than GDP per capita. Hence, the need to formulate measures that incorporate a broader range of factors to better reflect well-being across countries is needed.

The lessons learned from literature provided the framework and methodology for addressing the questions earlier posed in this research.

2.3 Conceptual Framework

Based from the research literature, the important variables are now selected and will be used in this study. The research will focus on studying what sustainable development factors affect the happiness of at the global level including clusters based on income and geographic location. The research will consider indicators on poverty, consumption and production patterns, macroeconomic performance for economic prosperity. In addition, people indicators relating on health, education, and employment as well as environmental sustainability factors on natural, built, and urban environment will be considered in the study.

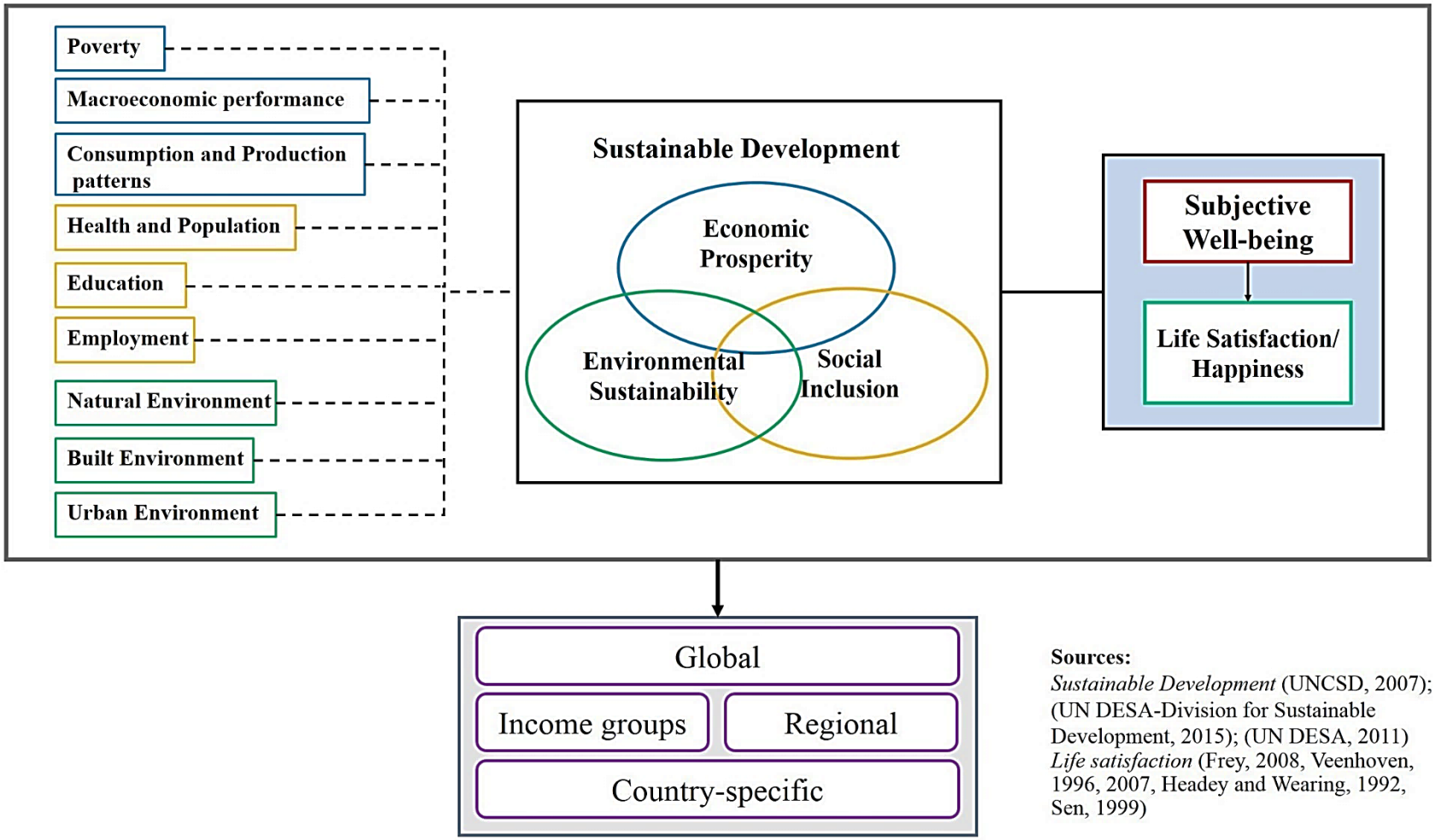
The research will be focusing on sustainable development indicators on economic prosperity, social inclusion and environmental sustainability and how these indicators can become determinants to happiness or life satisfaction of countries, income groups, and regional clusters. Clusters based on income and geographic location are considered important as previous literatures have highlighted income to be a significant determinant of happiness of countries.

At the same time, previous trends in happiness have also highlighted similarities in terms of the happiness levels of countries belonging in the same geographic region.

Based on the various theories on well-being, life satisfaction and happiness, this research will use Veenhoven's definition wherein life satisfaction and happiness are the same concepts which both deals with the overall appreciation of one's life-as-a-whole. The two interchangeable concepts contribute to the achievement of well-being, specifically subjective well-being which is in line with Headey and Wearing, and Sen's line of research. The study will likewise consider Frey's approach where happiness and life satisfaction are measures and part of the bigger umbrella that is well-being. On the other hand, the sustainable development framework utilized in this research is based from the framework of UN DESA and UNCSD. Since causality among the variables cannot be identified, the research will focus on finding the intermediate factors that affect the relationship between sustainable development and happiness.

Given that sustainable development must be achieved at various levels from local to global, the study will focus on studying which sustainable development factors have a two-fold effect of not just increasing sustainable development but also increasing happiness levels at various levels (e.g., global, regional, income groups, and country-specific levels).

Figure 4. Conceptual Framework



Sources:
Sustainable Development (UNCSD, 2007); (UN DESA-Division for Sustainable Development, 2015); (UN DESA, 2011)
Life satisfaction (Frey, 2008, Veenhoven, 1996, 2007, Headey and Wearing, 1992, Sen, 1999)

Chapter 3. Research Design and Methods

3.1 Introduction

This chapter focuses on the step-by-step approach undertaken towards the research design, data collection, and data analysis methods. The selected research design examines how sustainable development factors affect happiness at the global, regional, income-group and country-specific levels.

3.2 Operationalization: Concepts, Variables, and Indicators

The concepts selected in the study are based from the conceptual framework presented in the previous chapter. In the operationalization of the research, the concepts are further subdivided into variables which are categorized as independent (x-variable) and dependent (y-variable) variables.

Based from the conceptual framework, the main concepts in this research are sustainable development (independent variable) and life satisfaction or happiness (dependent variable).

In the review of related literature, several definitions of the concepts emerged. For the purpose of the research, the study has attempted to define the concepts using a combination of existing definitions of sustainable development and life satisfaction. Taking all the definitions presented in the review of related literature, sustainable development is defined as the progress that aims to improve the quality of life in the aspects of economic prosperity, social inclusion, and environmental sustainability without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987, Kates, Parris, et al., 2005, Dang and Pheng, 2015).

In the study, sustainable development factors represent the independent variables (x-variables). Sustainable development factors are further subdivided to three categories. These are economic prosperity, social inclusion, and environmental sustainability or prosperity, people, and planet, respectively.

For the purpose of this research and based from the conceptual framework, the concept of happiness and life satisfaction are assumed to mean the same and were used interchangeably throughout the research. Life satisfaction or happiness is defined using a combination of definitions by Veenhoven, Diener, and Frey and Gallus wherein life satisfaction or happiness represents the degree to which an individual evaluates the overall quality of life one leads (Veenhoven, 1989, Diener, 2006, Frey and Gallus, 2013). Life satisfaction or happiness represents the dependent variables (y-variables) in the study.

After the variables that will be used in the study were identified, the indicators belonging to each variables were selected. For the variables under sustainable development, the indicators were selected by combining existing indicators from the proposed Sustainable Development (SD) Goals and the approved sustainable development indicators by the UN Commission on Sustainable Development (UNCSD). The proposed Sustainable Development Goals which were formulated after the Rio+20 conference will be launched in September 2015 to replace the Millennium Development Goals set to expire on the same year. Based from the most recent draft in March 2015, the proposed SD goals contains 17 goals and 100 core indicators. On the other hand, the UNCSD-approved sustainable development indicators published on 2007 contains over 50 indicators on various themes such as poverty, health, education, governance,

atmosphere, biodiversity, and global partnerships. The research gathered only the indicators with available data relating to people, planet, and prosperity from these two sets of indicators to form part of the indicators that will be used in this study. Moreover, the research will only use the indicators relating to the following: a) poverty, macroeconomic performance, and production and consumption patterns for economic development; b) health and population, education, and employment for social inclusion; and c) natural, built, and urban environment for environmental sustainability.

In terms of life satisfaction, measures of life satisfaction using the Cantril 11-step ladder from the Gallup World Poll will be utilized in the study. Life ladder measured life satisfaction in terms of imagining a ladder with steps numbered from zero at the bottom and 10 at the top. It asks the respondents to measure their degree of satisfaction on the life ladder ranging from completely dissatisfied to completely satisfied by asking, "How satisfied are you with your life as a whole these days?"

The following figures shows the various indicators that will be used in the study. A detailed list of all indicators including its definitions can be found in Annex 1.

Figure 5. Sustainable Development Indicators

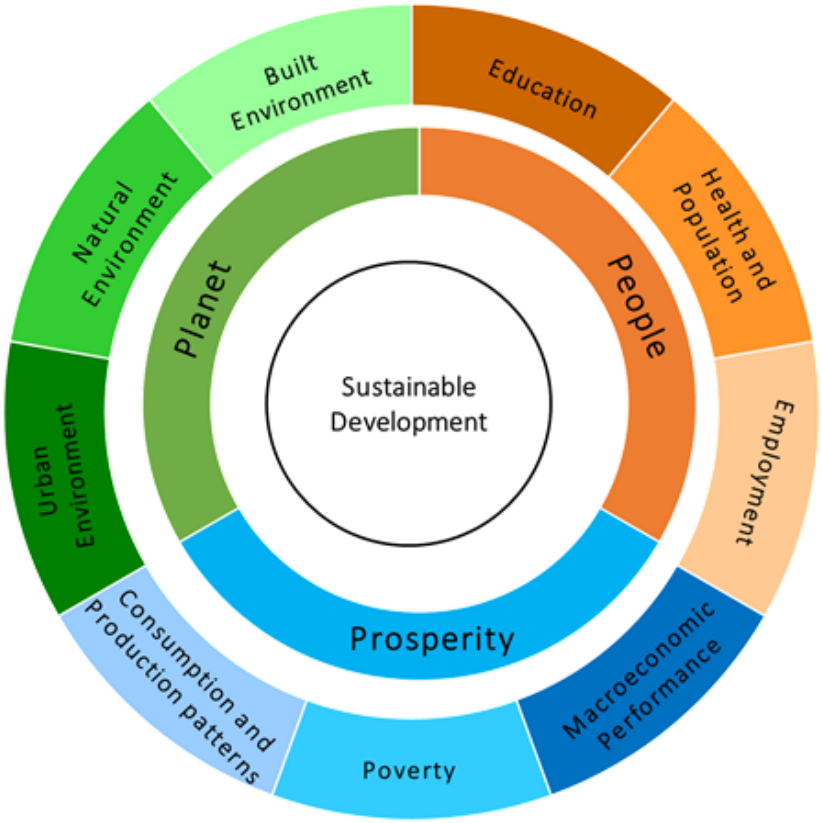


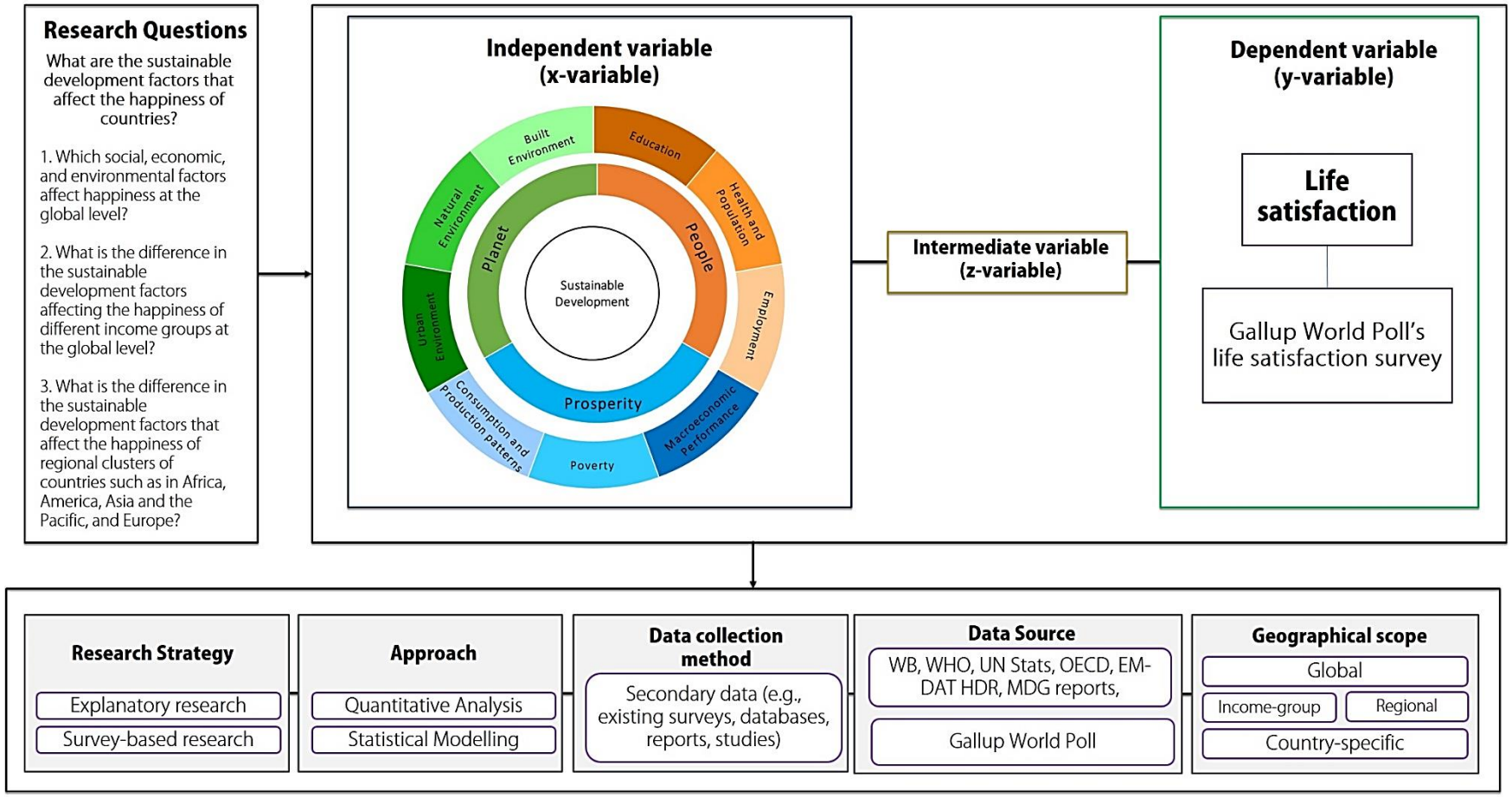
Figure 6. Life Satisfaction Indicator

3.3 Analytical Framework

The analytical framework details the step-by-step process to be undertaken in order to answer the research question. The analytical framework shows the concepts, variables, and indicators used in the study, as well as the research methodology employed in answering the research questions.

The following shows the analytical framework applied in the study.

Figure 7. Analytical Framework



3.4 Research Strategy, Approach and Data Collection Methods

This explanatory research used survey as a research strategy. The research used secondary data such as the survey data conducted by Gallup World Poll as a measure for life satisfaction levels of countries.

Primarily, the research used a quantitative approach to study what factors are essential to happiness at the global level. This approach further studied how various sustainable development factors affect happiness of countries, regions and income-groups. Given all the available secondary quantitative data, the research applied statistical modelling to determine the relationship between the independent and dependent variables in the study. As the research used panel data for life ladder and sustainable development indicators from 2005 to 2014, the statistical modelling utilized in the research was fixed effects regression analysis. The research likewise utilized panel data as it is suitable for multilevel analysis (e.g., global, income-groups, and regional level) and controls for factors that generate unobserved heterogeneity between countries. Fixed effects was then decided as the statistical model, as against random effects model, as it controls the time invariant differences between the countries. In addition, the Hausman test was also employed to further test if the research should utilize fixed or random effects (*see Annex 2 for the test results)*. Using the probability of obtaining the chi-square statistic (Prob>chi2) in the Hausman Test, it revealed that the p-value of the model is 0.0001 which was less that the fixed effects limit of less than 0.05. Hence, it is statistically significant to use fixed effects as a model in the research.

The fixed effect model was then used to identify the significant effects of the sustainable development indicators on life satisfaction of countries, regions, and income-groups. The formula used for fixed effect model is as follows:

$$Y_{it} = \beta_1 X_{it} + \ldots\ldots \beta_n X_{nt+} \alpha_i + \mu_{it}$$

Where:

Y_{it} = dependent variable (*life ladder*) where i=entity (*countries*); t= time (*2005-2014*)

X_{it} = independent variable (*sustainable development indicators*)

β_1 = coefficient for independent variable (X_{it})

α_i = unknown intercept for each entity

μ_{it} = error term

Likewise, the study employed Modified Wald test to check for groupwise heteroskedasticity for fixed effect regression model (*see Annex 2 for the test results)*. The Prob>chi2 likewise showed that the p-value of the model is 0.0000 which revealed the presence of heteroskedasticity. Hence, the option 'robust' was used in all statistical analysis to obtain heteroskedastic-robust standard errors.

For the purpose of the study, the data needed for the quantitative analysis were gathered using secondary data collection. In the process of answering the research questions, the study likewise utilized existing surveys and reports, as well as databases. The study also used secondary data to further explain and support the outputs of this research especially in explaining the relationship between the sustainable development factors and happiness.

Likewise, a limitation in the model prevented the study in identifying the causal relationship between happiness and sustainable development indicators. The model only shows the relationship between variables but does not shed light on the direction of the causality. However, the secondary data gathered assisted in determining and explaining the intermediate or intervening factors which may exist between sustainable development factors and happiness.

Specifically for the sustainable development indicators, the data came from various sources such as the World Bank Data Bank, World Health Organization database, UN Stats, Organization for Economic Co-operation and Development (OECD), Human Development Report, reports on the progress of the Millennium Development Goals, and the International Disaster Database.

For life satisfaction, the research utilized data from existing survey already conducted around the world. The data were gathered from the Gallup World Poll where the degree of satisfaction is measured on an 11-point scale using Cantril's measure of life satisfaction. The research utilized Gallup World Poll life ladder data annually from 2005 to 2014. The said survey was conducted in a total of 202 countries with approximately 1,000-3,500 respondents/ country/year. The samples are nationally representative of people aged 15 and older and included over all measure of life satisfaction using life ladder. Likewise, the survey used the same questionnaire in all countries to allow for cross-country comparisons. In conducting the survey, Gallup World Poll used the following question, "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?" The research specifically used life ladder as a measure of life satisfaction or happiness as it provides a more encompassing evaluation of life satisfaction in contrast with the positive experience index which is also a part of the Gallup World Poll and focuses on measuring positive affect or level of happiness experienced on a previous day.

3.5 Geographic Scope and Collection

The aim of the research is to study how sustainable development indicators affect happiness of countries, regions, and between income groups. Since the study includes global, income, regional, and country level comparisons, a number of countries were selected in the study. The selection of the countries were based on the availability of life satisfaction data as well as sustainable development indicators. The regional clustering of countries was based from the geographical region and composition being used by the United Nations (United Nations Statistics Division, 2013). Likewise, the grouping based on income which was used in the study was based from the most recent World Bank income classification (World Bank, 2015).

As the study will involve statistical analysis, countries were chosen based on the following: a) if the countries have at least one life ladder data, and b) if the countries have data on sustainable development indicators. A total of 4 income groups, 4 regions and 159 countries were included in the research. The income groups are: a) low income economies, b) lower middle income economies, c) upper middle income economies, and d) high income economies. However, due to limited number of observations on the statistical results, the low income and lower middle income economies are merged together in the regression runs. On the other hand, the regional groupings are as follows: a) Africa, b) America (including both North and South America, c) Asia and the Pacific (including Australia and New Zealand), and d) Europe. The list of countries based on region and income groups they belong to can be found in Annex 3.

3.6 Validity and Reliability

To establish the validity and reliability of the research, only data from credible sources were used. Quality-control was done throughout the research period to ensure the accuracy of data that were utilized. In addition, data cleaning was done to remove unusual or extreme values in the datasets. Statistical tests such as Hausman Test and Modified Wald test for groupwise heteroskedasticity for fixed effect regression model were employed to further establish the internal validity of the data. Likewise, test for multicollinearity was also employed throughout the statistical regression analysis to ensure the reliability of the model.

In addition, the statistical results were supported by existing theories and studies to further substantiate and validate the outputs of the research. These were also gathered using secondary data analysis.

Chapter 4: Research Findings

The following chapter presents the findings of the research. The research utilized life ladder scores of 159 countries from 2005 to 2014. In addition, the sustainable development indicators are divided into economic, social, and environment factors (*see Annex 4 for the descriptive table of the dependent and independent variables*). In order to answer the research questions, the flow of discussion will start with the descriptive analysis of life satisfaction across the years. Secondly, the chapter will include a discussion on the economic factors affecting life satisfaction of countries with focus at the global, income, regional, and selected country-specific levels. The same flow of discussion will be done for social and environmental factors. And then lastly, by combining the economic, social, and environmental indicators, the sustainable development factors affecting happiness at the global, income-group, and regional levels will be presented.

4.1 Life Satisfaction across Years

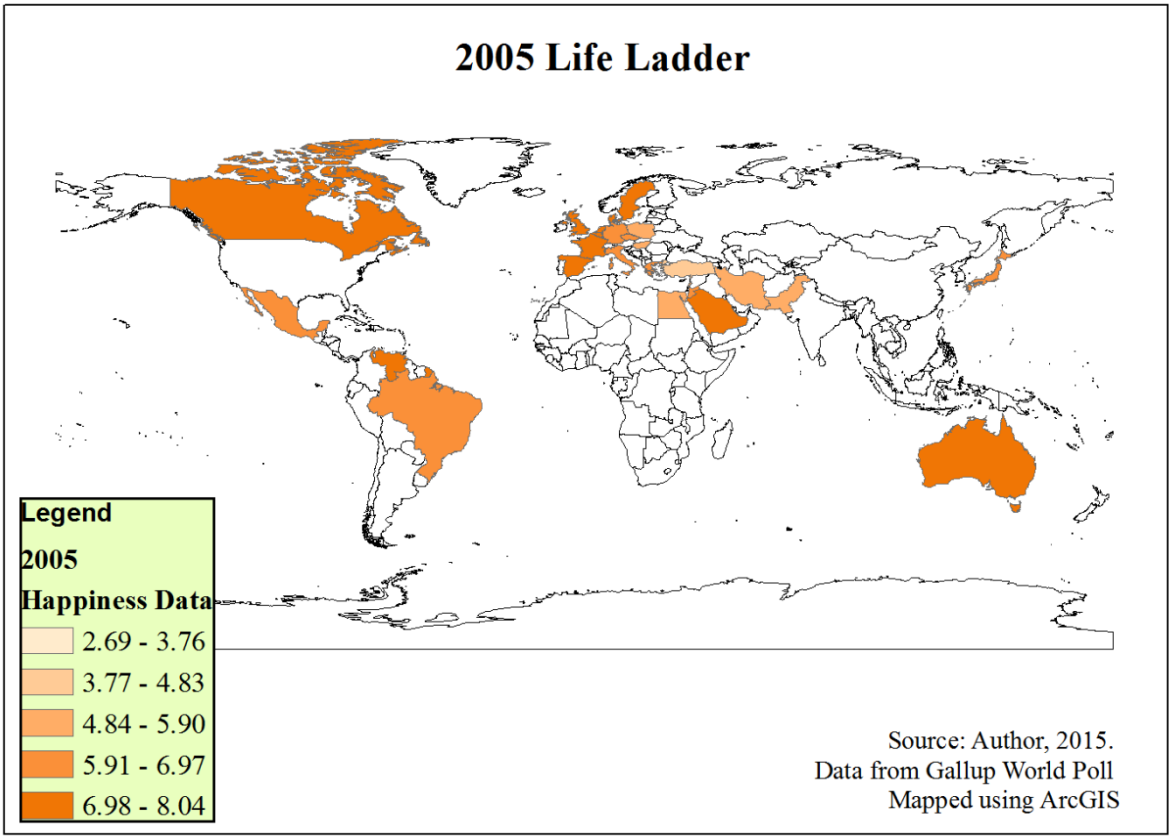
The following maps show life satisfaction levels of countries from 2005 to 2014. The data used in the maps are life ladder levels from the Gallup World Poll. The maps show how life ladder levels of countries change over time. It also shows the changes in the countries included and excluded in the Gallup World Poll for the past ten years. The maps from 2005 to 2010 show continued increase in the countries included in the survey. On the other hand, the last two years (2013-2014) showed a considerable decline in the countries included in the Gallup World Poll. It is worthwhile mentioning the significant reduction in the number of African and Asian countries included in the survey in the recent years. The reduction in the number of countries, especially in studying the determinants of life satisfaction in regions, specifically in Africa affected the results of the study.

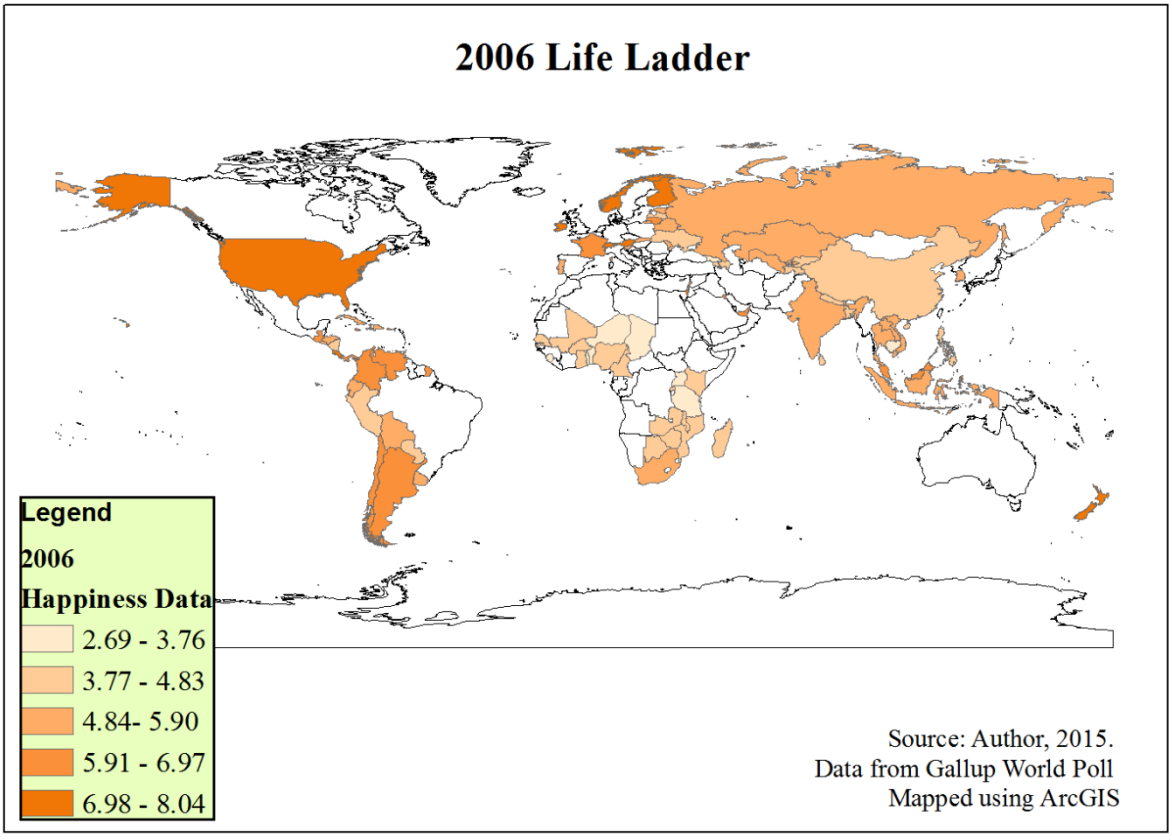
At the global level, there was not much change in the life satisfaction levels over time. As shown in the maps, American and European regions show a very high life satisfaction levels while African and Asian countries show gradual increase in life satisfaction over the years. Rich Western countries dominate the top of life satisfaction ratings with a few exception of Latin American countries which also show very high life satisfaction albeit being poorer. Veenhoven (2007) noted that the differences in the life satisfaction ratings of countries cannot be discounted as a mere measurement bias. As life satisfaction are measured based on a number of factors, the observed differences in happiness at the global level only shows that not all societies meet universal human needs equally well.

It can also be seen from the maps that neighboring countries as well as nations belonging to the same region usually fall within the same life satisfaction range. Hence, it is important to analyze countries based on geographic location in order to identify the determinants of life satisfaction within a region and also study how it differs with other regions.

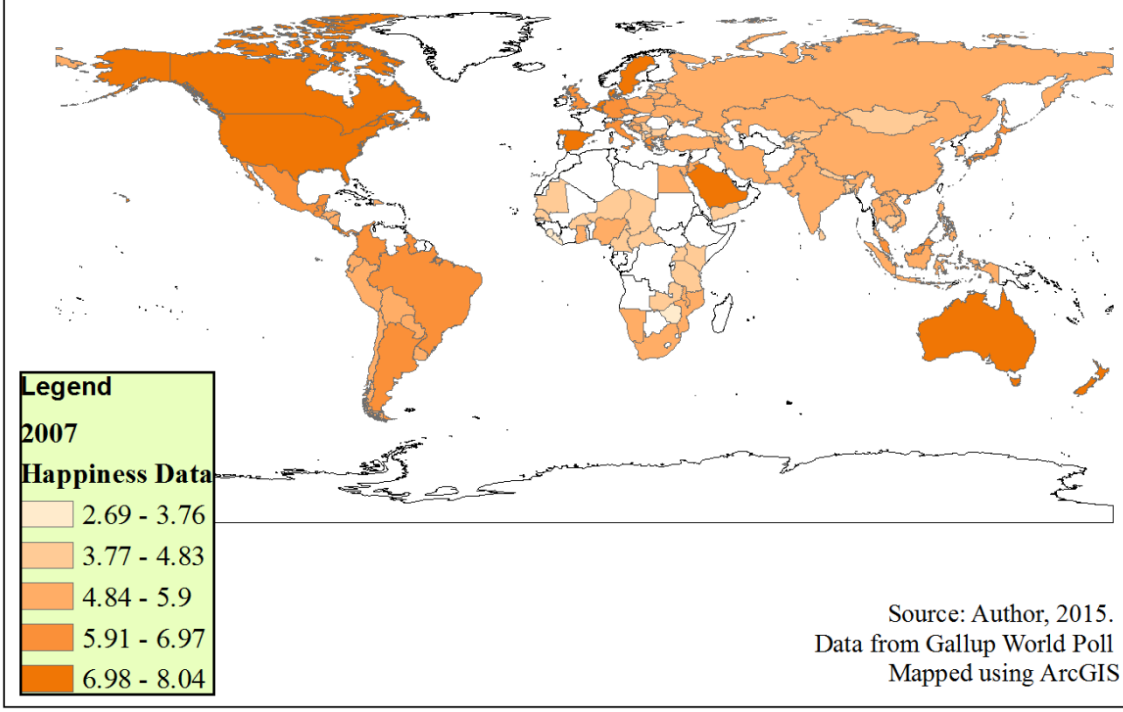
Generally, there has been steady increases in life satisfaction levels of countries each year which further supports the idea that countries can become happier. It likewise supports the theory of Veenhoven (2007) saying that it is also possible to achieve greater happiness for great number of people.

Figure 8. Life Satisfaction Maps from 2005 to 2014



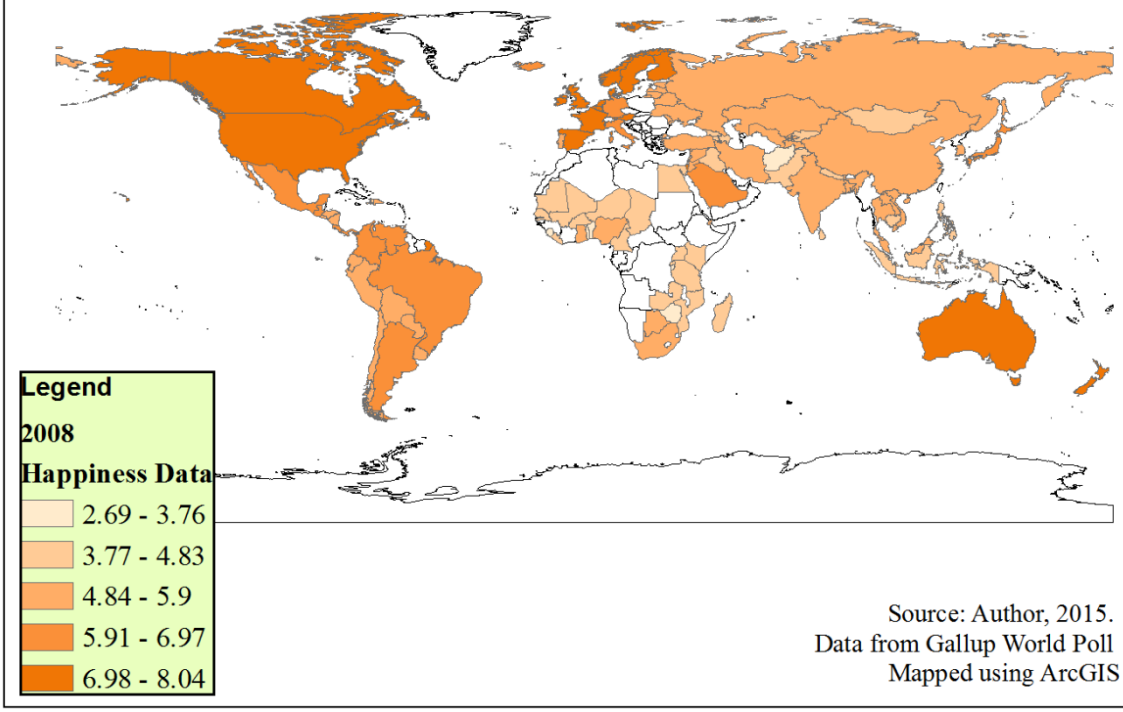


2007 Life Ladder



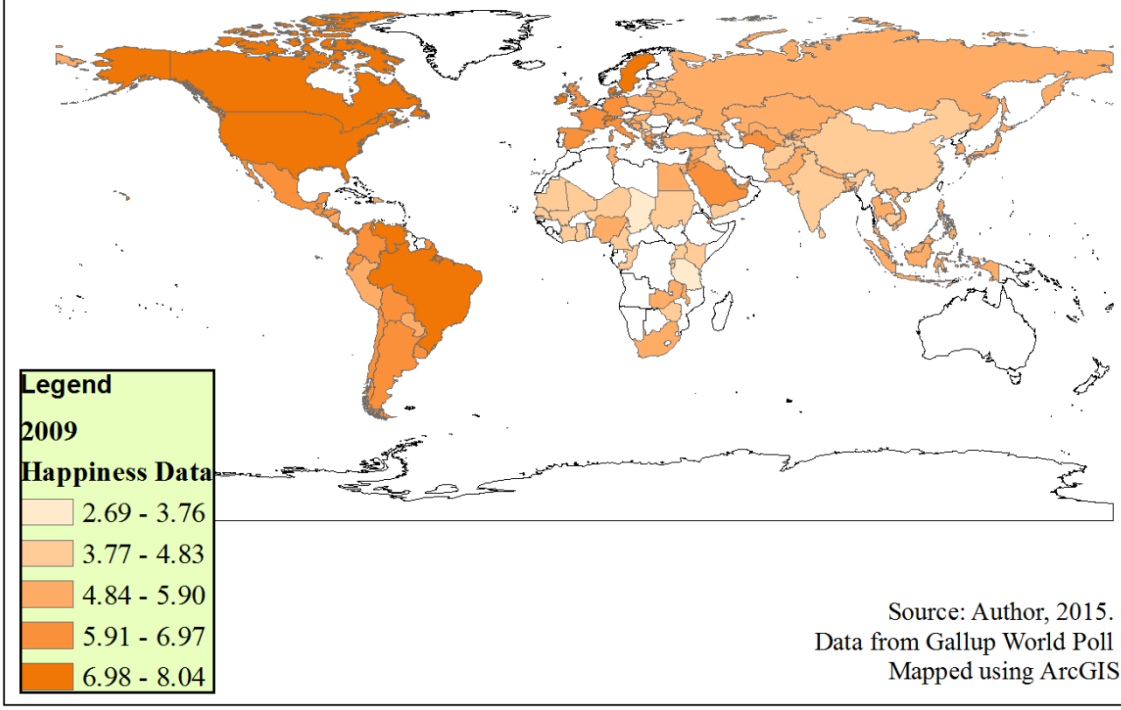
Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

2008 Life Ladder



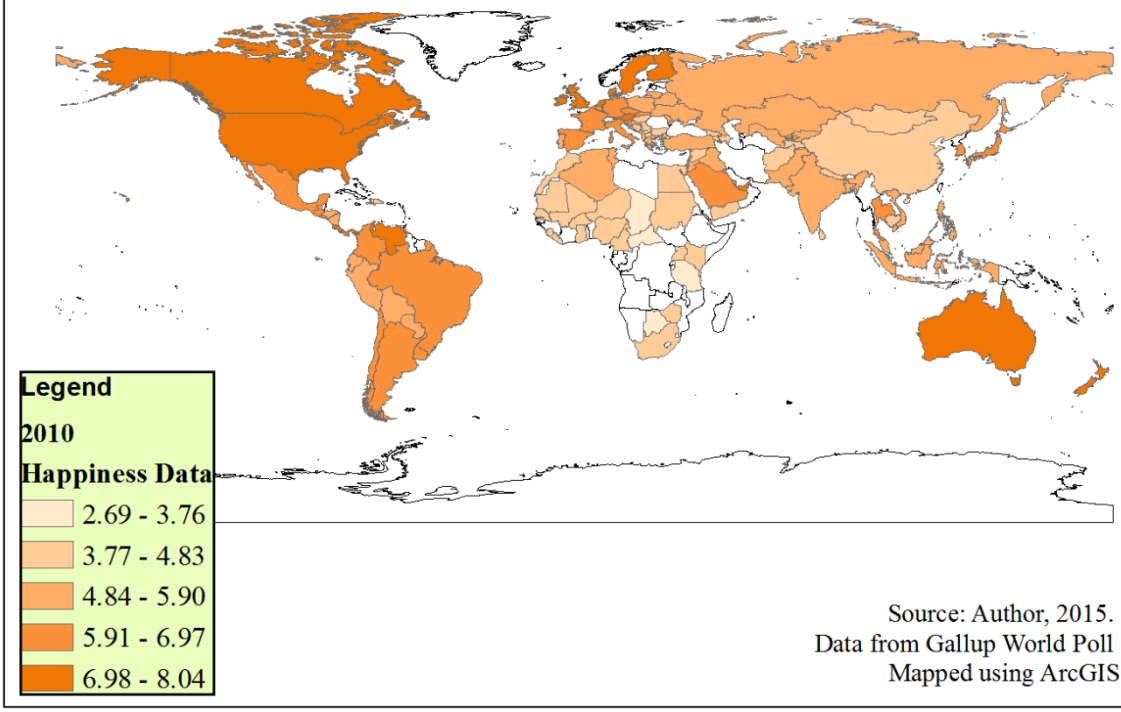
Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

2009 Life Ladder



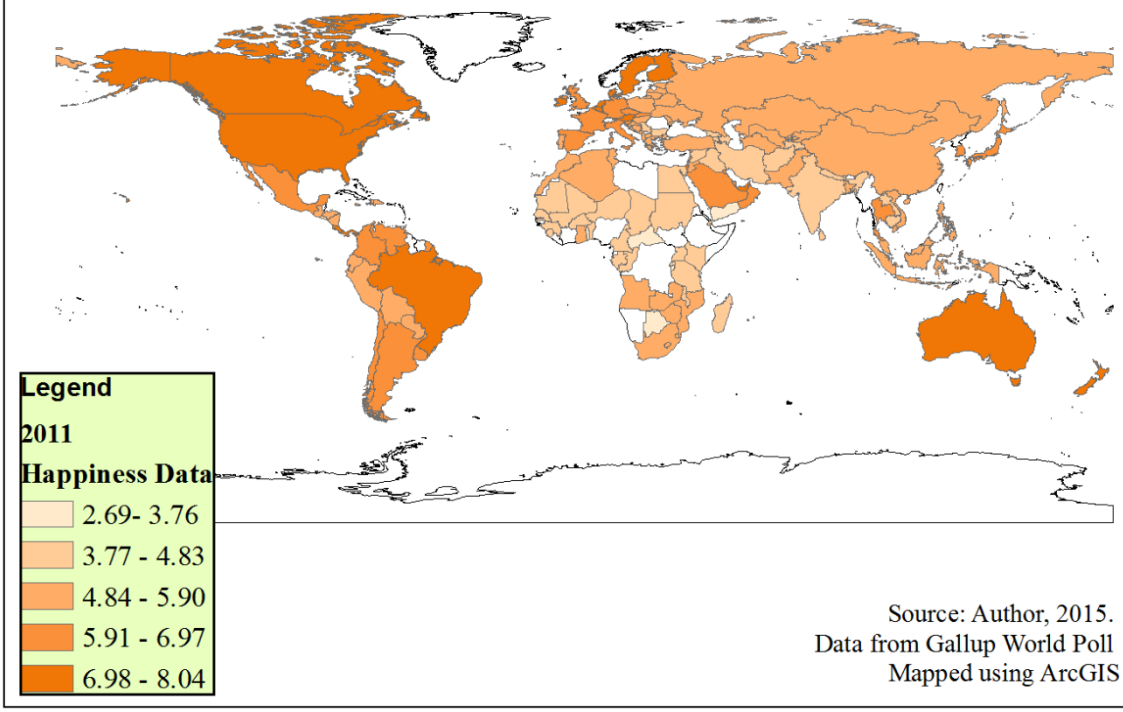
Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

2010 Life Ladder



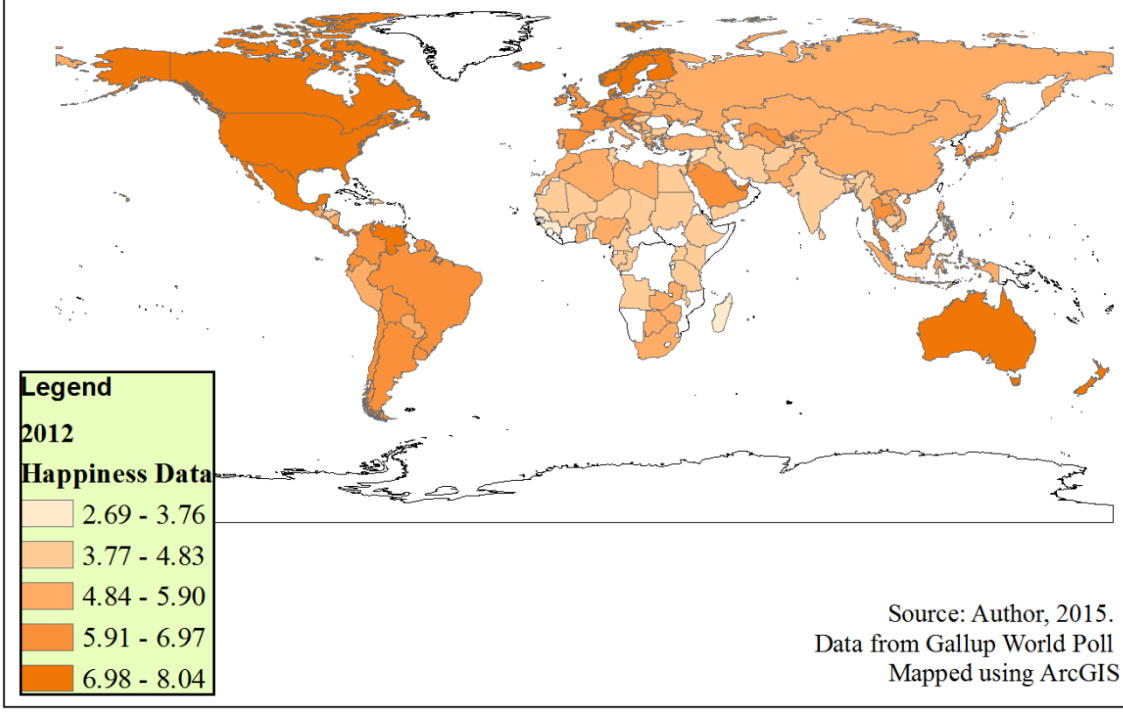
Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

2011 Life Ladder

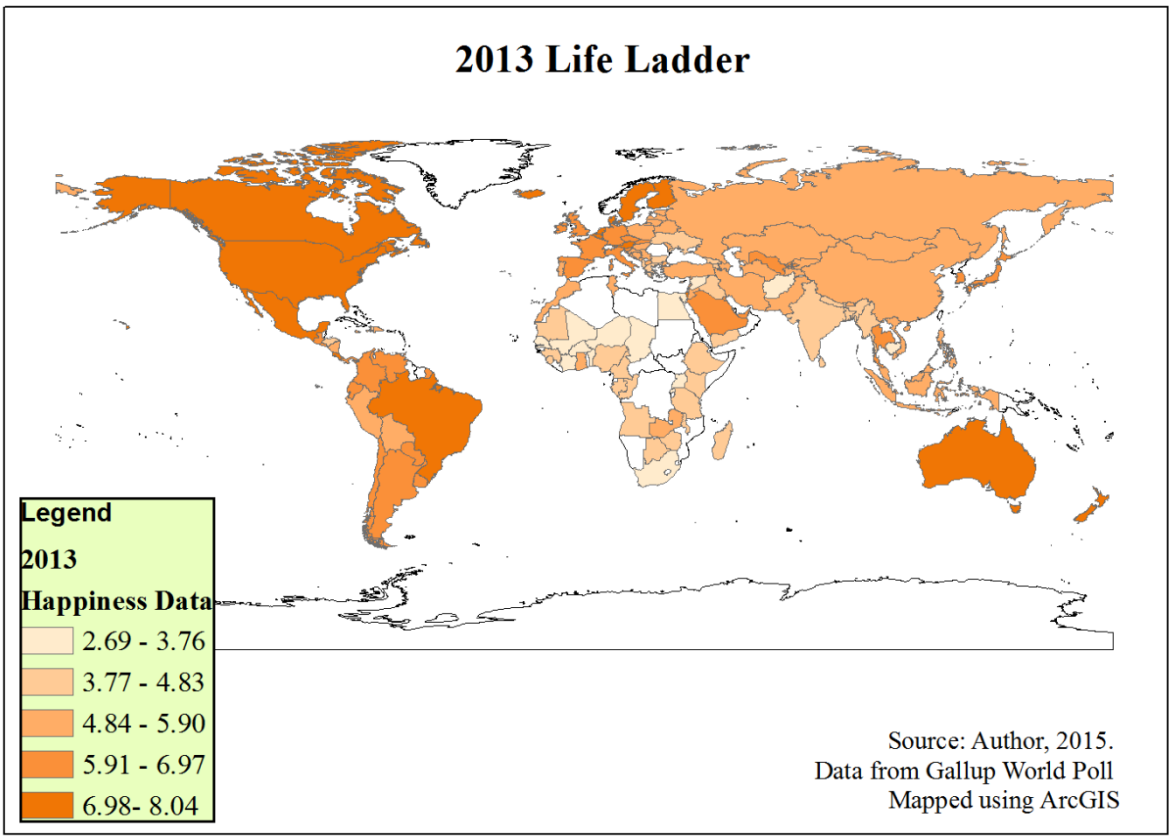


Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

2012 Life Ladder



Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS


2013 Life Ladder
Legend
2013
Happiness Data
2.69 - 3.76
3.77 - 4.83
4.84 - 5.90
5.91 - 6.97
6.98- 8.04
Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

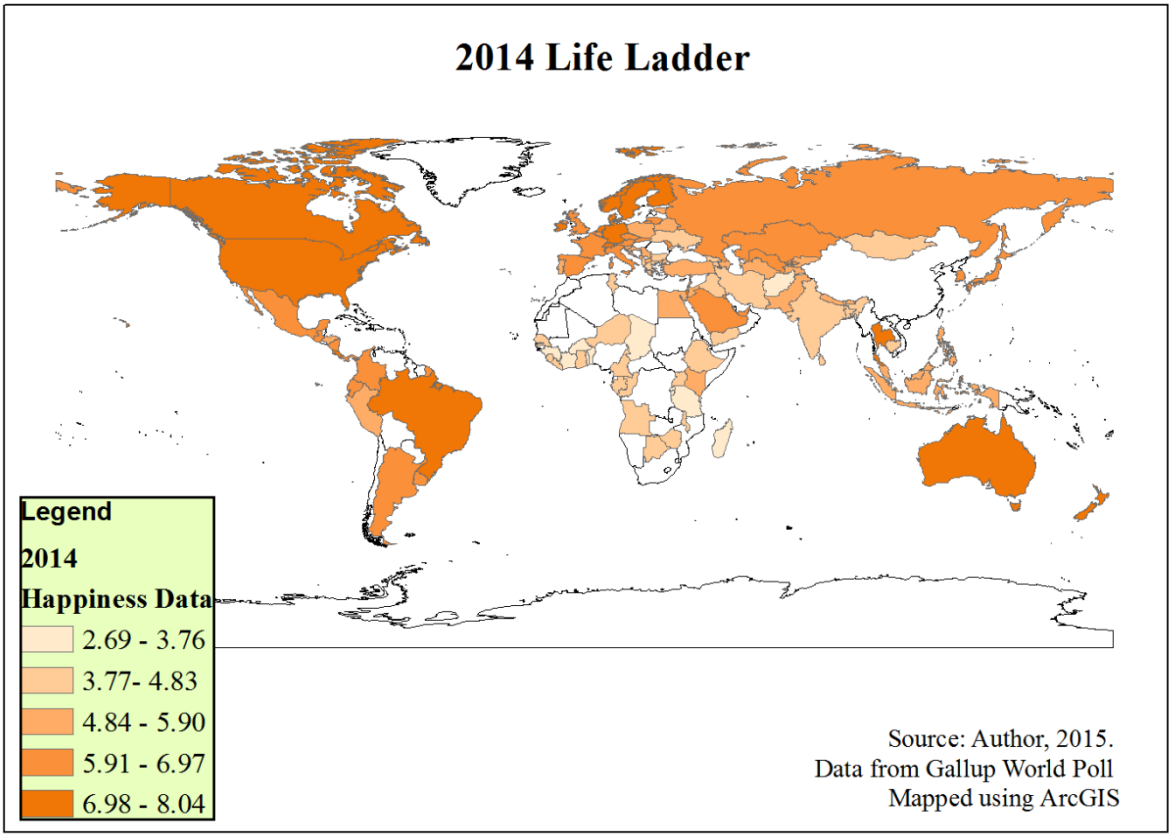
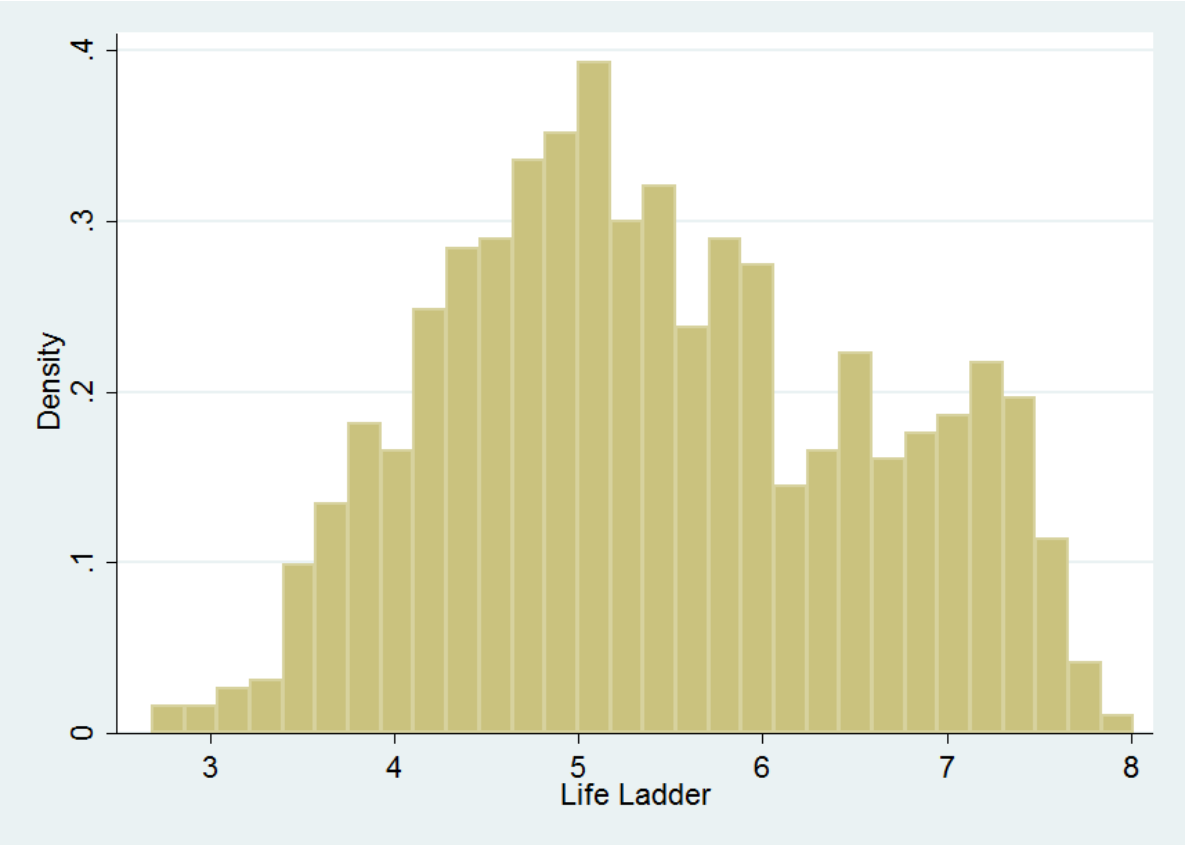

2014 Life Ladder
Legend
2014
Happiness Data
2.69 - 3.76
3.77- 4.83
4.84 - 5.90
5.91 - 6.97
6.98 - 8.04
Source: Author, 2015.
Data from Gallup World Poll
Mapped using ArcGIS

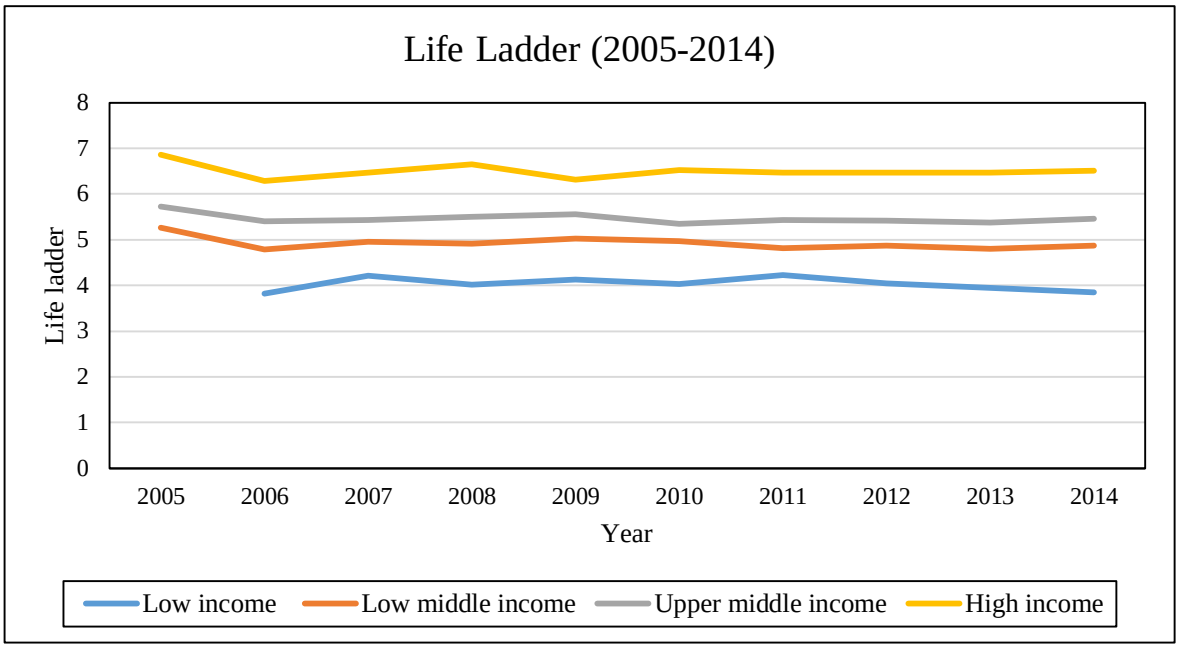
Figure 9. Distribution of Life Satisfaction across Countries



Source: Author, 2015. Plotted using Stata.

The histogram above shows the distribution of life satisfaction levels across countries. It shows a normal distribution at the global level where the life satisfaction scores recorded falls in between 2.69 and 8.02. The mean observation for life ladder is 5.45. It likewise shows that more countries (61%) have life ladder levels of above 5. A total of 1088 observations for 159 countries from 2005-2014 were used in the analysis (*see Annex 4 for the descriptive table of the dependent and independent variables*). In addition, 59 of these countries have life ladder scores for nine years, which is the most number of observations recorded in the 10-year data. Likewise, 76% of the countries have life satisfaction ratings for six years and longer which makes the Gallup World Poll life ladder data a very appropriate source for panel data analysis at the country level.

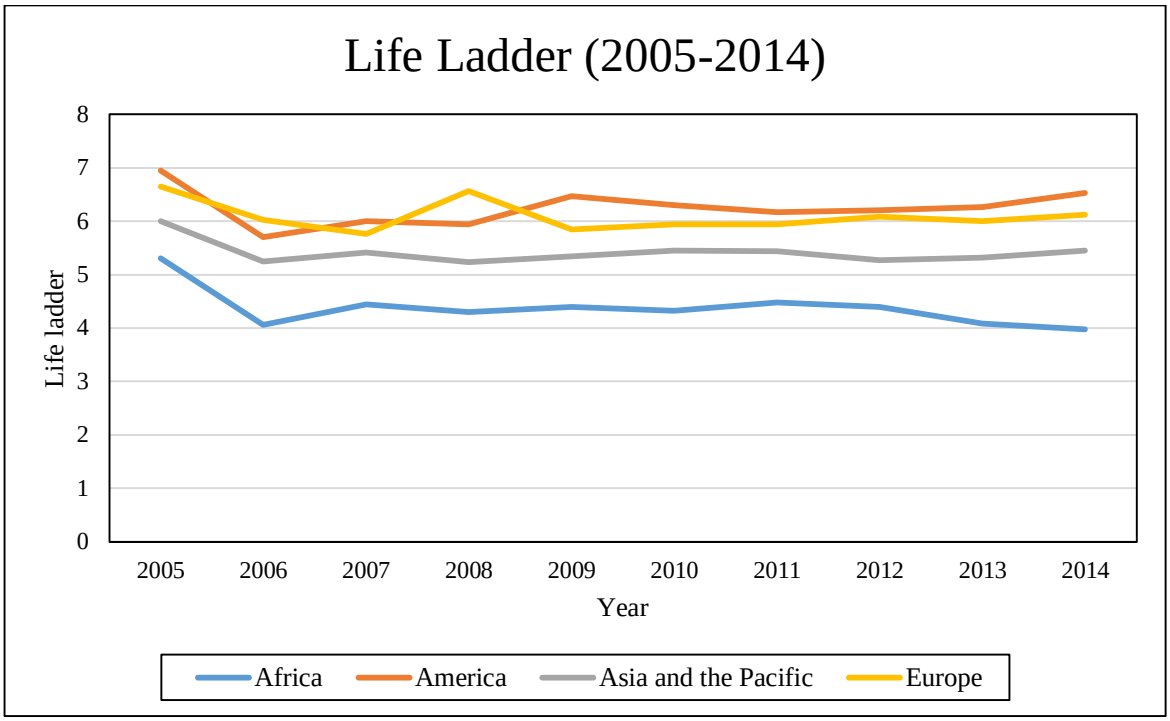
Figure 10. Life Ladder of Income Groups from 2005 to 2014



Source: Author, 2015.

The figure above shows how life ladder varies across different income groups. The results show life satisfaction is significantly higher for high income economies compared to middle and low income countries. It further reinforces theories suggesting that income and life satisfaction have a very strong correlation and that having high income really makes countries happier (Diener and Suh, 1997, Veenhoven, 1989, Bonini, 2008). Low income economies only have average life satisfaction levels of 3.8-4.2 during the nine year period. This is a huge difference compared to high income economies which showed average life satisfaction levels of 6.2-6.8 for the past ten years. The graph likewise shows that average life satisfaction for each of the income groups showed little variation across time although a slow but continuous decline in the life satisfaction can be seen for low income economies. Hence, the need to analyze the determinants of life satisfaction based on income becomes very relevant to reduce heterogeneity and to explain why high income countries are significantly happier than low income economies.

Figure 11. Life Ladder of Regions from 2005 to 2014



Source: Author, 2015.

The graph above shows the average life ladder levels of regions for the past ten years. A dip in the life satisfaction levels of regions in 2006 can be attributed to various factors. Most notably, since more countries were included in the Gallup World Poll, the averages at the regional level were affected. In 2006, countries with life ladder data increased from 88 to 27 in the previous year. In addition, the dip and upsurge of average life satisfaction levels for Europe from 2006 to 2008 can be attributed to changes in the data. In 2007, European countries in Gallup World Poll increased to 28 from 16 in the previous year. Most of the countries included in the 2007 Gallup World Poll had low life satisfaction levels such as Bulgaria, Macedonia, Albania, and Serbia which then reduced the average for Europe. In 2008, there were 23 European countries who participated in the Gallup World Poll compared to 28 in 2007 and 30 in 2009. Most of the countries that were not included in 2008 Gallup World Poll are countries with low life satisfaction levels such as Serbia, Hungary, Macedonia, and Bulgaria which then affected the average of life satisfaction in Europe. Likewise, additional countries that first participated in Gallup World Poll in 2008 had high life ladder scores such as Finland, France, Ireland, Austria, and Norway which ultimately contributed to the increase in average life satisfaction in Europe for the said year.

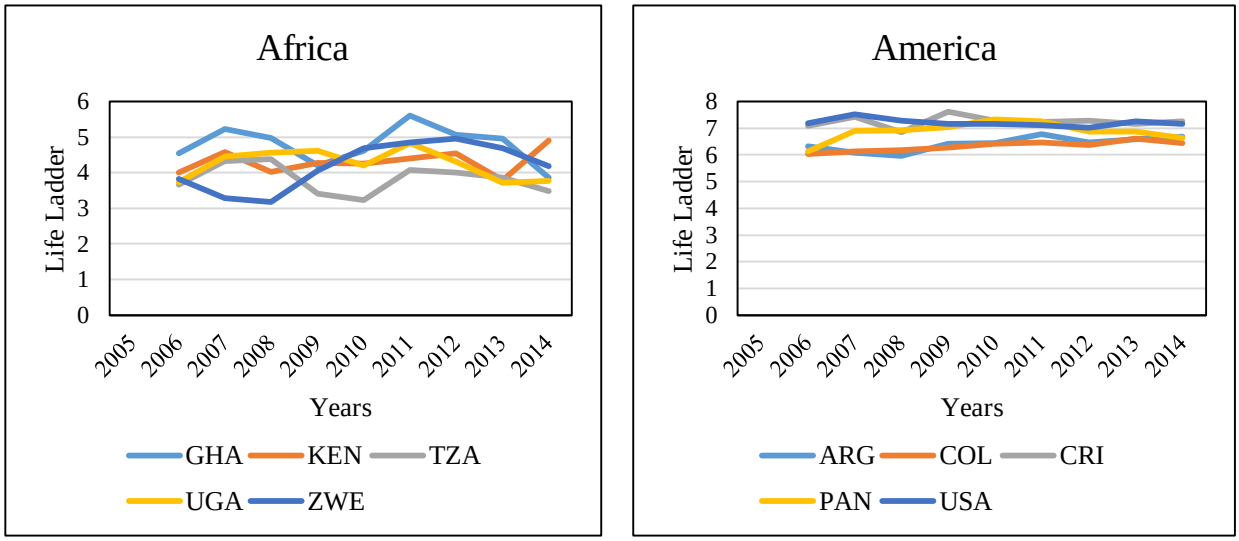
On the other hand, the reduction in happiness levels in 2006 for most of the regions can also be attributed to a variety of factors. By discounting the changes in Gallup World Poll country composition, the reduction of life ladder levels across regions may be due to the impending global economic downturn in 2007 as well as the crude oil production crisis. The crude oil crisis was further worsened by events in 2006 such as: (a) the conflict between Israel and Lebanon, (b) worries over Iranian nuclear plans, (c) North Korea missile tests, and (d) the destruction of Hurricane Katrina, which all contributed to the worsening of oil prices (BBC, 2008, Schienberg, J., 2006, Cashell and Labonte, 2005, BBC, 2006). And as most countries and people are heavily dependent for oil for electricity, mobility, and other economic activities,

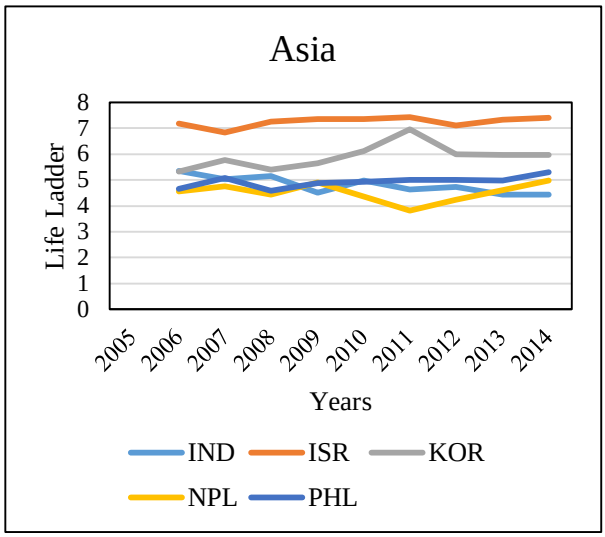
the increase in oil prices resulted in higher energy/electricity prices which affected negatively not only on the purchasing power of people but also on the inflation and unemployment levels of countries which ultimately lead to lower life satisfaction levels (Cashell and Labonte, 2005).

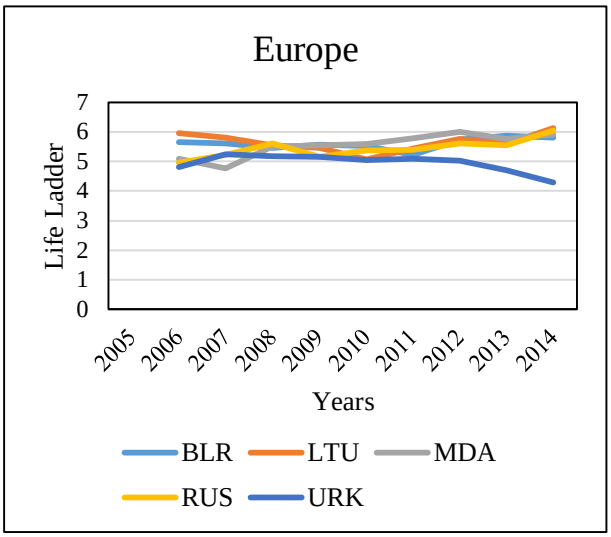
But for 2009-2014, life ladder levels showed very little variation. While Asia and the Pacific, America, and Europe showed continuous slow increases in life satisfaction each year, Africa showed slow decrease in life satisfaction for the past two years. This may also be attributed to reduction in life ladder data for Africa. In 2011, 39 African countries were included in the Gallup World Poll and the number of countries is also continuously reducing to 33, 31, and 28 in 2012, 2013, and 2014, respectively.

The following figure shows life satisfaction levels of some selected countries in Africa, America, Asia, and Europe. To discount the changes in the Gallup World Poll data, some countries with life satisfaction data from 2006-2014 were selected to see how life satisfaction varies within regions. From the table, we can see how in America and Europe, life satisfaction levels of countries are almost similar with each other while in Africa and Asia, huge difference exist across countries. For Africa, life satisfaction of countries (Ghana, Kenya, Tanzania, Uganda, and Zimbabwe) in the graph show huge variety not just across countries but also across time periods. For Asia, high income countries such as South Korea and Israel show high life ladder scores while low to middle income economies such as Nepal, India, and the Philippines show relatively lower life satisfaction levels. Unlike in Africa, Asian countries show more stable life satisfaction levels across years which are similar to America and Europe. While some of the countries show slow but stable increases in life satisfaction in the past years such as Nepal, Lithuania, and Russia, there are also some countries which show constant decrease in life satisfaction levels such as those in Ukraine and India. But relatively, happiness levels of countries, except those in Africa, are stable over time. Some shocks or external factors may cause the life satisfaction to increase or decrease significantly such as the example in South Korea and Nepal but it also managed stabilize after some years. Hence, it shows that while the life satisfaction levels of most regional clusters remain almost the same over time, the stable increase and decrease of life satisfaction in countries suggest that there is a possibility to increase happiness levels at the country level.

Figure 12. Life Satisfaction of Selected Countries in Africa, America, Asia, and Europe







Source: Author, 2015.

Lessons Learned

Hence, the descriptive analysis show that average life satisfaction at the global level generally move slowly with small changes over time. The consistency of life ladder reflects a good measure for well-being at the country level despite being subjective. The results further reinforce Veenhoven's (2007) theory that it is possible to achieve greater happiness for most countries of the world since most people rate their happiness above neutral. In addition, the glaring differences on the life ladder scores across income and regional groups further support the need to study the differences on the determinants of life satisfaction across these groups to reduce heterogeneity and to identify the differences in the determinants of life satisfaction between said groups. The results also show that it may be more appropriate to study happiness at the global, regional-, and income-group level as life satisfaction levels are more stable over time which reduces errors in measurements that might occur at the country level.

The succeeding sections will dwell on the various economic, social, and environmental factors affecting life satisfaction at different levels of analysis. In addition, population density is introduced as a control variable to consider size effects in the analysis.

4.2 Economic Factors Affecting Life Satisfaction

Upon doing fixed-effects regression analysis, the results show that for the economic indicators, it is GDP per capita, gross capital formation, and health expenditure that is significantly correlated with life satisfaction at the global level. The results show very significant results as it is true for 874 observations (for 144 countries) in contrast to the total sample size of 1088 observations (for 159 countries). It should also be noted that while poverty and inequality indicators such as urban poverty, poverty gap for 2USD a day, GINI index, and adequacy of social protection programs were significant, they were dropped from the model as they do not have sufficient panel data and are reducing the number of observations.

The study also predicted for happier countries with life satisfaction levels of 5.45 and above in order to determine the indicators that are also significant for "happier" countries which have life ladder scores above the mean. It shows that for happier countries, it is GDP per capita that is also statistically correlated with happiness.

The research likewise predicted for economic factors affecting happiness of different income levels to further see how economic factors have different effects for life satisfaction across income levels. The study shows that GDP per capita is a significant indicator for upper middle to high income countries. Likewise, gross capital formation and health expenditure proved to be a strong indicator for increased happiness levels of low to upper middle income economies.

Table 1. Economic Indicators determining Life Satisfaction across Income Groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.08***	0.04*	0.08	0.14**	0.07**
	(0.03)	(0.02)	(0.32)	(0.06)	(0.03)
Inflation consumer prices (annual %) (over 100)	-0.40	0.01	-0.59	0.14	-0.67
	(0.33)	(0.35)	(0.53)	(0.39)	(0.79)
Gross capital formation (% of GDP) (over100)	1.24***	0.63	1.11*	1.23*	1.42
	(0.40)	(0.75)	(0.56)	(0.67)	(0.87)
Health expenditure total (% of GDP)	0.07***	0.03	0.08*	0.14***	0.00
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Constant	3.85***	5.26***	3.82***	3.63***	4.35***
	(0.39)	(0.58)	(0.40)	(0.41)	(1.02)
Observations	874	402	350	224	300
R^2	0.07	0.04	0.04	0.10	0.13
Adjusted R^2	0.06	0.03	0.03	0.08	0.12

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

The study likewise controlled for population density (logarithm) to check if the population size of country affects the relationship between sustainable development factors and happiness. The results (*see Annex 5 for statistical regression results with population density as control variable*) show that the significance of economic indicators are unchanged even if population density is introduced in the model as a control variable.

The study then predicted for the economic factors affecting life satisfaction across regions in order to see if differences exist in the determinants of happiness at this level. Across regions, the study shows that there is a wide variety of indicators that are significantly correlated with happiness. GDP per capita proved to be strongly correlated with life satisfaction across regions except in Asia and the Pacific. Inflation, on the other hand, is not significant at all levels of analysis. Gross capital formation is significant only in Africa and Asia and the Pacific. And lastly, health expenditure is only significant in America. And again, even controlling for the logarithm of population density, the results at the regional level remained unchanged.

The huge variety on the indicators which are significant to the happiness of regions only suggest that there are really differences on what make regions happy. This may be attributed

to cultural differences, the varying view of development priorities or the general conditions that currently exist in these regions. An example would be the amounting pressure for health care reforms in United States in previous years which has impacts on health expenditure and life satisfaction of people in the United States.

It should also be noted that there were few significant indicators for regions. While the study does not recommend rejecting the non-significant indicators, it only suggests that a combination of other variables such as poverty and foreign trade indicators (e.g., poverty gap, inequality, foreign direct investments, personal remittances, etc) may have a strong effect on happiness of some regions and will likewise have a significant effect on existing indicators such as inflation, GDP per capita and gross capital formation.

Below is a discussion on the specific economic indicators and how it affects happiness at the global, income groups, and regional levels. Some country-specific examples are also provided to see how the results translate to country level data.

Table 2. Economic Indicators determining Life Satisfaction across Regions

	(1) Life Ladder (Total)	(2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.08***	-0.54*	0.24***	0.02	0.12***
	(0.03)	(0.29)	(0.07)	(0.04)	(0.03)
Inflation consumer prices (annual %) (over 100)	-0.40	0.46	-1.81	-0.66	-0.41
	(0.33)	(0.63)	(1.34)	(0.67)	(0.26)
Gross capital formation (% of GDP) (over100)	1.24***	1.93***	0.11	1.49**	0.30
	(0.40)	(0.60)	(0.85)	(0.65)	(0.76)
Health expenditure total (% of GDP)	0.07***	0.01	0.14***	0.05	-0.00
	(0.03)	(0.06)	(0.04)	(0.05)	(0.04)
Constant	3.85***	4.44***	3.27***	4.47***	3.34***
	(0.39)	(0.47)	(0.63)	(0.55)	(0.97)
Observations	874	201	155	252	252
R^2	0.07	0.07	0.24	0.05	0.18
Adjusted R^2	0.06	0.05	0.22	0.04	0.17

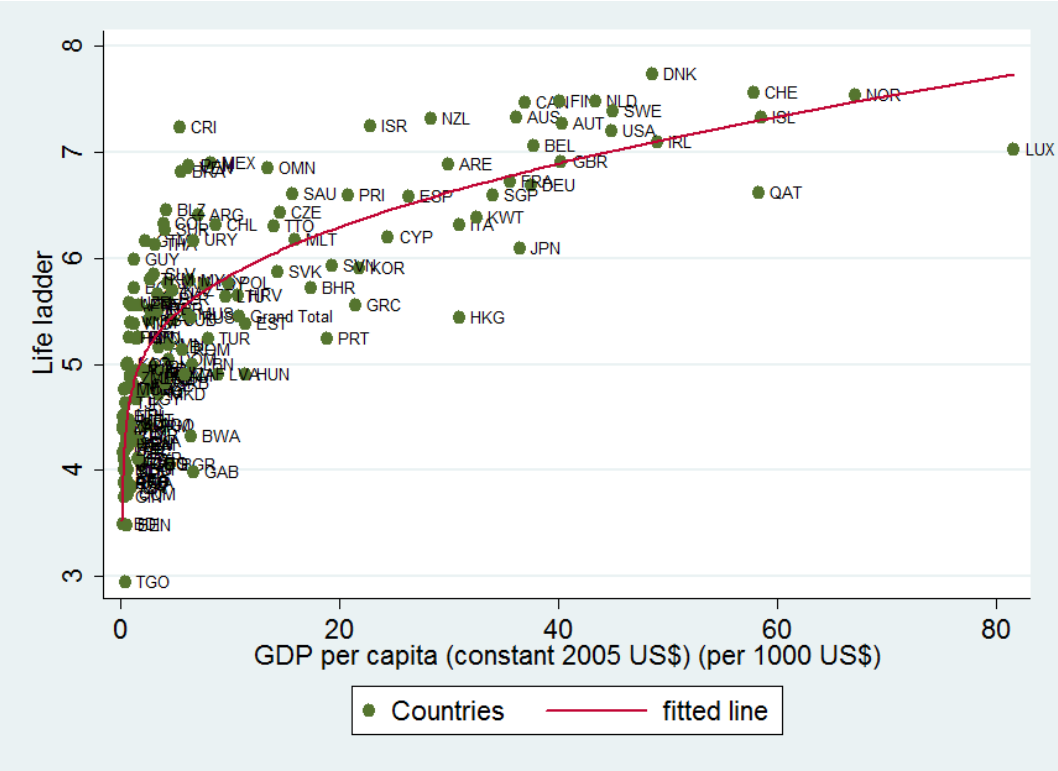
Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

4.2.1 GDP per Capita

By looking at the economic indicators one by one, the study further supports other researches saying that GDP is very significant to the happiness not only at the individual but also at global or cross country level of analysis. The scatter graph below shows the average life ladder and GDP per capita of countries in the span of 10 years. Based from the scatter graph, it can be inferred that countries with low GDP per capita mostly do have low life ladder ratings as well. It also shows that for countries with low GDP per capita, a small increase in GDP can equate

to high increase in life satisfaction. However, as countries move from low to high GDP per capita, the percentage increase in life satisfaction decreases. Hence, there is a diminishing marginal utility with GDP per capita. It only tells us that while income is very important in determining life satisfaction levels, the effect of GDP per capita on happiness reduces when it reaches to a point when basic needs are already met. It further supports the study by Inglehart, et.al. (2000) using the happiness data from World Values Survey in 1990s where once a threshold of around 10,000USD is reached, the average income level has little effect on subjective well-being of countries.

Figure 13. Scatter Graph of Average Life Ladder and GDP per Capita from 2005 to 2014



Source: Author, 2015. Plotted using Stata.

However, by looking at the regression results at different income groups, it shows that GDP per capita is actually significant for higher income economies compared to low income countries. The results also further supports Figure 10 where the life ladder levels of different income groups for the past ten years were presented. It shows that high income countries are happier than lower income economies at any stage in the past ten years. The same is also true at the regional level where GDP per capita is negatively significant to happiness in Africa compared to America and Europe where it is positively and significantly correlated. On the other hand, GDP per capita is not significant in Asia and the Pacific. One explanation for this is the rising income inequality in low income countries and in Africa. Hence, even if GDP per capita increases, if it does not translate into lessening the gap between the rich and the poor, it may have negative or no effect on life satisfaction of most people. Likewise, the ripple effects of increased income in terms of improving living environments also has greater effects on increasing life satisfaction.

Table 3. List of Countries with Highest and Lowest GDP per Capita

Country	Year	Life Ladder	GDP per capita
Luxembourg	2011	7.1014	819
Luxembourg	2010	7.097252	816
Luxembourg	2012	6.964097	798
Luxembourg	2013	7.130809	795
Luxembourg	2009	6.95792	790
Norway	2008	7.632288	685
Norway	2006	7.415682	678
Norway	2014	7.444471	672
Norway	2012	7.678277	668
Burundi	2009	3.791681	1.5
Burundi	2008	3.563228	1.5
Burundi	2011	3.705894	1.52
Burundi	2014	2.904535	1.58

Source: Author, 2015.

Table 4. List of Countries with Highest Life Ladder

Country	Year	Life Ladder	GDP per capita
Denmark	2005	8.018934	488
Denmark	2008	7.970892	500
Switzerland	2012	7.776209	586
Norway	2012	7.678277	668
Costa Rica	2009	7.614929	51.8
Venezuela, RB	2010	7.478455	60.1
Mexico	2013	7.442546	85.5
Costa Rica	2007	7.432132	52.5
Panama	2010	7.321467	61.5

Source: Author, 2015.

By looking at the country level, we can see that countries with high GDP per capita do have high life ladder scores and at the same time countries with the lowest GDP per capita also show low life satisfaction levels (*see Table 3*). However, if we look at countries with highest life ladder levels, it shows that while countries such as Denmark, Switzerland, and Norway have high life ladder and GDP per capita, South American countries show different results (*see Table 4*). South American countries such as Costa Rica, Venezuela, Mexico and Panama show high life ladder results while having low GDP per capita. It only shows that for these countries, indicators other than GDP per capita might also influence their happiness.

4.2.2 Inflation

Theories on economic indicators and life satisfaction show that inflation does have a negative impact on happiness. However, the results indicate that inflation has no significant effect at the global level as well as for different income and regional groups.

Again, the study does not recommend completely dropping the non-significant indicators, it only suggests that a combination of other variables may affect inflation and make it significant with life satisfaction. A good example would be the study of Di Tella, MacCulloch, and Oswald (2001) which suggest that the effect of unemployment and inflation on happiness can be combined and will produce significant results. This “misery index” calculates how much decrease in inflation rate should there be per increase in unemployment rate to keep the

population equally satisfied (Di Tella, MacCulloch, et al., 2003). As the research deals with sustainable development in general, unemployment was placed in social development indicators and not indexed with inflation. However, when the regression analysis was actually ran together with both inflation and unemployment, both indicators are significant at the global level which actually supports the theory of Di Tella, MacCulloch, and Oswald that inflation and unemployment are actually related to each other and are statistically significant with life satisfaction when combined together.

4.2.3 Gross Capital Formation

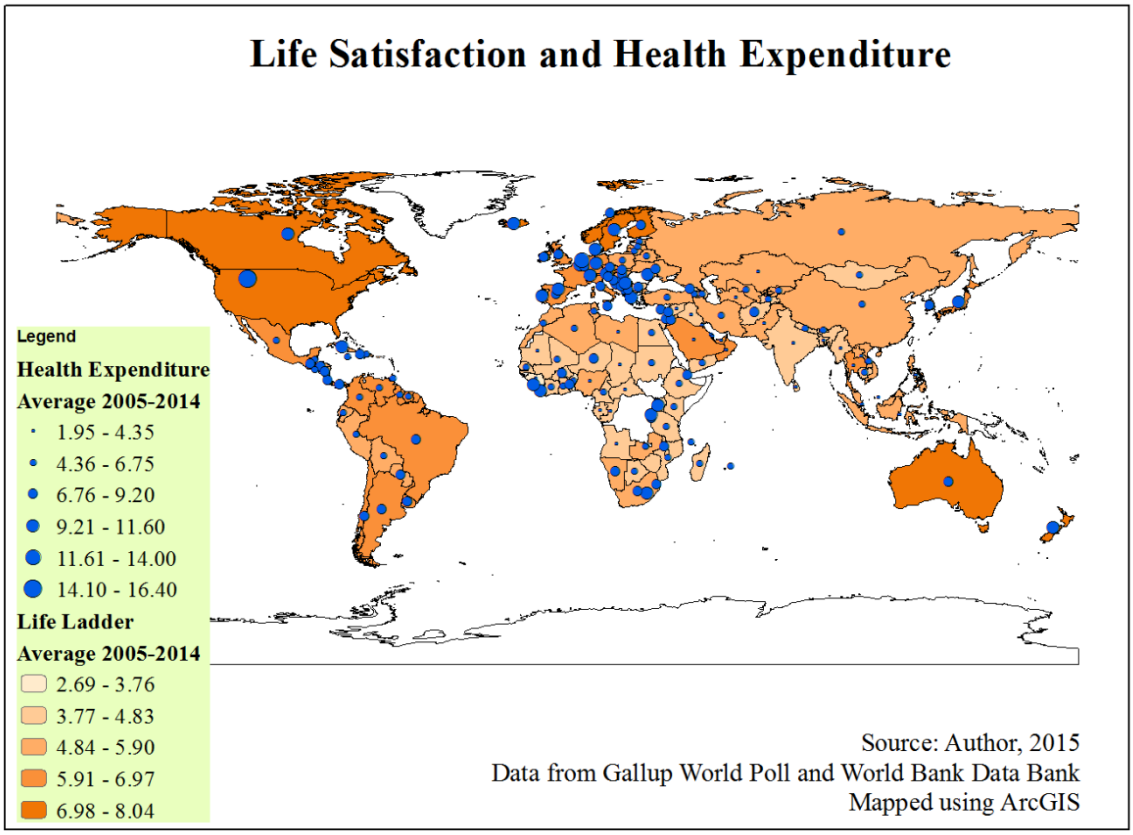
In terms of gross capital formation, it shows that the said indicator is positively and significantly correlated with happiness levels at the global level as well as for low to middle income economies. And in addition, the indicator was also positively and statistically significant in Africa and Asia and the Pacific. For Africa and Asia as well as for low to middle income economies, increased in investments facilitate increase in economic development by creating jobs and raising income which in turn increases life satisfaction for these groups. In addition, increase in investments has effects on improving living conditions of people through improved infrastructure facilities, efficient transportation, and increased income. Likewise, development theories discussed in chapter 2 mentioned that the need to create investments is a necessary step for countries to take-off from developing to developed economies. Hence, the effect of gross capital formation has significant effects for developing countries as it is necessary to increase their income and improve their living conditions, which also have impacts their life satisfaction. Therefore, the relationship between gross capital formation and happiness is not a direct relationship but rather, factors such as income and improved living conditions intervene as intermediate variables.

At country-specific levels, it can be seen that Asian countries such as China, Qatar, and Vietnam have high levels of gross capital formation (25-48% of GDP) while African countries such as Zimbabwe, Sierra Leone, and Nigeria show very low gross capital formation and life satisfaction levels. On the other hand, happiest countries such as the Scandinavian countries show gross capital formation at 18-26% of their GDP.

4.2.4 Health Expenditure

The results of the regression analysis also show that health expenditure has a positive and significant effect on happiness at the global level. While theories on health indicate that the causality between health and happiness is still unclear, the result is able to shed some light on how having good health makes people happier. While having good health certainly makes people happy, on the other hand, being satisfied or dissatisfied in life may also impact on health. Happy people may take good care of their health and unhappy people may neglect their health or form bad habits such as smoking and drinking that may be detrimental to their over-all wellbeing. However, the findings of this research shows that increased in government expenditure on health make countries happy. As health expenditure can be a proxy for health indicators, it tells us that government expenditure on health is a strong significant indicator for happiness and that the more government spends for health care helps in maintaining healthy citizens which in turn make people happier. The correlation of health expenditure with life satisfaction also reflects citizen's assessment on government services as the said indicator proved to be significant at global level in contrast with expenditures on military as well as research and development.

Figure 14. Map of Life Satisfaction and Health Expenditure



Another unresolved issue is the fact that it is unhappy people who seek more medical attention (Bjornskov, 2008). If such is the case, the results of the study may be surprising since based on the above-mentioned theory, increase in health expenditure should result to lower life satisfaction as more unhappy people are in need of medical support. However, relative happiness may explain why government health expenditure has a positive effect on life satisfaction of countries. Indirectly, government expenditure on health care reduces the disparity between the rich and the poor by increasing or widening the access to health care most especially to those who cannot afford it thereby making people, in general, happier. Government health care may also influence relative satisfaction of people especially during times of epidemic. Even if there are people who don't access health care, they may feel happy if the government is able to provide help to those affected by epidemic or those who need medical help so that the risk of spreading a disease also decreases. At the same time, people may feel happy not only if they are healthy but also if those surrounding them are healthy.

The study likewise shows that in predicting for different income groups, health expenditure is very significant for middle income countries. At the regional level, it shows that health expenditure is significant only in America. Again, the results for both income groups and regions doesn't change even when population density (logarithm) is introduced in the model as a control variable. Adaptation theory may explain the results for high income economies since health service may already be adequate or the needs of people for health care are already being met and therefore increases in health expenditure no longer has effects on life satisfaction. It likewise sheds light on why Latin American countries score high on life ladder while being middle income economies since at country-specific levels, some Latin American countries such as Brazil and Costa Rica have high health expenditures. It supports the theory

of Helliwell (2003) stating that people with highest life satisfaction are not those who live in the richest countries, but those who live where social and political institutions are effective since health expenditure reflects improvements in social and political environments.

At country-specific levels, it shows that it was actually United States of America (USA) which showed the highest health expenditure across the 159 countries included in the study. USA's health expenditure from 2005-2013 were the highest across the panel data with the exception of 2014 since no data was yet reported. Other countries in American region such as Canada, Costa Rica, and Brazil also showed high health expenditures together with high life ladder scores. This further shows why health expenditure was a significant determinant for happiness in America and also for middle income countries where most Latin American countries are included. In addition, happiest countries such as Switzerland, Denmark, Canada, and the Netherlands showed relatively high health expenditures and high life ladder scores while the least happy countries such as Benin and Syrian Arab Republic showed low health expenditures, which may also explain the significant relationship of the two variables at the global level.

4.3 Social Factors Affecting Life Satisfaction

The study predicted for the social indicators which are significant for life satisfaction at various levels. The result show that age dependency ratio, self-employment, unemployment, and life expectancy are significantly correlated with happiness at global levels and for happier countries both with and without the logarithm of population density as control variable (*see Annex 6 for regression results with population density as control variable*). On the other hand, predicting for income groups show differences in social factors which are significantly correlated with life satisfaction. For example, age dependency ratio, unemployment, and life expectancy is greatly significant for high income countries. The results also show that there are no significant social indicators for low and middle income economies. It does not imply that the existing indicators be rejected, however, it shows that introducing different social indicators such as prevalence of HIV can have significant effects on life satisfaction and to other indicators in low to middle income economies.

It should likewise be noted that while education indicators such as completion rates are significant to happiness of countries, the said indicator was dropped due to incomplete data. Likewise, prevalence of HIV is also a significant indicator for happiness across countries and specifically for regions such as America and Europe, however, due to data availability, the number of observations decreased by approximately 200 (43 countries are being excluded from the model), hence, HIV prevalence is excluded from the model.

Table 5. Social Factors Affecting Life Satisfaction across Income Groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
Age dependency ratio (% of working-age population)	-0.03**	-0.03*	-0.04	-0.02	-0.04**
	(0.01)	(0.01)	(0.02)	(0.03)	(0.02)
Self-employed total (% of total employed)	0.02**	0.02*	0.03	0.01	0.02
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Unemployment total (% of total labor force) (modeled ILO estimate)	-0.04***	-0.04***	-0.02	-0.02	-0.05***
	(0.01)	(0.01)	(0.04)	(0.03)	(0.01)
Life expectancy at birth total (years)	0.07***	0.05**	0.05	0.10	0.10***
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)
Constant	1.68	3.60**	2.30	-0.90	0.53
	(1.65)	(1.68)	(5.02)	(5.36)	(2.27)
Observations	551	338	114	164	273
R^2	0.13	0.13	0.07	0.08	0.28
Adjusted R^2	0.13	0.12	0.03	0.06	0.27

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

For social indicators, the results vary across regions. For example, age-dependency ratios show a positive effect on Africa compared to negative age dependency ratio at the global level. Unemployment likewise show negative but significant effect for Africa and Europe while life expectancy is positively significant in America. The result also show that the indicators are not significant in Asia and the Pacific. However, when controlled for population density, it showed that life expectancy becomes significant with life satisfaction in Asia and the Pacific and Europe. Again, the result does not suggest outright rejecting the insignificant indicators for Asia and the Pacific and for other regions. This only suggests that introducing different social indicators such as prevalence of HIV, education completion rate, employment to population ratio, and incidence to malaria can have significant effects on life satisfaction and to other indicators as well.

Table 6. Social Factors Affecting Life Satisfaction across Regions

	(1) Life Ladder (Total)	(2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
Age dependency ratio (% of working-age population)	-0.03**	0.23*	-0.03	0.02	-0.03
	(0.01)	(0.13)	(0.04)	(0.03)	(0.02)
Self-employed total (% of total employed)	0.02**	0.01	0.03	0.02	-0.01
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Unemployment total (% of total labor force) (modeled ILO estimate)	-0.04***	-0.17**	0.00	-0.03	-0.05***
	(0.01)	(0.07)	(0.04)	(0.03)	(0.01)
Life expectancy at birth total (years)	0.07***	-0.01	0.28*	0.13	0.07
	(0.02)	(0.04)	(0.15)	(0.08)	(0.03)
Constant	1.68	-9.38	-13.99	-5.65	3.11
	(1.65)	(6.20)	(13.77)	(6.92)	(2.30)
Observations	551	36	120	145	240
R^2	0.13	0.59	0.24	0.06	0.24
Adjusted R^2	0.13	0.54	0.22	0.03	0.22

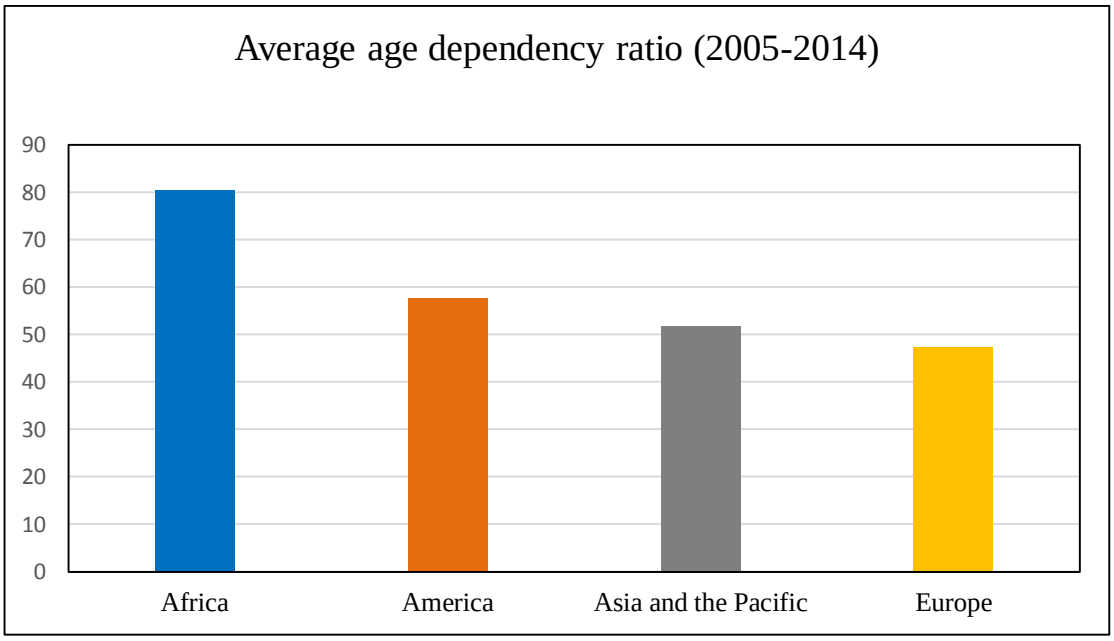
Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

4.3.1 Age Dependency Ratio

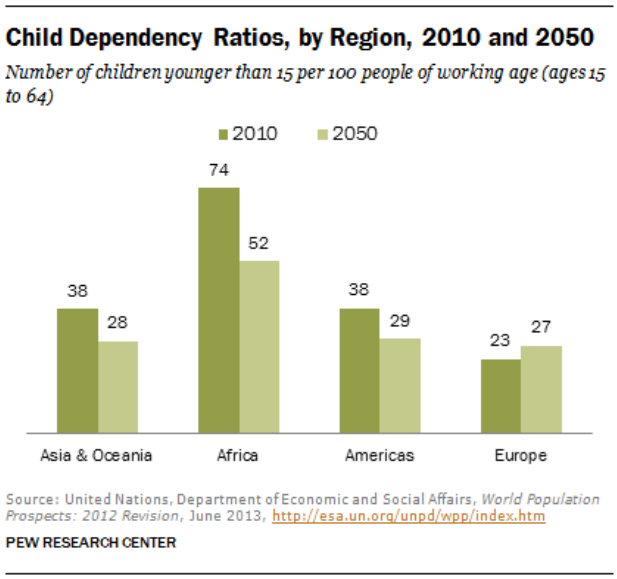
Age dependency ratio being negatively correlated with happiness means that as there are more percentage of the population highly dependent on the working population, the less happy the countries are. This result is highly expected since the more dependent population a country has, the demand for social security such as retirement pensions, unemployment insurance and other welfare services for education and health also increases and which if unmet, can decrease life satisfaction of people. The higher age dependency ratio may also increase the burden on the working population to be economically dependent and to have high income to support the dependent population.

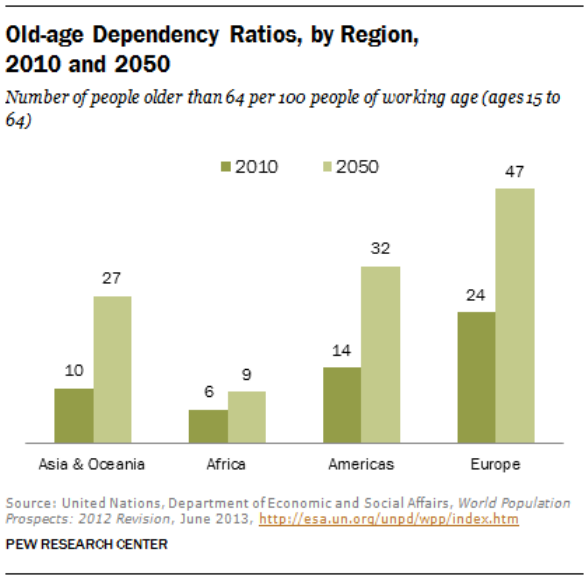
The composition of age-dependency ratios may partly explain differences across regions and income groups. For example, in Africa, the composition of age-dependency ratio is mostly children. Hence, as compared to other region, Africa anticipates increased in labor force in the next few years when these children enters the labor force. This may partly explain why age-dependency ratio has a positive coefficient in Africa. On the other hand, there is still a need to validate the results for Africa as the regression analysis showed few observations for the region due to limited data. On the other hand, the age-dependency ratios of high income and happier countries are mostly composed of older people. This will explain the negative effect of age dependency ratio of happier countries as well as high income countries where there are more old dependent population than young dependents. It then shows that the demand for social protection programs are higher for this countries. Good country examples are Japan, Denmark, Sweden, Switzerland, and United Kingdom where old dependency ratios are very high. Hence, the need for more welfare services and its effect on unemployment and reduction of income for older population affects life satisfaction negatively.

Figure 15. Average Age Dependency Ratio for 2005-2014



Source: Author, 2015.





Source (for child and old-age dependency ratios): (Pew Research Center, 2014)

4.3.2 Self-employment and Unemployment

At the individual level, self-employment showed high positive effects in job satisfaction which also affect life satisfaction (Blanchflower and Oswald, 1998). While the study of El Hardi and Grolleau (2012) mentions that self-employment has a negative impact for OECD countries, the results of this study tells otherwise. One of the main reasons why self-employment is positively correlated with happiness is because while it decreases job and income security, it actually increases economic freedom and also indirectly, personal freedom. Veenhoven (2010) mentions that economic freedom, together with political and personal freedom are strongly and statistically significantly correlated with happiness. The idea that people have more freedom in their working hours and the idea of becoming "one's own boss" increases job satisfaction levels

which in turn impacts on life satisfaction. At the global level, self-employment may not only mean getting a low wage job to compensate for unemployment but people also choose to be self-employed because of the economic and personal freedom it gives. Self-employment also consists of highly specialized skilled workers opting to move out of corporations they work in to start their own businesses which is to explain why self-employment is significant for happier countries. In addition, self-employment are preferred in these areas as it increases per capita income and generates additional jobs. Hence, intermediate variables such as income, freedom, and independence play a role in the relationship between self-employment and happiness.

On the other hand, unemployment is significantly correlated in Africa, Europe and high income economies. Unemployment is a strong indicator of reduction in income which makes countries and regions unhappy. For low income economies, unemployment is reduced by going into self-employment for income generation.

For unemployment, the results very much support all the existing theories of how unemployment reduces life satisfaction levels of people. Di Tella, MacCulloch, and Oswald (2003) mentions that unemployment has both direct and indirect effect on happiness. While directly, unemployment makes people unhappy, a rise on the unemployment rate also reduces happiness levels of those who have work because they feel bad about the unfortunate fate of those unemployed and at the same time, they fear of losing their jobs in the future (Di Tella, MacCulloch, et al., 2003). Unemployment may be an intermediate effect of recession or decreasing economic growth. Indirectly, the effects of unemployment on the reduction of income is also very significant which in turn reflect on decreased life satisfaction. Unemployment also has effects on reduced social interaction, decrease in self-esteem, and increased pressure on age-dependency which all affects life satisfaction at varying degrees.

Unemployment, on the other hand, showed large negative effects not just across countries and happier nations but also in regions of Africa and Europe. The effects of unemployment to life satisfaction is highly affected by income. Studies also show that the impact of unemployment is greater on high income countries as the effect of unemployment and income also connects to relative satisfaction. Generally, people feel worse if they are unemployed and had to suffer massive reduction in income while people around them are still employed with high income. Likewise, the reduction in income on high income economies where income and cost of living are higher impacts more compared to low and middle income countries. Likewise, income is also an intermediate effect between unemployment and life satisfaction.

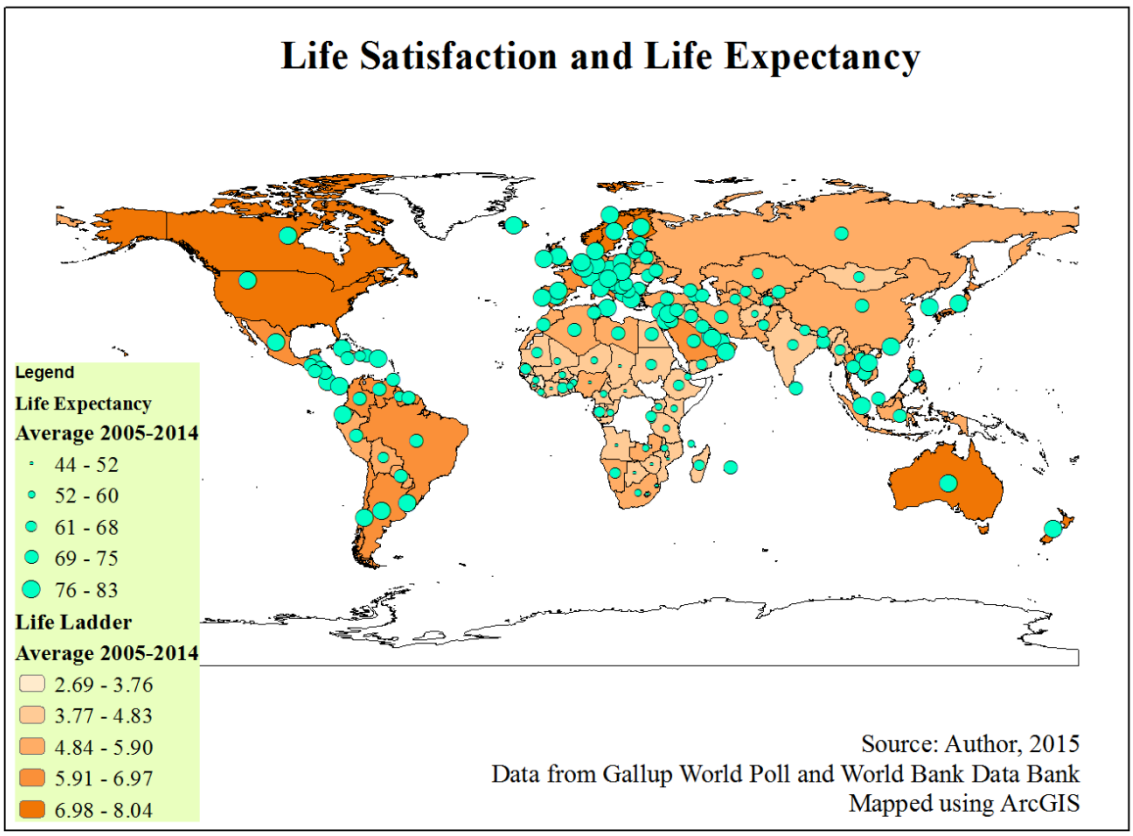
4.3.3 Life Expectancy at Birth

In terms of longevity, the results show that life expectancy at birth is positively and statistically significant with life satisfaction. The finding is likewise highly supportive of the theories by Yang and Veenhoven which poses that healthy life expectancy and expectancy at birth are positive elements of subjective well-being (Yang, 2008, Veenhoven, 2007).

Likewise, life expectancy at birth is significant in high income economies. At the regional level, life expectancy is significant in happiness levels of America. However, when controlled for population density, it showed that life satisfaction became insignificant in America and significant in Europe and Asia and the Pacific. At country-specific levels, it is countries from Asia and the Pacific and Europe such as Hong Kong, Japan, Iceland, Switzerland, Spain, Italy, and Australia which showed highest life expectancy levels of 82-84 years. Likewise, these countries showed life ladder levels higher than the mean average life satisfaction (5.45). The

same can be said for countries with highest life ladder levels as they likewise showed very high life expectancy of between 78-83 years.

Figure 16. Map of Life Satisfaction and Life Expectancy



4.4 Environmental Factors Affecting Life Satisfaction

For the environmental indicators, it shows that among other indicators, it was carbon dioxide emissions from transport, electricity production from renewable sources excluding hydroelectric, electricity production from hydroelectric sources, percentage of population with access to improved water source, and urban population which are significantly correlated with happiness. For happier countries, it was electricity production from renewable sources (including hydroelectric source) which is significantly and negatively correlated with life satisfaction. In predicting for different income groups, it showed that the same indicators at the global level are also significantly correlated at low income group. On the other hand, electricity production from hydroelectric source is negatively correlated with life satisfaction of middle to high income economies while improving water source in urban areas and urban population is significant to upper middle income countries. In addition, electricity production from renewable sources except hydroelectric is negatively significant for high income countries. The results do not have significant changes when population density is introduced in the model as a control variable (*see Annex 7 for the fixed effect regression results with population density as a control variable*).

Likewise, other environmental quality indicators such as sulphur hexafluoride (SF6), perfluorocarbons (PFC), and methane (CH4) gas emissions also proved to be significantly

correlated with life satisfaction as these indicators reflect pollution in the atmosphere. However, as they also reduce the number of observations by half, these were removed from the model.

Table 7. Environmental Indicators Affecting Life Satisfaction of Income Groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
CO2 emissions from transport (% of total fuel combustion)	0.01**	0.01	0.01*	0.00	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.03***	-0.02*	-0.02*	-0.07	-0.02**
	(0.01)	(0.01)	(0.01)	(0.05)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.02***	-0.02***	-0.01*	-0.02***	-0.02***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Improved water source urban (% of urban population with access)	0.05**	0.14	0.03**	0.18***	0.41
	(0.02)	(0.09)	(0.01)	(0.05)	(0.46)
Urban population (% of total)	0.03*	0.03	0.05*	0.06*	-0.04
	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)
Constant	-0.76	-8.94	0.34	-15.36***	-32.05
	(1.97)	(8.35)	(1.20)	(4.82)	(45.99)
Observations	606	303	209	171	226
R^2	0.07	0.08	0.05	0.15	0.10
Adjusted R^2	0.06	0.07	0.03	0.12	0.08

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

When predicted for regions, it showed that carbon dioxide emissions from transport and electricity production from renewable sources excluding hydroelectric are significant environmental indicators in Africa. On the other hand, electricity production from hydroelectric source, improved water source (urban) and urban population are statistically significant in America. In Asia and the Pacific and Europe, the significantly correlated indicators to life satisfaction are improved water source (urban), and electricity production from hydroelectric sources, respectively. However, when the logarithm of population density was introduced as a control variable, urban population became insignificant in all regions including at the global level.

Table 8. Environmental Indicators Affecting Life Satisfaction of Regions

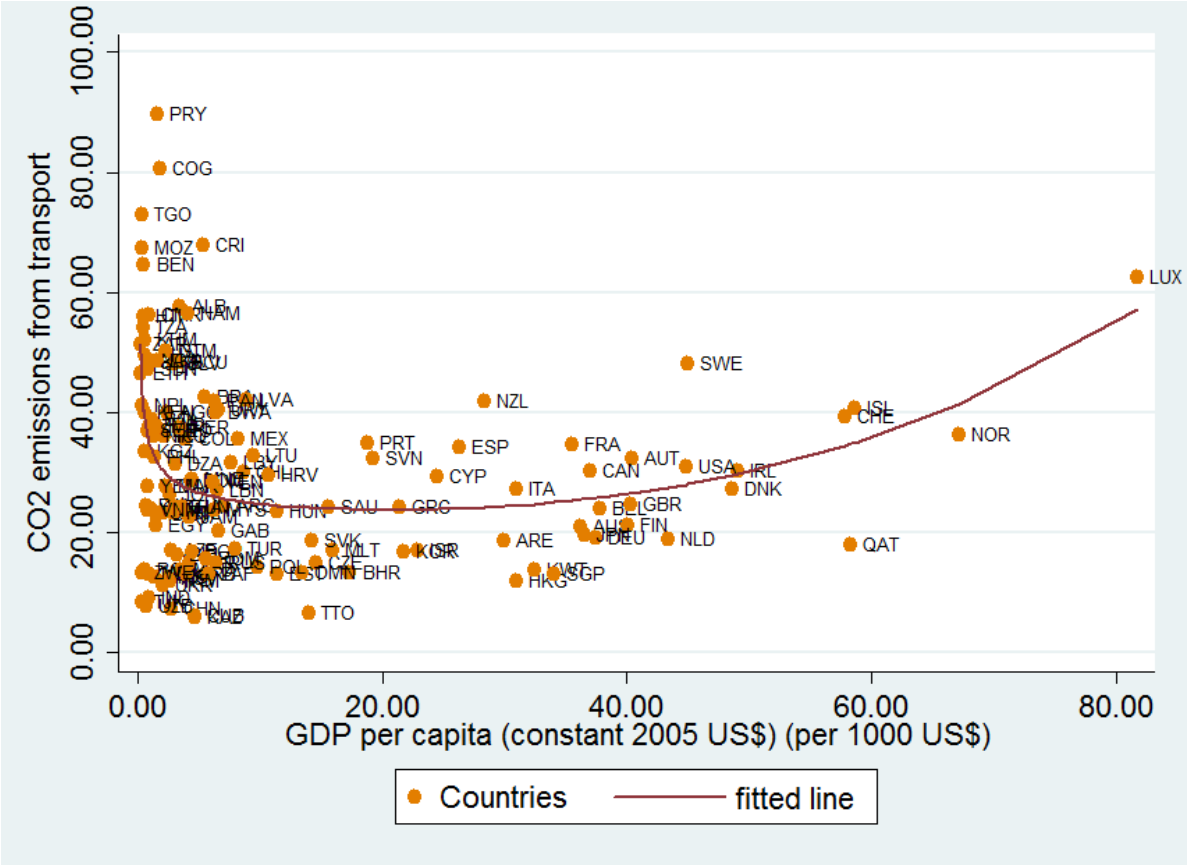
	(1) Life Ladder (Total)	2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
CO2 emissions from transport (% of total fuel combustion)	0.01**	0.02**	0.02	-0.00	0.01
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.03***	-0.09***	-0.03	-0.06	-0.02
	(0.01)	(0.03)	(0.02)	(0.05)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.02***	-0.01	-0.02**	0.01	-0.02***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Improved water source urban (% of urban population with access)	0.05**	-0.05	0.17***	0.04**	-0.32
	(0.02)	(0.07)	(0.05)	(0.02)	(0.32)
Urban population (% of total)	0.03*	-0.01	0.09**	0.03	-0.01
	(0.02)	(0.06)	(0.04)	(0.03)	(0.05)
Constant	-0.76	9.20	-16.73**	0.11	39.48
	(1.97)	(6.39)	(6.80)	(2.17)	(31.54)
Observations	606	90	126	202	178
R^2	0.07	0.07	0.22	0.02	0.18
Adjusted R^2	0.06	0.01	0.19	-0.00	0.15

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

4.4.1 Carbon Dioxide Emissions

In sustainable development scenarios, carbon dioxide emissions from transport should have a negative effect on life satisfaction of people since it increases carbon footprint, increases greenhouse gases and increases risk to global warming. In the model we can see that there is albeit a positive effect of carbon emissions from transport. The research only shows that while negative effects on carbon emission exist, we cannot deny the fact that carbon emission from transport is also an indirect indicator of mobility and increased economic activity. In addition, increase in income may also have an effect on the demand for transport as people may have the luxury to travel more or to live in better housing in the suburban areas which will then require increased transport demand. Hence, we may deduce that carbon emission from transport is heavily influenced by economic growth as reflected by income. As income increases, it leads to increased demand for cars, trains, domestic aviation and navigation, which in turn leads to increased carbon emissions, and consequently happiness. The graph below shows the relationship of how carbon dioxide emissions increase with increases in income. This further supports the theory of how income influences transport demand and further carbon dioxide emission and then, life satisfaction.

Figure 17. Scatter Graph of Average Carbon Dioxide Emissions and Income from 2005-2014



Source: Author, 2015. Plotted using Stata.

When predicted for different income groups, it showed that carbon emission is significant only for lower middle income economies. At the same time, it is only Africa which showed significant results at the regional level. The result may be related to the increase in gross capital formation which is also significantly and positively correlated with life satisfaction in Africa. This showed that increase in investments would increase economic activity, generate increase in jobs created and would have an effect on increased income and increased transportation demand. Likewise, increase in investment would necessitate increase in infrastructure and transportation support which is also an important precondition for economic growth as discussed in Chapter 2. The increase on transportation will then lead to increase in carbon emissions. Hence, carbon emissions may only become an intermediate variable for increased economic activity through rise in investments and income.

4.4.2 Electricity Production from Renewable Sources

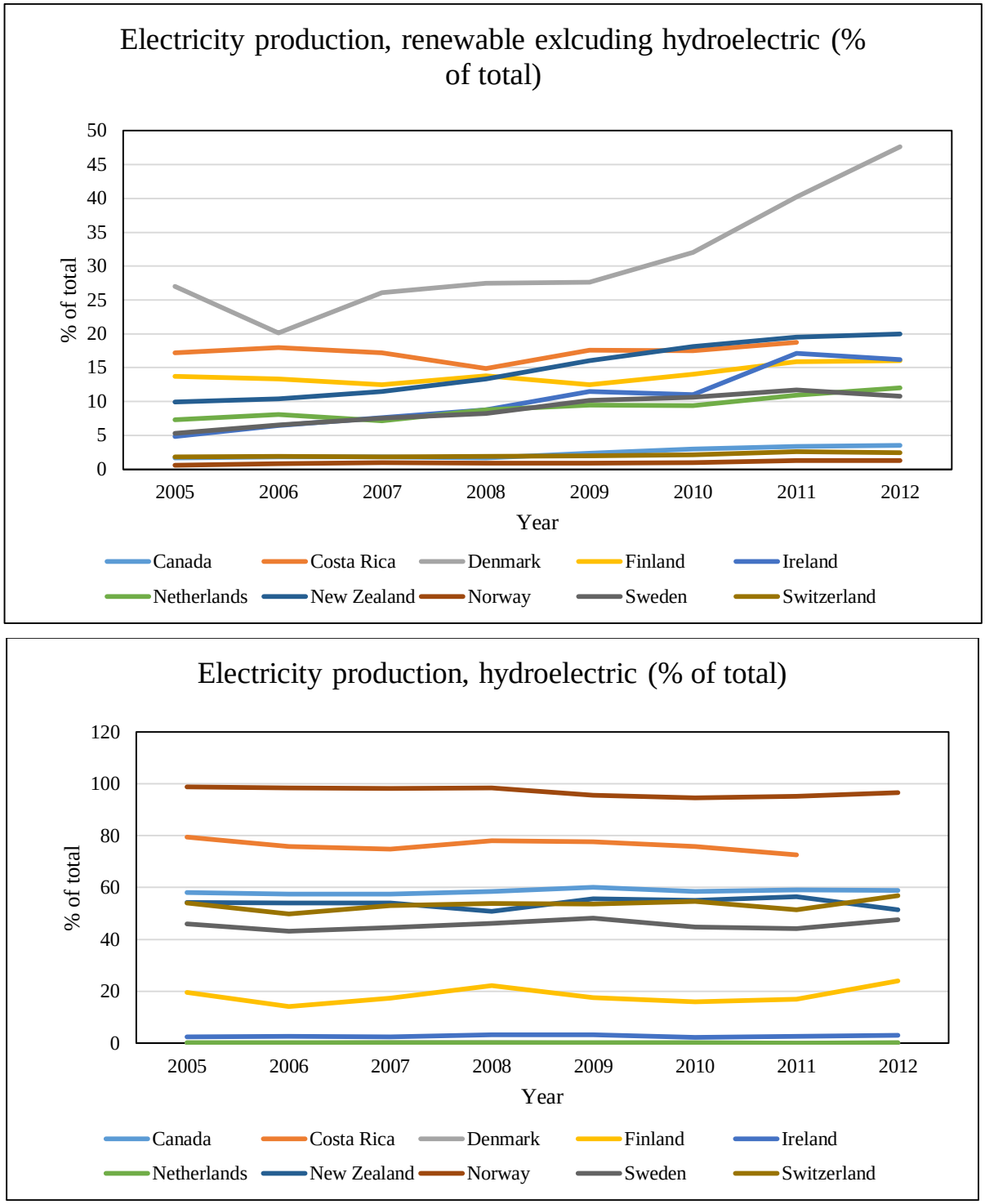
Another indicator which was strongly correlated with happiness was electricity production from renewable sources. It shows that while in theory, renewable electricity production should be positively correlated with life satisfaction as renewable electricity production is good for the environment and biodiversity. However, the study shows a negative effect of renewable electricity production to life satisfaction. One main reasons for the negative effect of renewable electricity is due to the externalities that it poses to people. For example, wind turbines affect

residents due to shadowing, noise, and influence on landscape and biodiversity (Drechsler, Ohl, et al., 2011). On the other hand, biogas plants pose odor nuisance, visual impacts, and possible decrease in tourism and property prices (Soland, Steimer, et al., 2013). While conventional electricity production (oil, gas, and nuclear) also has externalities such as air pollution, greenhouse gases, and nuclear risk, the lesser cost to produce electricity in this manner may also outweigh its externalities. The result of this study had a similar results with the study of Mollendorff and Welsch (2014) which showed negative effects of renewable energy to well-being of German citizens using nationwide panel data of life satisfaction. However, there might be a need to further increase acceptance for renewable energy through information campaigns as well as monetary compensation for the externalities in renewable electricity production (Mollendorff Von and Welsch, 2014). Likewise, the cost to produce electricity from renewable sources is another obstacle it must surpass. Most low to middle income countries still depend on conventional sources for most energy production due to lesser cost to produce.

In terms of renewable energy production except hydroelectric, it shows that aside from externalities and cost, another reason why there is a negative effect of renewable electricity production in low income economies and Africa is because of job creation. Conventional electricity production (oil, gas, and coal) are generally more labor-intensive which creates more work which in turn reduces unemployment, increases income, and increases happiness. Hence, the effect of electricity production to life satisfaction is not a direct relationship. Various factors such as externalities, cost, income, preferences, and job creation are affecting the relationship by being intermediate factors.

On the other hand, if we look into the top ten countries with highest life ladders, it shows that they also have very high renewable electricity production. While we cannot discount the negative effects of renewable electricity production, for very happy countries, the relationship may be different. Denmark actually tops the list of countries with highest renewable electricity production excluding hydroelectric sources, and it is also the happiest country in the world. In terms of hydroelectric energy production, Albania and Paraguay produce 100% hydroelectric energy. But not behind these countries is Norway which also produces 98-99% of its electricity from hydroelectric sources. Hence, at the global level, the results may be negative, but further studies at country-specific levels may show different results for happier countries. Hence, a closer look on happier countries suggest that sustainable production of electricity does have a positive effect on the top 10 happiest countries.

Figure 18. Renewable Electricity Production of Happy Countries from 2005-2014



Source: Author, 2015.

4.4.3 Urban Environment

In terms of urbanization, it shows that improved water source as well as urban population seemed to be significantly and positively correlated with life satisfaction. It only shows us that while most studies show preferences in living at rural areas, urban areas also shows a positive effect to life satisfaction. Veenhoven (2005) further supports this by saying that the more modern the country, the happier its citizens are. Glaeser (2011) likewise mentions in his study

that in countries where more than half of the population is urban, 30% of people say that they are very happy in comparison to only 25% of the people in nations where more than half of the population is rural. This is likewise in support of the study by Silva and Brown (2013) indicating that by controlling for some aspects of environmental quality, living in urban environment corresponds to higher levels of life satisfaction. While urban areas are beset with numerous problems, the fact still remains that urban areas open up a lot of economic opportunities compared to rural areas. This redistribution of population from rural to urban is induced by better income and employment opportunities in urban centers arising from the centralizing force of the new technologies of modern economic growth (Easterlin, Angelescu, et al., 2011).

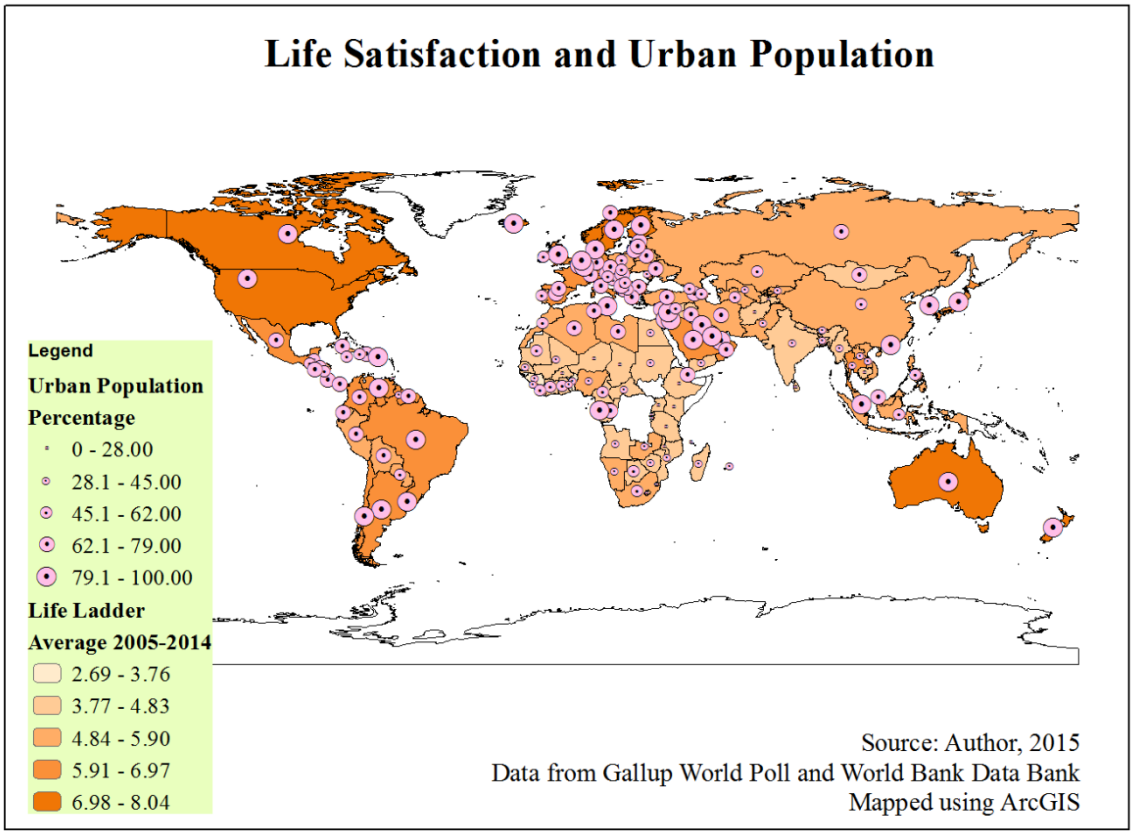
Urban areas may be plagued with urban problems but they are also the same place in countries where higher-order services and facilities can be found. This ultimately affects preference of people in terms of access and living opportunities.

In addition, water access proves to be important in all areas but most specially in urban areas. The result of the regression analysis likewise supports theories that water access is essential to the quality of life. Low quality water affects health of individuals with the subsequent influence on their happiness (Guardiola, Gonzalez-Gomez, et al., 2013). Likewise, studies of Bookwalter and Dalenberg (2004) in South Africa shows the important role of water access in subjective well-being of rich households.

The graph below shows the relationship between life satisfaction and urbanization. Life satisfaction and urban population for the past ten years were averaged and mapped. It shows that countries with higher happiness levels also account for higher urban population percentage. This is prominent in America and Europe where both life satisfaction and urban population are high. On the other hand, the map also shows that for African and Asian countries there are low life satisfaction levels as well as low urban population percentage.

However, one main consideration which must be taken into account in the future is the carrying capacity of urban areas. While presently, the relationship between urban indicators is positive, the continuous urban expansion and growth if unmanaged can lead to detrimental problems relating to carrying capacity of the environment, and more specifically urban carrying capacity which can affect life satisfaction negatively. This is alarming considering that 54% of the total world population now lives in urban areas (UN Department of Economic and Social Affairs, 2014). This will also become a concern most especially for Asia and Africa where the rate of urbanization is exceedingly high.

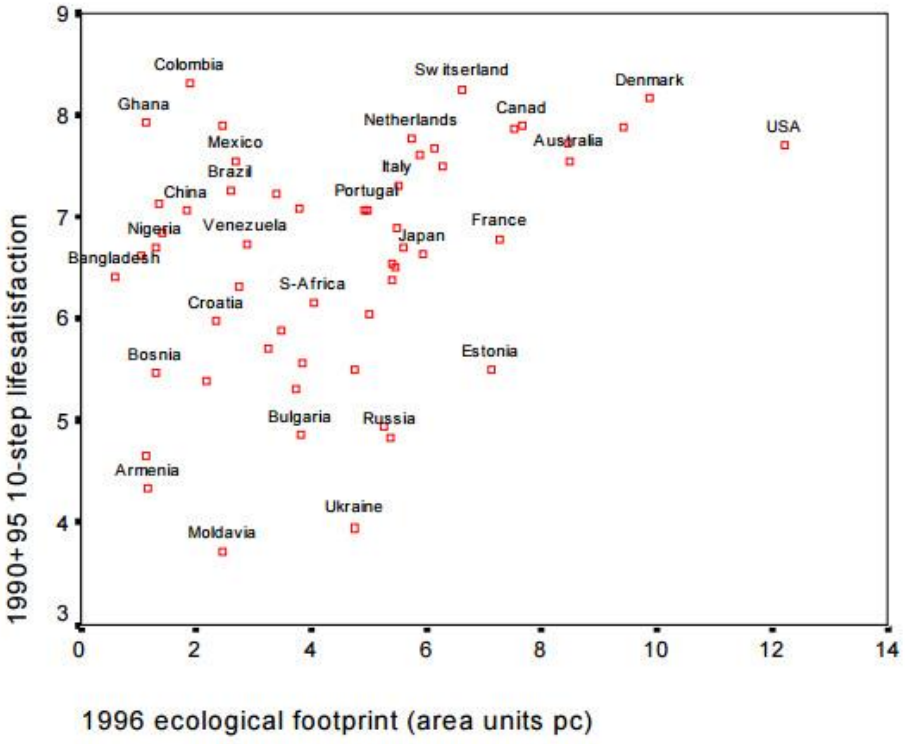
Figure 19. Map of Life Satisfaction and Urbanization



Source: Author, 2015. Mapped using ArcGIS.

Lastly, the results of the regression analysis with environmental indicators at the global level may show surprising results but existing theories seemed to validate the results. As such, urban population is an indication of urban carrying capacity. Together with carbon dioxide emission, this contribute to increasing ecological footprint while renewable electricity production reduces ecological footprint. Veenhoven's (2008) study on sustainable consumption likewise shows that happiness is not only high in nations which has high consumption, it is even higher in the countries which consume in an unsustainable way and thus increasing ecological footprint. Hence, the higher the income, the higher the ecological footprint of a country is, the happier they seem to be (*see Figure 20*). And this is further translated to indicators such as urban population, carbon emissions, and electricity production. Again, the results does not mean that countries should disregard sustainable consumption and production patterns. However, it only reinforces the fact that other externalities need to be addressed to change people's mind-set on sustainable consumption and production. Likewise, the results show that there might be a need to temporarily compromise people's happiness to achieve environmental sustainability. Achieving sustainability might reduce happiness levels of countries in the present but future improvements on the quality of life and living conditions of people will increase happiness and life satisfaction in the long-run.

Figure 20. Scatter Graph of Life Satisfaction and Ecological Footprint



Source: (Veenhoven, 2008)

4.5 Sustainable Development Indicators

4.5.1 Global Level

Taking all the significant indicators for people, planet, and prosperity together, it shows that for sustainable development at the global level, indicators such as age dependency ratio, self-employment, electricity production from renewable sources, health expenditure, and GDP per capita are the most significant indicators for life satisfaction of countries. The results show and further reinforce previous theories on the significance of income in determining happiness of countries. As income relates to a variety of indicators, it has a huge positive effect on life satisfaction both directly and indirectly.

When the same sustainable development indicators were applied to happier countries, the results showed that self-employment, electricity production from hydroelectric sources, health expenditure, and GDP per capita are significantly correlated with happiness. Likewise, for happier countries, it shows that energy production using hydroelectric sources is still a significant indicator despite being negatively correlated. On the other hand, while the results show that at the global and "happier" levels the environmental indicators such as hydroelectric production have negative effects on life satisfaction, specific country level analysis showing the relationship between such indicators with life satisfaction of happier countries may be undertaken to further study and validate the results. Specific country assessments show that there is a huge variety on countries who depend on hydroelectric sources for energy consumption. For example, Norway, Switzerland, Costa Rica, and Iceland are highly dependent on hydroelectricity production due to their mountainous land terrain while countries such as the Netherlands and Denmark have no source for hydroelectric production due to their flat terrain. Hence, natural endowments such as topography may affect some independent

variables. In addition, due to high cost of production, renewable electricity production may only be afforded by high income countries. Therefore, while the result is negative at the global and "happier" level in general, for happiest countries, the results may be different.

Table 9. Sustainable Development Indicators Affecting Life Satisfaction of Income Groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies)	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.10***	0.07***	0.46	0.33**	0.09***
	(0.02)	(0.02)	(0.55)	(0.13)	(0.02)
Health expenditure total (% of GDP)	0.13***	0.07**	0.38***	0.08	0.12***
	(0.03)	(0.03)	(0.13)	(0.06)	(0.04)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.02***	-0.01	-0.02	-0.06	-0.02***
	(0.01)	(0.01)	(0.03)	(0.06)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.01***	-0.01***	-0.01	-0.01**	-0.01***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)
Age dependency ratio (% of working-age population)	-0.04**	-0.04	-0.02	-0.01	-0.05**
	(0.02)	(0.03)	(0.03)	(0.05)	(0.02)
Self-employed total (% of total employed)	0.02**	0.03**	0.05***	0.02	0.03
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Constant	5.29***	6.17***	0.94	4.29	5.12***
	(1.18)	(1.52)	(2.66)	(3.16)	(1.14)
Observations	448	283	86	132	230
R^2	0.21	0.19	0.26	0.19	0.30
Adjusted R^2	0.20	0.17	0.20	0.15	0.28

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

4.5.2 Income Groups

When predicting for sustainable development indicators for different income groups, the low income and low-middle income groups are merged together as one group as the results were showing insufficient observations when the regression analysis was applied to low income groups alone. It shows that for low and low middle income countries, health expenditure and self-employment are statistically significant.

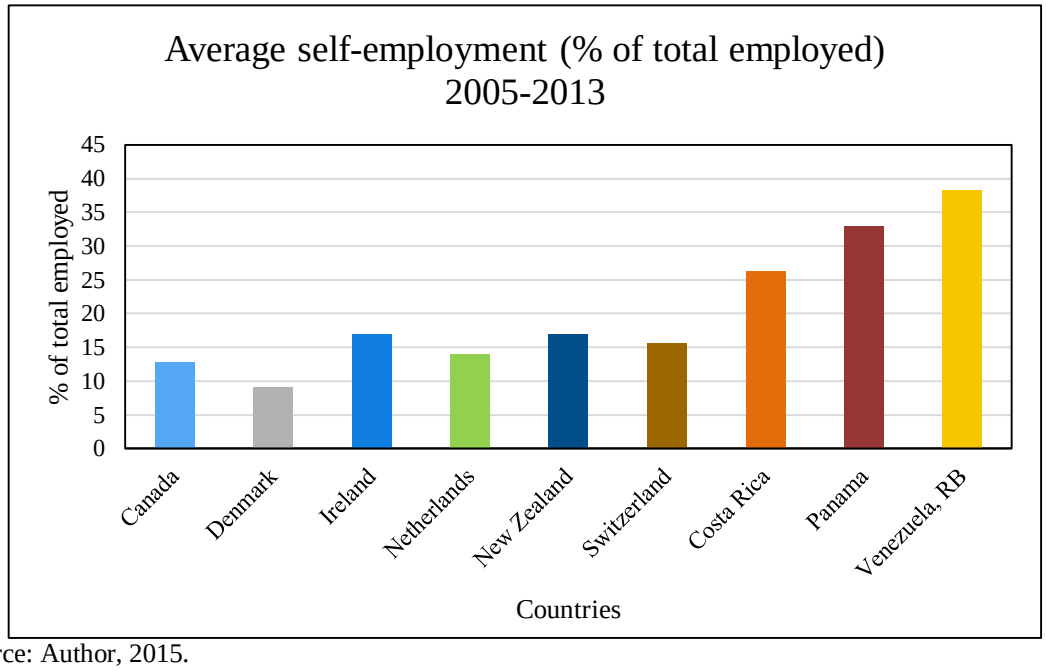
Several theories such as those by Easterlin has mentioned that increase in income for some high income countries were not accompanied by increase in life satisfaction (Easterlin, 1995).

However, the results of this study show that at cross-country level comparison, GDP per capita is statistically significant for upper middle and high income countries. The results of the study at the global level relates to adaptation theory which implies that increase in life satisfaction due to increase in income wears off over time. However, when predicting for different income levels, it shows that while human beings get used to rise in income, the benefits of having a higher national income does not change over time. This is because having a higher income is coupled with improvements in the living conditions such as better infrastructure and housing, better education and health care, and a more secure environment. This explains why GDP per capita is significant for upper middle to high income economies. This likewise explains the previous graph (*Figure 10*) which shows huge discrepancies in life satisfaction levels between low, middle and high income countries with high income countries being significantly happier compared to low and middle income countries.

In addition, self-employment is also significant not only for happier countries but for low and low middle income economies as well. Self-employment have different effects for these two scenarios. First, self-employment serves as alternative source of income for low income economies where unemployment is high. Second, self-employment becomes a choice for some individuals who prefer to have more economic and personal freedom in their lives. While generally happier countries do have self-employment percentage of less than 10% of the total employed, South American countries which have high life ladder scores (Costa Rica, Venezuela, Panama) likewise show high self-employment percentages ranging from 24-43% of the total population for the past ten years (*see Figure 21*).

The results also show that health expenditure, electricity production from renewable sources except hydroelectric source, and age dependency ratio are statistically significant for high income countries. On the other hand, hydroelectric energy production is a significant indicator for upper middle income countries. In addition, income may also influence the relationship between renewable electricity production and life satisfaction. Aside from the high cost of producing electricity the sustainable way, high income Middle Eastern countries are primary producers of conventional energy (using oil, gas, and coal) which may affect the negative relationship at upper middle to high income levels.

Figure 21. Average Self-employment of Happy Countries



Source: Author, 2015.

4.5.3 Regional Level

When predicting for sustainable development indicators at regional level, it shows that GDP per capita is very significant for Asia, America, and Europe. Health expenditure is significant for both America and Europe while electricity production from renewable sources excluding hydroelectric are significant for Europe and Africa. And lastly, electricity production from hydroelectric source is significant only in Europe while self-employment is only correlated with life satisfaction in America.

The results show that there is indeed quite a huge difference in terms of the indicators which are significant to life satisfaction across regions. While some patterns exist, such as GDP per capita and health expenditure, there are those indicators which may only be significant to one region. Again, the results do not suggest to drop the indicators which are not significant.

The results of GDP per capita being positively and statistically significant in most regions is not really surprising since based from most theories, income is one of the main determinants of life satisfaction. GDP per capita is even highly significant in Europe where most of the high-income and happiest countries such as Denmark, Sweden, Norway, and Switzerland can be found.

The results further validate the negative effect of renewable electricity production not just at the global and income-group level, but also at the regional level. For Africa, the negative relationship between renewable electricity production and happiness would be due to intervening variable that may exist between these variables. For one, conventional electricity production is primarily labor intensive and a shift towards renewable electricity production would result in reduction of employment. Unemployment will have an effect on the decrease of income which will result to lower life satisfaction. On the other hand, while European countries showed an aggressive move towards renewable electricity production in recent years, renewable electricity production still showed a significant but negative effect on life satisfaction. This might be the result of the negative externalities that renewable electricity production has over people. As such, the study of Mollendorf and Welsch (2014) on the effects of renewable electricity production on the life satisfaction of people in Germany showed that the negative externalities of renewable electricity production outweigh the positive effect of renewable electricity to people. Hence, the need to consider the intervening and intermediate factors on the relationship between sustainable development indicators and life satisfaction must be undertaken.

Likewise, self-employment being positively correlated in America is heavily influenced by South American countries where self-employment and life satisfaction are both high. It shows that the effects of self-employment in increasing economic and personal freedom of people has a positive effect in this region. Likewise, the rationale to go to self-employment to reduce unemployment may also influence the income of people.

Table 10. Sustainable Development Indicators Affecting Life Satisfaction at Regional Level

	(1) Life Ladder (Total)	2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.10***	-0.53	0.17*	0.14*	0.08***
	(0.02)	(0.87)	(0.10)	(0.08)	(0.03)
Health expenditure total (% of GDP)	0.13***	-0.08	0.20**	0.09	0.09*
	(0.03)	(0.40)	(0.09)	(0.07)	(0.04)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.02***	-1.12*	-0.02	-0.03	-0.02**
	(0.01)	(0.51)	(0.02)	(0.05)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.01***	0.00	-0.01	-0.00	-0.02***
	(0.00)	(0.09)	(0.01)	(0.01)	(0.00)
Age dependency ratio (% of working-age population)	-0.04**	0.05	-0.06	0.01	-0.05
	(0.02)	(0.16)	(0.04)	(0.03)	(0.03)
Self-employed total (% of total employed)	0.02**	0.01	0.05*	0.00	-0.00
	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)
Constant	5.29***	3.68	5.82	3.04	6.13***
	(1.18)	(13.05)	(3.94)	(1.97)	(1.73)
Observations	448	26	106	113	193
R^2	0.21	0.56	0.35	0.11	0.32
Adjusted R^2	0.20	0.42	0.31	0.06	0.30

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Author, 2015. Calculated using Stata.

4.5.4 Lessons Learned

The results show that sustainable development factors such as GDP per capita, government expenditure on health, renewable electricity production, age dependency ratio, and self-employment have effects on the life satisfaction of countries at the global level. However, as the results have shown, there are huge differences in terms of sustainable development indicators which are significant for different levels of analysis. As such, the indicators which are significant varies across income groups and across regions as well. It shows that there is not one indicator which shows significant correlation at all levels of analysis. Even GDP per capita which proved to be a very strong determinant for life satisfaction both from theories and from statistical results was not significantly correlated with happiness for some income groups and regions. Still, the results show that against other indicators, GDP per capita still proves to be a very good determinant of life satisfaction. While the results show that there is a diminishing marginal utility between increases in income and its effect on life satisfaction, we cannot deny the fact that the benefits from increase in income has effects on life satisfaction which goes beyond the monetary benefits. This ripple effect from increase in income translates

to better living environment which has positive effects on life satisfaction. However, there is still a need to look beyond income to see non-economic factors affecting life satisfaction levels of countries.

For happier countries, it was GDP per capita, health expenditure, hydroelectric energy production, and self-employment which showed to be statistically significant with happiness. It was important to determine specific indicators which are statistically correlated with life satisfaction for happier countries as one of the aims of happiness research is to find out what are the conditions that make other countries happier than others. In terms of policy making and planning, it is also important to look at these indicators which distinguishes happier countries from other countries.

At different income groups, it showed that for high income economies, the significant sustainable development indicators are GDP per capita, health expenditures, renewable electricity production (including hydroelectric source), and age dependency ratio. At upper middle income group, indicators such as GDP per capita and hydroelectric energy production are statistically correlated with life satisfaction. Lastly, health expenditures and self-employment are significant with the life satisfaction of low and lower middle income countries. These differences should also be taken into account when identifying the determinants of happiness and in prescribing policy actions at the country level.

By looking at regional clusters, we can see that in Africa only electricity production excluding hydroelectric source is significant to life satisfaction. For America, it is GDP per capita, health expenditure, and self-employment which is significant when correlated with life satisfaction. On the other hand, it is only GDP per capita which is significant in Asia and the Pacific. And lastly, sustainable development indicators such as GDP per capita, health expenditure, and renewable electricity production (including hydroelectric source) were statistically and significantly correlated with life satisfaction in Europe. The results imply that the determinants of life satisfaction differ greatly between regions.

Chapter 5: Conclusions and Recommendations

The final chapter presents a summary of the research and provides answers to the research questions posed at the beginning of the study. The study results and its implications are stated in relation to research objectives. The lessons learned are highlighted within the context of sustainability and increasing happiness levels. Finally, proposals for further studies are presented in this chapter.

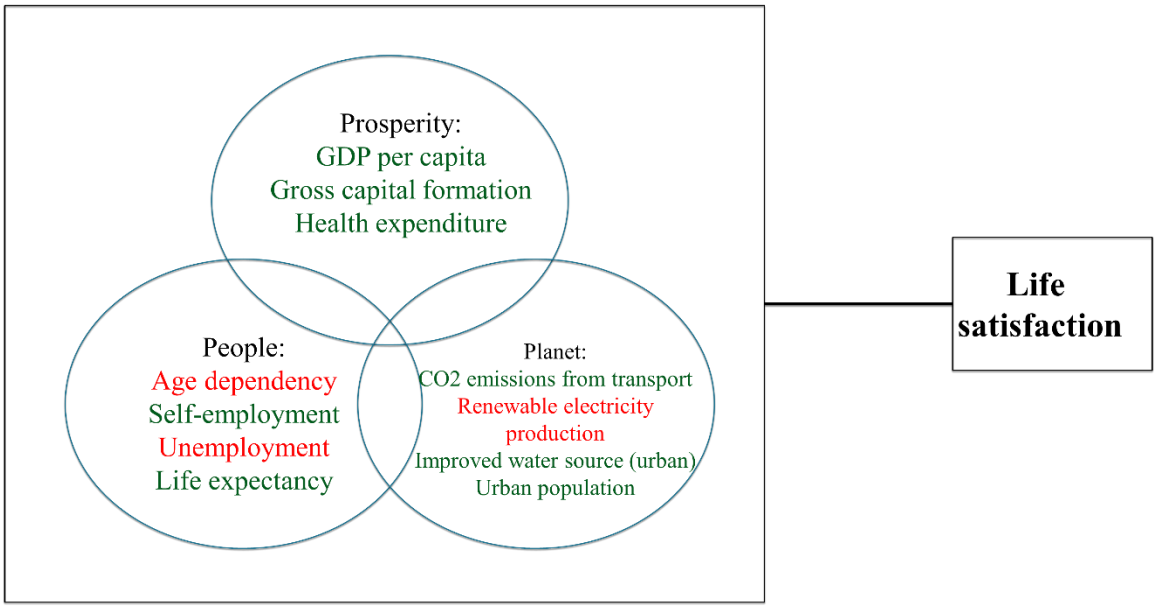
5.1 Major Findings and Answering the Research Questions

5.1.1 Answer to Research Sub Question 1

Q. Which social, economic, and environmental factors affect happiness at the global level?

The figure below shows the following social, economic, and environmental indicators which have a significant effect on life satisfaction at the global level. The results show that at the global level, the following indicators have a positive relationship with life satisfaction: a) GDP per capita, gross capital formation, and health expenditure for economic growth, b) self-employment, and life expectancy for social inclusion, and c) carbon dioxide emissions from transport, improved water source (urban), and urban population for environmental sustainability. On the other hand, indicators such as age dependency and unemployment for social inclusion as well as renewable electricity production for environmental sustainability show a negative impact on life satisfaction.

Figure 22. Social, Economic, and Environmental Factors Affecting Life Satisfaction at the Global Level



Source: Author, 2015.

The results further validate the theories in chapter 2 which highlighted the significant effect of income to increasing life satisfaction. However, the results also show that other indicators are also significant to the happiness of people.

The results also show that intervening variables play a role on the relationship between the sustainable development indicators and life satisfaction. For example, carbon dioxide

emissions do not have a straightforward relationship with life satisfaction, however, other variables such as increase in investments and increase in income may intervene which may affect the result. Hence, while sustainable development ideologies explain that carbon dioxide negatively affect the environment and therefore should have negative effects on life satisfaction, other factors such as income and investments intervene and affect the relationship between this indicator and life satisfaction. Thereby, making the relationship positive instead of negative.

The same can be said for renewable electricity production which have a negative but very significant relationship with life satisfaction. In theory, renewable electricity production should improve environmental quality and increase life satisfaction, however, the externalities and high cost of renewable electricity production intervenes with people's preferences. Likewise, the nation's natural resources endowment as well as its capacity to produce renewable electricity may also intervene in the relationship between renewable electricity production and happiness which makes the relationship negative.

5.1.2 Answer to Research Sub Question 2

Q. What is the difference in the sustainable development factors affecting the happiness of different income groups at the global level?

At different income groups, it showed that the significant sustainable development indicators are GDP per capita, health expenditures, renewable electricity production (including hydroelectric source), and age dependency ratio. At upper middle income group, indicators such as GDP per capita and hydroelectric energy production are statistically correlated with life satisfaction. Lastly, health expenditures and self-employment are significant with the life satisfaction of low and lower middle income countries.

The variations in the sustainable development factors affecting the happiness of different income levels is only a manifestation of the dissimilarities in the development contexts between these income groups. Given that high income countries are significantly happier than any other income groups show that income is indeed a good determinant of life satisfaction for countries. It further supports the study by Bonini (2008) which shows that neither Human Development Index nor Environmental Sustainability Index show a good indicator for life satisfaction that GDP per capita. Hence, there is a need to establish a holistic development indicator which also captures life satisfaction of people.

Likewise, the variations in the determinants of life satisfaction at different income groups should also be taken into account when prescribing policy actions. While theories mention the decreasing marginal effects of income with life satisfaction, the results of this study show that having a higher income makes people happier. The results also reinforce the fact that the better living conditions that comes along with higher income also play a role in increasing happiness of people.

There is likewise a need to find the differences in the determinants of happiness across these groups as income influences the economic, social, and environmental background of countries. In addition, difference in income affects capacities of countries to achieve development, specifically, sustainable development. Hence, studying the determinants of life satisfaction at different income groups facilitates better and sound planning.

Table 11. Sustainable Development Factors Affecting Happiness of Income Groups

Sustainable development indicators	Low AND lower middle income economies	Upper middle income economies	High income countries
GDP per capita		++	+++
Health expenditure	+++		+++
Electricity production from renewable sources excluding hydroelectric			---
Electricity production from hydroelectric sources		--	---
Age dependency ratio			---
Self-employed	+++		

Source: Author, 2015.

5.1.3 Answer to Research Sub Question 3

Q. What is the difference in the sustainable development factors that affect the happiness of regional clusters of countries such as in Africa, America, Asia and the Pacific, and Europe?

The results from the analysis of sustainable development indicators at different regional clusters show that GDP per capita is a strong determinant for life satisfaction for most regions except Africa. Likewise, health expenditure is a strong indicator for happiness in America and Europe. In addition, renewable electricity production is statistically significant in Europe while self-employment is a strong indicator for life satisfaction in America.

The negative results of renewable electricity production also support similar analysis by Mollendorff and Welsch (2014) which studied renewable electricity production and satisfaction of people in Germany. The results show the need to address externalities being posed by renewable electricity production to residents.

The results likewise show that there are huge differences on the sustainable development indicators which proved to be significant across regions. It only shows that culture and their view of happiness and sustainable development as well as the development priorities at the regional level may play a role on the differences. While it is acceptable to prescribe policies at the global level, a closer look on the sustainable development indicators which are more significant to some regions should be taken into account when pursuing regional-specific and country-specific policies on sustainable development.

Table 12. Sustainable Development Factors Affecting Happiness of Regional Clusters

Sustainable development indicators	Africa	America	Asia and the Pacific	Europe
GDP per capita		+	+	+++
Health expenditure		++		+
Electricity production from renewable sources excluding hydroelectric	-			---
Electricity production from hydroelectric sources				---
Age dependency ratio				
Self-employed		+		

Source: Author, 2015

5.2 Lessons Learned

The results show potentially important implications to public policy and planning especially in identifying development priorities of governments. Measures of life satisfaction is slowly gaining momentum as a measure of well-being at the country level. This is attested by the clamor of nations for a more multidimensional measure of development which reflects people's well-being as well as the inclusion of life satisfaction measures in the proposed Sustainable Development Goals. Hence, the need to identify sustainable development indicators which has a two-tier effect of achieving sustainable development and increasing life satisfaction becomes even more necessary given the limited resources of the government.

Hence, while the proposed 2015 Sustainable Development indicators are geared towards achieving long-term sustainable development, achieving the 17 goals and 100 indicators at the country level will be a difficult challenge. As countries have limited resources, prioritizing government efforts in terms of achieving sustainable development might be necessary. Therefore, the results have shown that governments should focus towards achieving the above-mentioned indicators as it will have a two-tier effect on sustainable development and happiness. In addition, some policy actions such as reducing unemployment, creating an attractive environment for self-employment, and increasing government expenditure on health have ripple effects on other indicators which will further contribute to life satisfaction and sustainable development. For example, increasing gross capital formation will have effects on increasing income, reducing unemployment, reducing age dependency ratio, and reducing poverty which all leads to greater life satisfaction. Likewise, increasing government expenditure on health will have ripple effects on improved health, longer life expectancy, healthier labor force which in turn increases their income and then happiness. Likewise, income is not the end factor per se. Increase in income may reflect improvement in living conditions, reduction of poverty, and affordability of services such as health and education. Hence, while income proves to be a very strong indicator for life satisfaction, there is also a need to focus on the interrelationship between these indicators and how some variables such as income become an important intermediate factor in explaining the relationship between sustainable development and life satisfaction.

Therefore, in terms of national development and physical planning of countries, importance must be placed on indicators such as increasing GDP per capita, increasing government expenditure on health, and reducing unemployment, as these indicators show two-tier effect of not just contributing to sustainable development by reinforcing economic and social development but also by increasing life satisfaction levels of countries.

As the results have shown, there are huge differences in terms of sustainable development indicators which are significant for different levels of analysis. Likewise, the results imply that there is not one indicator which shows significant correlation at all levels of analysis. Even GDP per capita which proved to be a very strong determinant for life satisfaction both from theories and from statistical results was not significantly correlated with happiness for some income groups and regions. The results likewise reinforces the idea that prescribing one policy at the global level may not be effective across countries. Past experiences with meeting global targets such as those in MDGs proved that differences in countries affect their views on matters such as development and well-being, and therefore will also influence country priorities in terms of meeting development targets. Hence, as global partnerships and countries are considering well-being as a prime goal for policy, there is a need to consider differences in the determinants of happiness or life satisfaction across income groups and across regions when planning and identifying policy actions.

Likewise, it is important to determine specific indicators which are statistically correlated with life satisfaction for happier countries as happiness research aims to create greater happiness for greater number of people. As such, knowing the conditions which makes some countries happier that others are important in guiding development priorities and policy decisions at the country level.

The research also supports other previous studies which highlighted the major role of GDP per capita in enhancing people's life satisfaction. The results show that compared with other indicators, GDP per capita still proves to be a very strong determinant of life satisfaction levels. While the results show that there is a diminishing marginal utility between increases in income and its effect on life satisfaction, we cannot deny the fact that the benefits from increase in income has effects on life satisfaction which goes beyond the monetary benefits. This ripple effect from increase in income translates to better living environment which has positive effects on life satisfaction of people. However, there is still a need to look beyond income to see non-economic factors affecting life satisfaction levels of countries. As such, countries should also consider major policy actions such as increasing health expenditure, reducing unemployment, and creating an encouraging environment for self-employment, to further increase life satisfaction. Country-specific analysis and even specific urban area analysis of these indicators to identify which factors are significant for a specific country or a city may likewise become helpful in development and physical planning of countries and urban areas. The results likewise show which sustainable development indicators can the government prioritize to be able to achieve not just sustainable development but also to increase subjective well-being of people.

On the other hand, environmental sustainability indicators such as renewable electricity production and carbon dioxide emissions from transport which have an effect on life satisfaction different from the sustainable development agenda may require different policy interventions. First, there is a need to influence citizen behavior and preferences toward sustainable production and consumption. As shown in the study of Happiness Research Institute in Denmark, sustainable behavior has a significant positive effect on life satisfaction (Happiness Research Institute, 2015). Although it is difficult to ascertain the causality between sustainable behavior and happiness, the need to influence people's behavior toward sustainable consumption and production patterns may be beneficial in achieving environmental sustainability and increasing life satisfaction at country level. Likewise, externalities greatly affect the relationship between renewable electricity production and life satisfaction. Therefore, there is a need to reduce externalities brought upon by renewable electricity through monetary compensation and careful planning when undertaking projects on renewable electricity production. Lastly, there is a need to consider steps on influencing pricing for renewable electricity as well as optimizing the production of renewable energy which ultimately affects the cost of electricity and the life satisfaction of people.

Likewise, the study does not suggest that countries turn their back from environmental sustainability, rather it shows that enforcing sustainable means of production and consumption will go at the cost of life satisfaction of people, at least temporarily. As sustainable development is also anchored on a holistic and forward-looking view of development, pushing for sustainable means of livelihood even if it means sacrificing albeit temporarily the happiness of present citizens will add to the happiness of future generations in the long run if it improves environmental quality, uplifts living conditions of people, and reduces poverty.

Lastly, there is still a need to provide a more in depth study to analyze how the direction of causality runs between sustainable development and happiness. For indicators such as carbon dioxide emissions, it is unclear if undertaking activities which increases carbon dioxide emissions make people happy or are happier people tend to have activities which increases

carbon dioxide emissions. Hence, it is unclear if sustainable consumption decreases happiness or are happy people tend to consume unsustainably. Similarly, while the results show that high income makes people happier, it is also unclear if there is a reverse causality. Ergo, it is difficult to ascertain if people who are happier tend to have better aspects or better living environment makes people happier.

5.3 Recommendations

The study on the sustainable development indicators affecting happiness of countries leaves many open questions and challenges for further research. As such, a support study on the willingness-to-pay of people on renewable electricity production or to reduce carbon emissions may be undertaken to further consider how far people are willing to go to achieve sustainable environments. While the results of this study show some negative correlation of environmental sustainability indicators, the recommended further study may also shed some clarifications on people's preferences for sustainable consumption and production.

Likewise, for renewable electricity production and carbon dioxide emissions for transportation, there is truly a need to influence personal traits and preferences in order to positively influence sustainable consumption and production at the country level. Such is the case in Denmark where the study of Happiness Research Institute established that there is a positive relationship between sustainable and pro-environment behaviors such as waste management with the level of happiness of Danish people (Happiness Research Institute, 2015). Hence, while the global results may show that some environmental sustainability indicators have a negative effect on happiness, specific country level analysis may also be done to further study how sustainable consumption and production patterns differ among countries. This subsequent study may, for example, explain the differences across happier countries where Denmark, Norway, Iceland and New Zealand show relatively high sustainable production and consumption patterns in the results of this study.

In addition, further studies may be undertaken to investigate the causality between sustainable development indicators and life satisfaction. This will shed light on how life satisfaction of people affects or is affected by external environments. This will also provide clarity and guidance on the perpetual question of happiness researchers on causality between happiness and other factors.

In addition, a more focused study on the determinants of happiness in some sub-regional and economic organizations/committees such as those in the Association of South East Asian Nations (ASEAN), Economic Community of West African States (ECOWAS), European Union (EU), and the Latin American Integration Association (LAIA) may also be undertaken. It is highly recommended that happiness research may also be undertaken for these areas as these economic communities have more similar characteristics and also prescribe policies at sub-regional levels.

Moreover, there is also a need to further conduct an in-depth study at a country level to see how sustainable development affects happiness in a specific country. As the proposed sustainable development goal will be implemented this year, the monitoring mechanism of the proposed SGDs provides promising information on the extent to which sustainable development targets are met at the local and national levels. Hence, a more in-depth study for countries can be done in the future to further test and validate the results of this research analysis country-specific levels to confirm if regional and income differences do really play a role in the determinants of life satisfaction at the country level. Subsequently, a clearly defined

and more specific analysis at the country-level might be necessary to identify factors affecting happiness of a specific country. Likewise, integrating happiness research in the national and local planning processes might be useful in identifying policies and strategic actions in the national development and physical plans of a country in the future.

Lastly, succeeding studies may also be undertaken to identify sustainable development indicators which affects happiness levels of urban areas. As countries are becoming more and more urban, there is a need to further determine the factors affecting happiness of people living in urban areas. Likewise, as the population of countries are now mostly becoming more urban, there is a need to further incorporate people's subjective well-being or people's happiness in terms of identifying the limits to urban carrying capacity. The study on determinants of well-being at urban levels will likewise become very useful if integrated in urban planning.

Bibliography

Happiness: towards a holistic approach to development, 2011. United Nations.

Adelman, I., 2000. Fallacies in development theory and their implications for policy. In: G. M. Meier and J. E. Stiglitz eds., 2000. Frontiers of development economics: The future in perspective. Washington, DC: World Bank and Oxford University Press. pp. 103-134.

Aslam, A. and Corrado, L. 2012. The geography of well-being. *Journal of Economic Geography,* 12 pp. 627-649.

Basu, K., 2000. On the goals of development. In: G. M. Meier and J. E. Stiglitz eds., 2000. Frontiers of development economics: The future in perspective. Washington, DC: World Bank and Oxford University Press. pp. 61-86.

BBC, 2006. Iran nuclear fears fuel oil price. Available at: http://news.bbc.co.uk/2/hi/business/4684844.stm [Accessed 08 Aug 2008].

BBC, 2008. Oil hits $100 barrel. Available at: http://news.bbc.co.uk/2/hi/business/7083015.stm [Accessed 08 Aug 2008].

Bentham, J., 1789. Introduction to the Principles of Morals and Legislation. London: Athloue Press.

Berenger, V. and Verdier-Chouchane, A. 2007. Multidimensional measures of well-being: Standard of living and quality of life across countries. *World Development,* 35 (7), pp. 1259-1276.

Bjornskov, C., 2008. Healthy and happy in Europe? On the association between happiness and life expectancy over time. *Social Science and Medicine,* 66 pp. 1750-1759.

Blanchflower, D. G. and Oswald, A. 1998. What makes an entrepreneur? *Journal of Labor Economics,* 16 (1), pp. 26-60.

Bonini, A., 2008. Cross-National Variation in Individual Life Satisfaction: Effects of National Wealth, Human Development, and Environmental Conditions. *Social Indicators Research,* 87 pp. 223-236.

Bookwalter, J. T. and Dalenberg, D. R. 2004. Subjective well-being and household factors in South Africa. *Social Indicators Research,* 65 (333), pp. 353.

Braun, A. A., 2011. Gross National Happiness in Bhutan: A Living Example of an Alternative Approach to Progress. *Wharton Asia Economic Review,* 2 (2), pp. 4-14.

Cashell, B. and Labonte, M., 2005. The Macroeconomic Effects of Hurricane Katrina. The Library of Congress, USA.

Chenery, H. B., 1960. Patterns of industrial growth. *The American Economic Review,* 50 (4), pp. 624-654.

D'Acci, L., 2010. Measuring Well-Being and Progress. *Social Indicators Research,* 104 (1), pp. 47-65.

Dang, G. and Pheng, L. S. 2015. Theories of Economic Development. Theories of Economic Development. 2015. Infrastructure Investments in Development Economies: The Case of Vietnam. Singapore: Springer Science. pp. 11-26.

Deaton, A., 2008. Income, Health, and Well-Being around the World: Evidence from the Gallup World Poll. *Journal of Economic Perspectives,* 22 (2), pp. 53-72.

Di Tella, R., MacCulloch, R. and Oswald, A. 2003. The Macroeconomic of Happiness. *The Review of Economics and Statistics,* 85 (4), pp. 809-827.

Diener, E., 2006. Guidelines for National Indicators of Subjective Well-Being and Ill-Being. *Journal of Happiness Studies,* 7 pp. 397-404.

Diener, E. and Suh, E. 1997. Measuring Quality of Life: Economic, Social, and Subjective Indicators. *Social Indicators Research,* 40 pp. 189-216.

Drechsler, M., Ohl, C., Meyerhoff, J., Eichlorn, M., et al., 2011. Combining spatial modeling and choice experiments for the optimal spatial allocation of wind turbines. *Energy Policy,* 39 pp. 3845-3854.

Easterlin, R. A., 1973. Does money buy happiness? *Public Interest,* 30 (30), pp. 3-10.

Easterlin, R. A., 1995. Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior and Organization,* 27 pp. 35-47.

Easterlin, R. A., Angelescu, L. and Zweig, J. S. 2011. The Impact of Modern Economic Growth on Urban-Rural Differences in Subjective Well-Being. *World Development,* 39 (12), pp. 2187-2198.

El Harbi, S. and Grolleau, G. 2012. Does self-employment contribute to national happiness? *The Journal of Socio-Economics,* 41 pp. 670-676.

Florida, R., Mellander, C. and Rentfrow, P. 2013. The Happiness of Cities. *Regional Studies,* 47 (4), pp. 613-627.

Frey, B., 2008. Research on Happiness. Research on Happiness. 2008. Happiness: A revolution in economics. USA: Massachusetts Institute of Technology. pp. 3-14.

Frey, B. and Gallus, J. 2013. Subjective Well-Being and Policy. *Topoi: An International Review of Philosophy,* 32 pp. 207-212.

Frey, B. and Stutzer, A. 2002. What Can Economists Learn from Happiness Research? *Journal of Economic Literature,* 15 pp. 402-435.

Galatsidas, A., 19 January 2015. Sustainable development goals: changing the world in 17 steps. Available at: http://www.theguardian.com/global-development/ng-interactive/2015/jan/19/sustainable-development-goals-changing-world-17-steps-interactive [Accessed 08 May 2015].

Ghatak, S., 2003. Introduction to development economics. 2nd edition. London: Routledge.

Glaeser, E., 2011. Triumph of the city: How urban spaces make us human. London: MacMillan.

Guardiola, J., Gonzalez-Gomez, F. and Grajales, A. L. 2013. The influence of water access in subjective well-being: Some evidence in Yucatan, Mexico. *Social Indicators Research,* 110 pp. 207-218.

Happiness Research Institute, 2015. Sustainable happiness: Why waste prevention may lead to an increase in quality of life. Denmark: Happiness Research Institute, Danish Ministry of the Environment.

Headey, B. and Wearing, A., 1992. Understanding happiness: A theory of subjective well-being. Australia: Longman Cheshire.

Helliwell, J. F., 2003. How's life? Combining individual and national variables to explain subjective well-being. *Economic Modelling,* 20 (331), pp. 360.

Helliwell, J., Layard, R. and Sachs, J., 2015. World Happiness Report 2015. New York: UN Sustainable Development Solutions Network.

Inglehart, R. and Klingemann, H. D. 2000. Genes, culture, democracy, and happiness. In: E. Diener and E. Suh eds., 2000. Culture and subjective well-being. Cambridge, MA: MIT Press. pp. 165-184.

Kates, R. W., Parris, T. M. and Leiserowitz, A. A. 2005. What is sustainable development? *Environment Science and Policy for Sustainable Development*, 47 (3), pp. 8-21.

Layard, R., 2005. Happiness Lessons from a New Science. London, England: Penguin Books.

Mankiw, G. N., Gans, J., King, S. and Stonecash, R. 2012. Measuring a Nation's Income. Measuring a Nation's Income. 2012. Principles of Economics. Australia: Cengage Learning Australia. pp. 546-565.

Meier, G. M., 2000. The old generation of development economists and the new. In: G. M. Meier and J. E. Stiglitz eds., 2000. Frontiers of development economics: The future in perspective. Washington, DC: World Bank/Oxford University Press. pp. 13-50.

Mollendorff Von, C. and Welsch, H. 2014. Measuring Renewable Energy Externalities: Evidence from Subjective Well-Being Data. *Oldenburg Discussion Papers in Economics,* 373 pp. 1-34.

New Economics Foundation, 2015. The Happy Planet Index. Available at: http://www.happyplanetindex.org/about/ [Accessed 24 April 2015].

Pearce, D. W. and Turner, R. K., 1990. Economics of natural resources and the environment. New York: Harvester Wheatsheaf.

Pew Research Center, 2014. Chapter 3. Aging in Major Regions of the World, 2010 to 2050. Available at: http://www.pewglobal.org/2014/01/30/chapter-3-aging-in-major-regions-of-the-world-2010-to-2050/ [Accessed 15 August 2015].

Schienberg, J., 2006. Missile tension sends oil surging. Available at: http://edition.cnn.com/2006/BUSINESS/07/05/oil.price/index.html [Accessed 08 Aug 2015].

Sen, A., 1999. Commodities and Capabilities. India: Oxford University Press.

Sen, A., ed., 1999. The Perspective of Freedom, [Development as Freedom]. New York: Anchor Books. pp. 13-34.

Silva, J. and Brown, Z. 2013. More than the sum of their parts: Valuing environmental quality by combining life satisfaction surveys and GIS data. *OECD Statistics Working Papers,* 2013 (01), pp. 1-23.

Soland, M., Steimer, N. and Walter, G. 2013. Local acceptance of existing biogas plants in Switzerland. *Energy Policy,* 61 pp. 802-810.

Stevenson, B. and Wolfers, J. 2008. Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *Brookings Papers on Economic Activity,* Spring 2008 pp. 1-87.

Stutzer, A. and Frey, B., 2012. Recent Developments in the Economics of Happiness: A Selective Overview. 7078), Bonn, Germany: Institute for the Study of Labor (IZA). Available at: http://ftp.iza.org/dp7078.pdf [Accessed 26 February 2015].

Sustainable Development Solutions Network, 2015. Indicators and a Monitoring Framework for the Sustainable Development Goals: Launching a data revolution for the SDGs.

Todaro, M. P. and Smith, S. C., 2012. Economic Development. 11th Edition. USA: Addision-Wesley.

UN Department of Economic and Social Affairs, 2007. Indicators of Sustainable Development: Guidelines and Methodologies. Third Edition. New York: United Nations.

UN Department of Economic and Social Affairs, 2011. Institutional framework for sustainable development. Available at: http://www.uncsd2012.org/index.php?page=view&type=12&nr=228&menu=63 [Accessed 05 May 2015].

UN Department of Economic and Social Affairs, 2014. World Urbanization Prospects: The 2014 Revision, Highlights. UN Department of Economic and Social Affairs.

United Nations, ed., 2002. Report of the World Summit on Sustainable Development, [World Summit on Sustainable Development]. Johannesburg, South Africa, 04 September 2002. New York: United Nations. pp. 1-5.

United Nations Statistics Division, 2013. Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings. Available at: http://unstats.un.org/unsd/methods/m49/m49regin.htm [Accessed 28 May 2015].

Veenhoven, R., 1989. National Wealth and Individual Happiness. In: K. Grunert and F. Oelander eds., 1989. Understanding Economic Behaviour. Dordrecht: Kluwer Academic Publishers. pp. 9-32.

Veenhoven, R., 1996. Developments in satisfaction research. *Social Indicators Research,* 37 (1), pp. 46.

Veenhoven, R., 2005. Is life getting better? How long and happy do people live in modern society? *European Psychologist Special Section on 'Human Development and Well-being',* 10 pp. 330-343.

Veenhoven, R., ed., 2007. Comparability of Happiness across Nations, [International Meeting of the Psychometric Society (IMPS)]. Tokyo, Japan, 9-13 July 2007. Tokyo, Japan: KwanseiGakuin University, Journal of Sociology. pp. 1-30.

Veenhoven, R., ed., 2007. Measures of Gross National Happiness, [OECD Conference on measurability and policy relevance of happiness]. Rome, 02-03 April 2007.

Veenhoven, R., 2008. Sustainable consumption and happiness. In: S. Reddy ed., 2008. Green consumerism: approaches and country experiences. Hyderabad, India: The Icfai University Press. pp. 39-68.

Veenhoven, R., 2009. How do we assess how happy we are? Tenets, implications and tenability of three theories. In: A. K. Dutt and B. Radcliff eds., 2009. Happiness, Economics and Politics: Towards a multi-disciplinary approach. Cheltenham, UK: Edward Elger Publishers. pp. 45-69.

Veenhoven, R., 2010. Greater happiness for a greater number: Is that possible and desirable? *Journal of Happiness Studies,* 11 pp. 605-629.

Veenhoven, R., 2012. HAPPINESS: Also known as 'life-satisfaction' and 'subjective well-being'. In: K. C. Land, A. C. Michalos and M. J. Sirgy eds., 2012. Handbook of Social Indicators and Quality of Life Research. Dordrecht, Netherlands: Springer Publishers. pp. 63-77.

World Bank, 1991. World development report 1991: The challenge of development. Washington, D.C.: World Bank.

World Bank, 2015. Country and Lending Groups. Available at: http://data.worldbank.org/about/country-and-lending-groups [Accessed 13 August 2015].

World Bank, 2015. Sustainable Development Overview. Available at: http://www.worldbank.org/en/topic/sustainabledevelopment/overview#1 [Accessed 28 February 2015].

World Commission on Environment and Development, 1987. Our common future. New York: Oxford University Press.

Yang, Y., 2008. Long and happy living: Trends and patterns of happy life expectancy in the U.S., 1970-2000. *Social Science Research*, 37 pp. 1235-1252.

Annexes

Annex 1. Detailed list of indicators

A. Concept: Sustainable Development

Theme	Indicator	Definition of indicator
Variable: Economic Development (Prosperity)	Gross domestic product (GDP) per capita	GDP per capita is gross domestic product divided by midyear population. Data are in constant 2005 U.S. dollars and per 1000 U.S. dollars.
	Gross capital formation (% of GDP) (Investment share in GDP)	Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.
	Inflation rate, consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.
	Health expenditure, total (% of GDP)	Total health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.
Variable: Social Inclusion (People)	Age dependency ratio (% of working-age population)	Age dependency ratio is the ratio of dependents--people younger than 15 or older than 64--to the working-age population--those ages 15-64. Data are shown as the proportion of dependents per 100 working-age population.
	Self-employed, total (% of total employed)	Self-employed workers are those workers who, working on their own account or with one or a few partners or in cooperative, hold the type of jobs defined as a "self-employment jobs." i.e. jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced. Self-employed workers include four sub-categories of employers, own-account workers, members of producers' cooperatives, and contributing family workers.
	Unemployment total (% of total labor force) (modeled ILO estimate)	Unemployment refers to the share of the labor force that is without work but available for and seeking employment.
	Life expectancy at birth total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
Variable: Environmental sustainability (Prosperity)	CO2 emissions from transport (% of total fuel combustion)	CO2 emissions from transport contains emissions from the combustion of fuel for all transport activity, regardless of the sector, except for international marine bunkers and international aviation.
	Electricity production from renewable sources excluding hydroelectric (% of total)	Electricity production from renewable sources, excluding hydroelectric, includes geothermal, solar, tides, wind, biomass, and biofuels.

Theme	Indicator	Definition of indicator
	Electricity production from hydroelectric sources (% of total)	Sources of electricity refer to the inputs used to generate electricity. Hydropower refers to electricity produced by hydroelectric power plants.
	Improved water source urban (% of urban population with access)	Access to an improved water source refers to the percentage of the population using an improved drinking water source. The improved drinking water source includes piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection).
	Urban population (% of total)	Urban population refers to people living in urban areas as defined by national statistical offices.

Source: Author, 2015

B. Concept: Subjective Well-Being

Variable	Indicator	Definition of the indicator
Life satisfaction or happiness	Life ladder	Answers the question, "*Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?"*

Source: Author, 2015

Annex 2. Results of Statistical Tests

A. Hausman Test for Fixed Effects

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
GDP_per_ca~r	.0077508	.0048039	.0029469	.0020489
elec_prod_~t	-.0211225	-.0115629	-.0095596	.0040997
elec_prod_~o	-.0150174	-.0038381	-.0111792	.0036922
urban_popn~h	.0723708	.05077	.0216007	.026588
Govt_expen~c	.1383261	.1220948	.0162313	.0176558

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 24.94
Prob>chi2 = 0.0001

If <0.05 (i.e., significant, use fixed effects)

B. Modified Wald Test for Groupwise Heteroskedasticity

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (99)  =    1.1e+30
Prob>chi2 =      0.0000
```

Presence of heteroskedasticity. Hence, use the option 'robust' to obtain heteroskedasticity-robust standard errors

Annex 3. List of countries by income group and regional cluster

A. Income groups

Income group	Countries			
Low income economies (25 countries)*	Afghanistan	Comoros	Malawi	Tanzania
	Benin	Congo, Dem. Rep.	Mali	Togo
	Burkina Faso	Ethiopia	Mozambique	Uganda
	Burundi	Guinea	Nepal	Zimbabwe
	Cambodia	Haiti	Niger	
	Central African Republic	Liberia	Rwanda	
	Chad	Madagascar	Sierra Leone	
Lower-middle income (41 countries)*	Armenia	Ghana	Mauritania	Swaziland
	Bangladesh	Guatemala	Moldova	Syrian Arab Republic
	Bhutan	Guyana	Morocco	Tajikistan
	Bolivia	Honduras	Myanmar	Ukraine
	Cameroon	India	Nicaragua	Uzbekistan
	Congo, Rep.	Indonesia	Nigeria	Vietnam
	Cote d'Ivoire	Kenya	Pakistan	Yemen, Rep.
	Djibouti	Kosovo	Philippines	Zambia
	Egypt, Arab Rep.	Kyrgyz Republic	Senegal	
	El Salvador	Lao PDR	Sri Lanka	
	Georgia	Lesotho	Sudan	
Upper middle income economies (42 countries)	Albania	Colombia	Lebanon	Peru
	Algeria	Costa Rica	Libya	Romania
	Angola	Cuba	Macedonia, FYR	Serbia
	Azerbaijan	Dominican Republic	Malaysia	South Africa
	Belarus	Ecuador	Mauritius	Suriname
	Belize	Gabon	Mexico	Thailand
	Bosnia and Herzegovina	Iran, Islamic Rep.	Mongolia	Tunisia
	Botswana	Iraq	Montenegro	Turkey
	Brazil	Jamaica	Namibia	Turkmenistan
	Bulgaria	Jordan	Panama	
	China	Kazakhstan	Paraguay	
High income economies (51 countries)	Argentina	France	Lithuania	Singapore
	Australia	Germany	Luxembourg	Slovak Republic
	Austria	Greece	Malta	Slovenia
	Bahrain	Hong Kong SAR, China	Netherlands	Spain
	Belgium	Hungary	New Zealand	Sweden
	Canada	Iceland	Norway	Switzerland
	Chile	Ireland	Oman	Trinidad and Tobago
	Croatia	Israel	Poland	United Arab Emirates
	Cyprus	Italy	Portugal	United Kingdom
	Czech Republic	Japan	Puerto Rico	United States
	Denmark	Korea, Rep.	Qatar	Uruguay

Income group	Countries			
	Estonia	Kuwait	Russian Federation	Venezuela, RB
	Finland	Latvia	Saudi Arabia	

B. Regions

Regions	Countries			
Africa (45 countries)	Algeria	Cote d'Ivoire	Malawi	South Africa
	Angola	Djibouti	Mali	Sudan
	Benin	Egypt, Arab Rep.	Mauritania	Swaziland
	Botswana	Ethiopia	Mauritius	Tanzania
	Burkina Faso	Gabon	Morocco	Togo
	Burundi	Ghana	Mozambique	Tunisia
	Cameroon	Guinea	Namibia	Uganda
	African Republic	Kenya	Niger	Zambia
	Chad	Lesotho	Nigeria	Zimbabwe
	Comoros	Liberia	Rwanda	
	Congo, Dem. Rep.	Libya	Senegal	
	Congo, Rep.	Madagascar	Sierra Leone	
America (28 countries)	Argentina	Costa Rica	Haiti	Peru
	Belize	Cuba	Honduras	Puerto Rico
	Bolivia	Dominican Republic	Jamaica	Suriname
	Brazil	Ecuador	Mexico	Trinidad and Tobago
	Canada	El Salvador	Nicaragua	United States
	Chile	Guatemala	Panama	Uruguay
	Colombia	Guyana	Paraguay	Venezuela, RB
Asia and the Pacific (46 countries)	Afghanistan	India	Lebanon	Sri Lanka
	Armenia	Indonesia	Malaysia	Syrian Arab Republic
	Australia	Iran, Islamic Rep.	Mongolia	Tajikistan
	Azerbaijan	Iraq	Myanmar	Thailand
	Bahrain	Israel	Nepal	Turkey
	Bangladesh	Japan	New Zealand	Turkmenistan
	Bhutan	Jordan	Oman	United Arab Emirates
	Cambodia	Kazakhstan	Pakistan	Uzbekistan
	China	Korea, Rep.	Philippines	Vietnam
	Cyprus	Kuwait	Qatar	Yemen, Rep.
	Georgia	Kyrgyz Republic	Saudi Arabia	
	Hong Kong	Lao PDR	Singapore	
Europe (40 countries)	Albania	Finland	Lithuania	Romania
	Austria	France	Luxembourg	Russian Federation
	Belarus	Germany	Macedonia, FYR	Serbia
	Belgium	Greece	Malta	Slovak Republic
	Bosnia and Herzegovina	Hungary	Moldova	Slovenia
	Bulgaria	Iceland	Montenegro	Spain

Regions	Countries			
	Croatia	Ireland	Netherlands	Sweden
	Czech Republic	Italy	Norway	Switzerland
	Denmark	Kosovo	Poland	Ukraine
	Estonia	Latvia	Portugal	United Kingdom

Source: Author, 2015. Based from the geographical region and composition of the United Nations (United Nations Statistics Division, 2013) and the World Bank income classification (World Bank, 2015)

Note:
* In the statistical analysis, low and lower middle income economies are grouped together to obtain significant number of observations

Annex 4. Descriptive Statistics of the Variables

	Number of observations	Mean	Standard Deviation	Min	Max
Life Ladder	1088	5.45	1.13	2.69	8.02
PROSPERITY INDICATORS					
GDP per capita (constant 2005 US$) (per 100 USD)	1551	107.86	158.58	1.44	861.00
Gross capital formation (% of GDP)	1477	23.95	7.70	2	68
Health expenditure total (% of GDP)	1395	6.59	2.53	1.77	17.10
Inflation consumer prices (annual %) (per 100)	1502	5.97	6.21	-10.10	62.20
PEOPLE INDICATORS					
Age dependency ratio (% of working-age population)	1581	59.90	18.72	16.50	112.00
Life expectancy at birth total (years)	1431	69.40	9.89	42.10	83.80
Self-employed total (% of total employed)	765	29.58	19.88	0.50	91.80
Unemployment total (% of total labor force) (modeled ILO estimate)	1413	8.55	6.06	0.00	37.60
PLANET INDICATORS					
CO2 emissions from transport (% of total fuel combustion)	931.00	30.28	16.37	5	91
Electricity production from hydroelectric sources (% of total)	965	28.91	31.79	0.00	100.00
Electricity production from renewable sources excluding hydroelectric (% of total)	965	3.48	6.46	0.00	47.60
Improved water source urban (% of urban population with access)	1233	94.28	8.30	49.00	100.00
Urban population (% of total)	1580	57.80	23.04	8.55	100.00

Source: Author, 2015

Annex 5. Fixed-Effects Regression Results for Prosperity Variables with Population Density as Control Variable

A. Economic indicators across income groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies)	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.08***	0.04*	0.39	0.23**	0.07**
	(0.03)	(0.02)	(0.32)	(0.09)	(0.03)
Inflation consumer prices (annual %) (over 100)	-0.44	0.02	-0.66	-0.02	-0.44
	(0.34)	(0.34)	(0.53)	(0.44)	(0.82)
Gross capital formation (% of GDP) (over100)	1.35***	0.61	1.34**	1.24*	1.31
	(0.39)	(0.82)	(0.54)	(0.69)	(0.93)
Health expenditure total (% of GDP)	0.09***	0.03	0.09**	0.16***	0.01
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Population density (people per sq. km of land area) (logarithm)	-0.81*	-0.11	-1.16**	-1.81	-0.62
	(0.42)	(0.65)	(0.47)	(1.62)	(0.97)
Constant	7.09***	5.70**	8.43***	10.02*	6.96
	(1.68)	(2.71)	(1.97)	(5.91)	(4.06)
Observations	874	402	350	224	300
R^2	0.08	0.04	0.06	0.11	0.14
Adjusted R^2	0.07	0.03	0.05	0.09	0.12

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B. Economic indicators across regions

	(1) Life Ladder (Total)	(2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.08***	-0.38*	0.24**	0.03	0.11***
	(0.03)	(0.19)	(0.09)	(0.04)	(0.04)
Inflation consumer prices (annual %) (over 100)	-0.44	0.41	-1.82	-0.73	-0.37
	(0.34)	(0.63)	(1.35)	(0.71)	(0.27)
Gross capital formation (% of GDP) (over100)	1.35***	2.33***	0.08	1.43**	0.43
	(0.39)	(0.54)	(0.98)	(0.67)	(0.78)
Health expenditure total (% of GDP)	0.09***	0.03	0.15***	0.05	0.01
	(0.03)	(0.05)	(0.04)	(0.05)	(0.04)
Population density (people per sq. km of land area) (logarithm)	-0.81*	-1.18**	-0.24	-0.48	-0.78
	(0.42)	(0.56)	(1.67)	(0.73)	(1.44)
Constant	7.09***	8.48***	4.07	6.73*	6.73
	(1.68)	(2.02)	(5.89)	(3.45)	(6.40)
Observations	874	201	155	252	252
R^2	0.08	0.09	0.24	0.06	0.18
Adjusted R^2	0.07	0.07	0.21	0.04	0.17

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Annex 6. Fixed-Effects Regression Results for People Variables with Population Density as Control Variable

A. Social indicators across income groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies)	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
Age dependency ratio (% of working-age population)	-0.04***	-0.03**	-0.05*	-0.01	-0.05**
	(0.01)	(0.01)	(0.03)	(0.03)	(0.02)
Self-employed total (% of total employed)	0.02**	0.02*	0.03	0.02	0.02
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Unemployment total (% of total labor force) (modeled ILO estimate)	-0.05***	-0.04***	-0.02	-0.02	-0.05***
	(0.01)	(0.01)	(0.04)	(0.03)	(0.01)
Life expectancy at birth total (years)	0.10***	0.07**	0.13	0.08	0.12***
	(0.03)	(0.02)	(0.14)	(0.06)	(0.04)
Population density (people per sq. km of land area) (logarithm)	-1.40	-0.87***	-3.35	0.87	-1.08
	(0.98)	(0.81)	(4.28)	(1.91)	(0.85)
Constant	6.43*	5.97**	13.03	-3.98	4.50
	(3.50)	(2.72)	(14.31)	(8.04)	(3.57)
Observations	551	338	114	164	273
R^2	0.14	0.14	0.10	0.08	0.28
Adjusted R^2	0.14	0.12	0.05	0.05	0.27

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B. Social indicators across regions

	(1) Life Ladder (Total)	2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
Age dependency ratio (% of working-age population)	-0.03**	0.20*	-0.03	-0.02	-0.02
	(0.01)	(0.11)	(0.03)	(0.03)	(0.02)
Self-employed total (% of total employed)	0.02***	0.01	0.03	0.02	-0.01
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Unemployment total (% of total labor force) (modeled ILO estimate)	-0.04***	-0.17**	0.01	-0.03	-0.05***
	(0.01)	(0.07)	(0.03)	(0.03)	(0.01)
Life expectancy at birth total (years)	0.08***	-0.04	0.06	0.29**	0.06*
	(0.02)	(0.15)	(0.31)	(0.13)	(0.03)
Population density (people per sq. km of land area) (logarithm)	-0.00***	-1.45	3.86	-4.70**	-1.32
	(0.00)	(5.14)	(4.43)	(2.19)	(1.28)
Constant	1.50	-4.70	-11.77	7.66	9.06
	(1.67)	(15.30)	(13.63)	(8.03)	(5.95)
Observations	551	36	120	145	240
R^2	0.14	0.59	0.26	0.12	0.24
Adjusted R^2	0.13	0.52	0.22	0.09	0.23

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Annex 7. Fixed-Effects Regression Results for Planet Variables with Population Density as Control Variable

A. Environmental indicators across income groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies)	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
CO2 emissions from transport (% of total fuel combustion)	0.01**	0.01	0.01*	0.00	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.03***	-0.02**	-0.02*	-0.08	-0.03**
	(0.01)	(0.01)	(0.01)	(0.05)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.02***	-0.02***	-0.01*	-0.02***	-0.02***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Improved water source urban (% of urban population with access)	0.04**	0.13	0.03**	0.21***	0.44
	(0.02)	(0.09)	(0.01)	(0.07)	(0.45)
Urban population (% of total)	0.03	0.02	0.07	0.08**	-0.05
	(0.02)	(0.03)	(0.05)	(0.03)	(0.03)
Population density (people per sq. km of land area) (logarithm)	0.37	0.50	-0.69	-1.56	0.90***
	(0.44)	(0.36)	(1.62)	(1.72)	(0.30)
Constant	-1.68	-9.49	2.34	-12.90**	-37.43
	(2.23)	(8.39)	(4.79)	(5.97)	(45.33)
Observations	606	303	209	171	226
R^2	0.07	0.09	0.05	0.15	0.12
Adjusted R^2	0.06	0.07	0.02	0.12	0.10

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B. Environmental indicators across regions

	(1) Life Ladder (Total)	2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
CO2 emissions from transport (% of total fuel combustion)	0.01**	0.02**	0.02	-0.00	0.01
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.03***	-0.09***	-0.03	-0.06	-0.02
	(0.01)	(0.03)	(0.02)	(0.05)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.02***	-0.01*	-0.02**	0.01	-0.02***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Improved water source urban (% of urban population with access)	0.04**	-0.06	0.07	0.04**	-0.37
	(0.02)	(0.07)	(0.07)	(0.02)	(0.35)
Urban population (% of total)	0.03	-0.09	0.00	0.02	-0.01
	(0.02)	(0.22)	(0.06)	(0.04)	(0.05)
Population density (people per sq. km of land area) (logarithm)	0.37	1.82	4.58	0.02	-1.08
	(0.44)	(4.62)	(2.97)	(0.48)	(1.51)
Constant	-1.68	6.69	-18.22**	0.03	49.05
	(2.23)	(8.88)	(6.90)	(2.68)	(38.11)
Observations	606	90	126	202	178
R^2	0.07	0.08	0.24	0.02	0.18
Adjusted R^2	0.06	0.01	0.20	-0.01	0.15

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Annex 8. Fixed-Effects Regression Results for Sustainable Development Variables with Population Density as Control Variable

A. Sustainable development indicators across income groups

	(1) Life Ladder (Total)	(2) Life Ladder (Happier countries)	(3) Life Ladder (Low AND lower middle income economies)	(4) Life Ladder (Upper middle income economies)	(5) Life Ladder (High income countries)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.10***	0.07***	0.75	0.36**	0.10***
	(0.02)	(0.02)	(0.47)	(0.16)	(0.02)
Health expenditure total (% of GDP)	0.14***	0.08**	0.39***	0.09	0.13***
	(0.03)	(0.04)	(0.13)	(0.06)	(0.05)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.02***	-0.01	-0.03	-0.06	-0.02***
	(0.01)	(0.01)	(0.03)	(0.07)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.01***	-0.01**	-0.01	-0.01**	-0.01***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)
Age dependency ratio (% of working-age population)	-0.05***	-0.05*	-0.03	-0.03	-0.05**
	(0.02)	(0.02)	(0.04)	(0.05)	(0.02)
Self-employed total (% of total employed)	0.02**	0.03**	0.05***	0.02	0.03
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Population density (people per sq. km of land area) (logarithm)	-0.69	-0.98	-2.03	-1.64	-0.30
	(1.04)	(1.23)	(2.71)	(3.11)	(1.18)
Constant	8.38*	10.46**	10.60	11.37	6.40
	(4.52)	(5.12)	(13.66)	(13.16)	(4.97)
Observations	448	283	86	132	230
R^2	0.22	0.19	0.27	0.19	0.30
Adjusted R^2	0.20	0.17	0.20	0.15	0.27

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B. Sustainable development Indicators Across Regions

	(1) Life Ladder (Total)	2) Life Ladder (Africa)	(3) Life Ladder (America)	(4) Life Ladder (Asia and the Pacific)	(5) Life Ladder (Europe)
GDP per capita (constant 2005 US$) (per 1000 US$)	0.10***	-0.81	0.16	0.18**	0.08***
	(0.02)	(0.47)	(0.10)	(0.08)	(0.03)
Health expenditure total (% of GDP)	0.14***	-0.86**	0.19*	0.11	0.08*
	(0.03)	(0.29)	(0.11)	(0.07)	(0.04)
Electricity production from renewable sources excluding hydroelectric (% of total)	-0.02***	-2.63***	-0.02	-0.00	-0.02**
	(0.01)	(0.78)	(0.02)	(0.05)	(0.01)
Electricity production from hydroelectric sources (% of total)	-0.01***	-0.05	-0.01	-0.01	-0.02***
	(0.00)	(0.06)	(0.01)	(0.01)	(0.00)
Age dependency ratio (% of working-age population)	-0.05***	0.11	-0.06	-0.01	-0.06
	(0.02)	(0.10)	(0.04)	(0.04)	(0.03)
Self-employed total (% of total employed)	0.02**	0.00	0.05*	0.00	-0.00
	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)
Population density (people per sq. km of land area) (logarithm)	-0.69	10.32**	0.88	-2.42	1.18
	(1.04)	(3.77)	(2.75)	(1.96)	(1.44)
Constant	8.38*	-30.89*	2.33	15.76	1.19
	(4.52)	(15.73)	(10.78)	(10.42)	(5.96)
Observations	448	26	106	113	193
R^2	0.22	0.71	0.35	0.13	0.32
Adjusted R^2	0.20	0.60	0.30	0.07	0.30

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$