

# Introduction to Sustainable Development

A brief handbook for students by students

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## *Abstract*

This handbook (Greek and English version) was prepared under the care of various IHU professors while graduates and postgraduate students of the IHU Master of Science in Environmental Management and Sustainability and other fields conducted the composing part. It is the outcome of collective efforts and work. The purpose of this initiative is to create a simple, understandable and useful guide or tool for the reader, in order to understand the basic principles of sustainable development and the essential value of sustainability that contributes to the solution of various global problems and concerns.

In this handbook you may find some basic definitions of terms concerning sustainability. Moreover, the three pillars of sustainability (environment, society, economy) are fully explained in various chapters. Also, the birth and evolution of Sustainable Development is illustrated while the role of the enterprise in sustainable development is demonstrated. In addition, the connection between Tourism, Cooperations and Sustainable Development is analysed. Furthermore, you may find chapters concerning The Impact of Urban Pollution in Sustainability and the Role of Citizens in promoting sustainable development, while there is a chapter dedicated to the Right to Environment: the principle of sustainability in the Greek legal order. Finally, there are some special contributions analysing various concepts that are connected to Sustainable Development.

Keywords: Sustainable Development, Handbook, Sustainability, Students

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October 18, 2015



## ***List of Abbreviations***

CAP	Collaborative Awareness Platform
CBA	Cost-Benefit Analysis
CMUR	Centres for Management of Urban Residues
COP	Conference of the Parties
CSR	Corporate Social Responsibility
DAX	German stock index
DESA	Department of Economic and Social Affairs
EEA	European Environment Agency
EIA	Environmental Impact Assessment
ELECTRE	ELimination Et Choix Traduisant la REalité
EMF	Electromagnetic Field
EU	European Union
GDP	Gross Domestic Product
GRI	Global Reporting Initiative
ICA	International Cooperative Alliance
ICT	Information and Communication Technology
IHU	International Hellenic University
ILO	International Labor Organization
IMF	International Monetary Fund
LCA	Life Cycle Analysis
LOHAS	Lifestyle Of Health And Sustainability
NGO	Non-Governmental Organization
ODS	Ozone-Depleting Substances
OECD	Organisation for Economic Co-operation and Development
SD	Sustainable Development
SME	Small and Medium Enterprises
UN	United Nations
UNCED	United Nations Conference on the Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
UNWTO	United Nations World Tourism Organization
USA	United States of America
WB	World Bank
WHO	World Health Organization
WTO	World Trade Organization

## *Table of Contents*

<b>Abstract.....</b>	<b>4</b>
<b>List of Abbreviations .....</b>	<b>6</b>
<b>Table of Contents .....</b>	<b>7</b>
<b>Acknowledgments .....</b>	<b>9</b>
<b>Foreword from Prof. Nicolas Moussiopoulos.....</b>	<b>10</b>
<b>Foreword from Prof. Eftichios Sartzetakis .....</b>	<b>12</b>
<b>Introduction.....</b>	<b>14</b>
<b>Highlights of the 1<sup>st</sup> IHU International Conference on Sustainable Development .....</b>	<b>16</b>
<b>Definitions of terms.....</b>	<b>21</b>
<b>The Three Pillars of Sustainability.....</b>	<b>25</b>
<b>The birth and evolution of Sustainable Development .....</b>	<b>29</b>
<b>Sustainable Development and the Environment.....</b>	<b>35</b>
<b>The Social Dimension of Sustainable Development.....</b>	<b>37</b>
<b>Basic Economic Principles of Sustainable Development.....</b>	<b>41</b>
<b>Environmental Policy and Governance .....</b>	<b>45</b>
<b>The Role of the Enterprise in Sustainable Development: Corporate Social Responsibility .....</b>	<b>50</b>
<b>Sustainable Development and Tourism .....</b>	<b>54</b>
<b>Cooperations and Sustainable Development.....</b>	<b>57</b>
<b>The Impact of Urban Pollution in Sustainability – the Role of Citizens .....</b>	<b>62</b>
<b>Right to Environment: the principle of sustainability in the Greek legal order..</b>	<b>69</b>
<b>Contributions .....</b>	<b>Error! Bookmark not defined.</b>
<b>Is sustainability worthwhile for companies? .....</b>	<b>73</b>
<b>Creating motives and tools in order to enable citizens to become “Smart Citizens”: A “socially-oriented” bottom-up approach towards sustainability. ...</b>	<b>80</b>
<b>Multi-criteria decision analysis as a decision making tool towards adaptation of urban sustainability policies .....</b>	<b>88</b>

## *Table of Figures*

<b>Figure 1 - Source: <a href="http://www.thwink.org/">http://www.thwink.org/</a>.....</b>	<b>25</b>
<b>Figure 2 - Source: <a href="http://www.oryktosploutos.net/2010/06/blog-post.html#.VSL1gNysWSp">http://www.oryktosploutos.net/2010/06/blog-post.html#.VSL1gNysWSp</a>.....</b>	<b>32</b>
<b>Figure 3 - The three pillars of sustainability .....</b>	<b>62</b>
<b>Figure 4 - Waste Management Hierarchy .....</b>	<b>65</b>
<b>Figure 5 - Pyramid of the levels of citizens' interaction in order to enable citizens to become "Smart Citizens" .....</b>	<b>82</b>
<b>Figure 6 - The overall collective intelligence concept .....</b>	<b>83</b>
<b>Figure 7 - ICT towards collective intelligence.....</b>	<b>84</b>

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Giorgos Goniadis & Maria Lampridi

Final Editors

## ***Foreword from Prof. Nicolas Moussiopoulos***

Humanity in the 21<sup>st</sup> century is facing various environmental, social and economic problems. Almost every government, various international organizations and private stakeholders are facing challenges. The climate change effects and resources scarcity are constantly increasing, while their impact is not limited to a state but rather spread all around the world. This, non-border parameter of environmental, social and economic problems, has rendered them into collective problems demanding joint efforts in order to reach a solution, or at least to mitigate the problems or their impact.

Different approaches concerning successful ways to tackle these problems exist. Most of these approaches lead to joint efforts, which need a specific framework in order to reach fruitful and solution-oriented policies. One successful approach is the sustainable development strategy framework. According to Brundtland Commission sustainable development is the “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*”. Sustainable development is a matter that primarily concerns states and enterprises, but it also concerns citizens equally. For instance, we tend to speak regularly about Corporate Social Responsibility while we undermine the value and importance of Personal Social Responsibility in our efforts to ameliorate the quality of life for everyone.

Taking into account these thoughts/ideas, the International Hellenic University, through the MSc in Environmental Management and Sustainability established a passionate group of students and recent alumni, called “Students for Sustainability”, drawn together by the common vision to promote and spread the ideas and principles of sustainable development. Our main aim was to initiate and trigger our students’ personal social responsibility. These initiatives led to the organization of a conference, the “1<sup>st</sup> IHU International Conference on Sustainable Development” that presented the practices of sustainable development in a non-academic framework by experts, accessible to every single individual. This conference was a joint event, fully organized by our students in partnership with other regional authorities, non-governmental organizations, institutions and enterprises, an event that revealed the core value of joint initiatives in the framework of sustainable communities. In the context of “Students for Sustainability” activities to raise public and social awareness concerning issues of sustainable development, our students prepared this handbook in Greek and English. It was prepared under the guidance of IHU professors and academics while graduate and postgraduate students of the IHU Master of Science in Environmental Management and Sustainability conducted the editorial part.

Furthermore, distinguished professors in the field of sustainable development and environmental protection, such as Prof. Dr. Dr. Franz Josef Radermacher and Prof. Klaas Dirks Van Den Hout, contributed by writing some of the chapters in the handbook.

The purpose of this handbook is to create a simple, comprehensive, useful guide and tool for the reader, in order to understand the basic principles of sustainable development. Moreover, it seeks to present the essential value of sustainability that contributes to the solution of various global, regional and local problems and concerns. Finally, our students seek, through this handbook, to promote and foster the significance of sustainable development in a greater context, as much in favor of society, as of the economy and the environment.

Professor Nicolas Moussiopoulos  
Vice President of the Governing Board,  
International Hellenic University

## ***Foreword from Prof. Eftichios Sartzetakis***

The continuously increasing severity of environmental problems led to a series of reactions from independent organizations over the years, from the International Union for Conservation of Nature in 1948 to the Club of Rome and its report *The Limits to Growth* in 1972. Focusing initially on environmental protection and natural resources' conservation the movement established, over the seventies and eighties, the links between the environmental, economic and social dimensions. At the institutional level, the concept of Sustainable Development was coined at the United Nations Conference on the Human Environment in Stockholm in 1972 and subsequently defined through the World Conservation Strategy (1980), the Brundtland Report (1987), and the United Nations Conference on Environment and Development in Rio (1992).

Although in the ensuing decades, mainstream sustainable development thinking was progressively developed, the notion still remains vague and difficult to pinpoint to specific international and national policies, business' practices and citizens' everyday actions. Thus, it is clear that more research is still needed but most importantly practical knowledge and skills to apply the ideas and basic guidelines of sustainable development in all social and economic activities and primarily in the production of goods and services.

Responding to this need, that was mainly uncovered in Greece, the International Hellenic University took the initiative in 2012 to develop a program of graduate studies, the MSc in Environmental Management and Sustainability. The program's primary goal is to provide potential businesses and organizations' staff with the necessary theoretical knowledge and practical skills in order to manage operations sustainably to the benefit of the organization at which they work and the society at large.

Having benefited from the courses and based on their strong drive to promote sustainability issues, the program's students and alumni initiated a group of volunteers called "Students for Sustainability". The most important among the group's actions is the organization of the "1<sup>st</sup> IHU International Conference on Sustainable Development" in May 2015. Although the conference had the support of the program and the University, it was the students that defined the topics and organized, in collaboration with other regional authorities, non-governmental organizations, institutions and enterprises, what proved to be an extremely successful event.

Furthermore, it was the students' idea to publish this volume that contains mainly the conference's proceeding and selected other contributions. I would like to focus on the students' initial idea of preparing a comprehensive guide to different views and approaches of sustainable development. A volume created primarily by students for students and the public at large. I strongly believe that the volume achieves its target and I would like to congratulate all those involved, including those that contributed their thoughts as well as those that participated in editing, preparing and publishing this Handbook. As the Director of the program I am extremely proud of my students since I believe that their participation in this type of extracurricular activities contributes very positively to their own and the program's development.

Professor Eftichios Sartzetakis  
Director of the MSc in Environmental Management and Sustainability,  
International Hellenic University

## *Introduction*

In recent years, particularly since 2007, when the bubble in the US housing market burst, the international community faced a global economic crisis that changed several social and economic beliefs. Bearing also in mind the complexity of the theory of sustainable development, and the complexity of the global economy and the various interests, it became apparent that the traditional way of thinking and acting was not only unsustainable but also detrimental to the environment, society and the economy. Therefore a new economic, social and environmental reality was presented, which pushed and pushes gradually societies to less wasteful and more sustainable, green or ecological behaviors, which in turn drives changes in business and social activities and perceptions. With the passage of time the need for joint coordination of the various strategies becomes obvious, while a further and fruitful application of best practices and decisions appears to be a promising solution, while the whole effort requires comprehensive and constructive cooperation.

It is important to emphasize that the sustainability of an activity concerns its long-term extension in the future; the sustainability in its present sense is a route, a process of humanity to be maintained in the finite ecosystem of the Earth. Sustainability however is not a specific, well-established concept, but an evolution to improve the management of natural and human systems through better understanding and knowledge. The main goal of sustainability is human survival and in this sense it is anthropocentric, but completely different from the "wild" or unlimited growth-growth that classical economics profess, for the simple reason that it places restrictions. We could say that it is a much broader concept than environmental protection, because it also presupposes long-term cultural change. Prerequisite is the adaptability of a state / people / culture. Apart from its ability to adapt, striving for sustainable development largely involves innovation in terms of ideas, technology, actions etc. The problems to be faced by humanity in the 21st century can not be solved by traditional means and practices.

Today, it is generally accepted that sustainability is a dynamic process based on three pillars, which interact with each other and they are not mutually exclusive. Even though there are interrelationships between these pillars, there is also one rudimentary and logical hierarchy that is not often highlighted. Specifically, the environment is a superior system and exerts long-term control over human systems of economy and society.

The road to sustainability has specific targeting which is presented in this handbook, but there are certain conditions that we must at least maintain and some others that we need to develop or evolve in a positive direction.

The challenges for sustainable development are both heterogeneous and complex as the diversity of human societies and natural ecosystems worldwide. Indicative problems are a. the depletion of finite resources (fuel, soil, minerals, species); b. excessive use of renewable energy sources (forests, fish and wildlife, soil fertility), c. pollution (air, water, soil) d. inequality (economic, political, social, racial), and finally e. the loss of species (endangered species and endangered soils). The theory of sustainable development is complex, complicated and unclear. But, in fact, sustainable development gets much of its impact, power, and creativity from this particular ambiguity.

Sustainability, besides a theory, is a call to action, a work in progress, a singular political process of which we are called to be a part. Therefore, we as a group of young scientists and under the individual social responsibility, through our group «Students for Sustainability» decided to make a start on the issue of sustainable development. And like this, the 1st International Conference on Sustainable Development (the first of its kind in our country) which was held on May 16, 2015 in the City Council Chamber at City Hall of Thessaloniki was born.

Aim of the conference was to promote the idea of sustainability in society, and awakening and awareness about important issues related to the sustainable development of the Earth and the parallel promotion of sustainable development strategies. In the same context we moved for the creation of this manual.

Giorgos Goniadis

Founding Member and Coordinator of the Students for Sustainability Team  
Graduate of the MSc in Environmental Management and Sustainability of the  
International Hellenic University

# ***Highlights of the 1<sup>st</sup> IHU International Conference on Sustainable Development***

***Elli Melliou***

## **Morning session:**

### **Opening speeches by:**

- A. Prof. N. Moussiopoulos (International Hellenic University): presentation of the mission of IHU, “it is delightful to see how students can really organize and assist in organizing a conference in order to diffuse their academic knowledge”.
- B. Ms N. Katsioulis (Friedrich Ebert Stiftung): expressed her support and respect for the Conference on behalf of FHS, referenced Naomi Klein (recent book entitled “This Changes Everything”) in stressing out the importance of tackling climate change (“N. Klein questions the type of policy put forth by the Troika in Greece, disapproves of the privatization of energy actors in Greece – we should rather invest in (state) renewable energies”)
- C. Representative of the Municipality of Thessaloniki: briefly presented the weak points of technologies that are destructive to the environment
- D. G. Goniadis (Students for Sustainability): speaking on behalf of the organizing committee, Mr. Goniadis as the coordinator of the committee, stated that the conference was a joint effort by graduate and postgraduate students. He emphasized on the sources of funding for the conference, which derived from private sponsors, solely from companies that embrace sustainable development policies. Moreover, he pointed out that the aim of the committee, and its various initiative towards public awareness on sustainable development issues, is to further promote the personal social responsibility.

### **Lectures - Discussions:**

1. Prof. F. J. Radermeicher: His presentation entitled “Twelve Action Lines for a Better World” revolved around the fictional scenario of him being in charge of organizing the world in a sustainable manner; he covered all sectors (global governance, economic & financial sector, social sector, environmental issues); “Non-sustainable living could result in a global two-class society (very rich and very poor) or in an unprecedented ecological catastrophe”. He pointed out that the major reason why we are not able to shift from oil, coal, and other environmentally harmful fuels, to alternative energy sources is the approximately 30-billion-dollar value of assets like oil, coal etc. → in that case, investing and trading in alternative energy sources would cause a

domino of collapses to the mineral energies sector (companies, suppliers, employers, poor people, etc.); the challenge lies in solving the climate problem in a way that avoids this domino of negative effects. \*\*\* He said that “the strongest power of young people is their ability to change the mentality of humanity through their fresh ideas and, thus, the way the world runs” – “you, as young people, still have 70 years to convince others, to make them think differently – use your years!”

2. Prof. D. van der Hout: On the basis of the recognition that air quality is one of the sustainable cities indicators, his presentation thoroughly demonstrated the growing health concerns associated with air pollution and climate change, and, subsequently, the research and calculations provided by the European project “TRANSPHORM”, whose aim was to improve knowledge on the health impact caused by particular matter generated by the transport sector (particularly in cities). In particular, emphasis was given to the ranking of various proposed transport measures (such as the enhanced use of bicycles, public transportation, shore-based electricity for ships, kerosene tax, etc.) in regard to their effectiveness in tackling the health impact of harmful matter in the air, reducing greenhouse gas and enhancing climate protection, but also in regard to their cost. He concluded that 1) the best approach for a city’s urban transport policy depends on the city’s particular characteristics and political atmosphere, and 2) air quality seems to be gradually improving, but the concentrations of particular matter in the air, now and in the foreseeable future, are far above healthy levels, and therefore, we are in need of a sustainable air policy with measures taken at international, national and local level.
3. Ms. A. Kallia-Antoniou: She provided an overview of the Greek and EU environmental law framework, particularly focusing on the evolution of the latter through the adoption of over 400 Directives, Regulations and Decisions on issues such as biodiversity, water, air pollution and environmental liability, as well as of framework Directives, which set long-term objectives to be gradually accomplished (e.g. on waste management). She stressed out the importance of “voluntary” law, comprising optional instruments to be implemented by companies (in case of compliance, there are certain benefits) and the usefulness of studies elaborated by the EU Environmental Agency on the basis of data collected by EU member states. Moreover, it was interesting for the participants of the existence of the right to a clean and healthy environment (the right of an EU citizen to file a complaint with the European Commission regarding violations of environmental legal provisions). Finally, she made certain recommendations for the enhancement of environmental law in Europe: 1) European environmental inspectors operating in parallel with

national ones, 2) more efficient training of civil servants, 3) balancing of social, economic and environmental considerations.

4. Round Table: Interaction between Sustainable Development and Human Rights (discussion led by Prof. N. Moussiopoulos and jointly carried out by the latter and Prof. E. Sartzetakis, Mr. S. Famellos, Ms A. Kallia – in Greek). This very enlightening discussion revolved around three major issues: 1) the relationship between Sustainable Development and moral values; 2) the possibility of Sustainable Development being used as a tool for the eradication of poverty; 3) the compatibility between economic growth and Sustainable Development. Each of the speakers highlighted a variety of important facts (such as the modification of our moral value system in line with the evolution of the law and the current prevalence of the progress of economic values against the progress of moral values, which inevitably brings about destruction of economic, human and natural capital, creates many contradictions within society and leads to friction between citizens, cities and even countries), yet all speakers ultimately focused and agreed on one common point: the need for fair distribution of wealth in order to achieve sustainable development and safeguard human rights; such progress will become feasible, not on the basis of economic indicators, but through the active participation of the public in decision-making processes; it is necessary to ensure the participation of society to the development model by applying the tools of Sustainable Development, in order to restore democracy, equality and solidarity to decent standards of operation.

Greeting by the Mayor of Thessaloniki, Mr. G. Boutaris: He was pleased to see young people take such an initiative, because most people are not aware of the essence of Sustainable Development yet, and thus they do not respect it so much

**Afternoon session:**

5. Mr. G. Drakopoulos: With the UNWTO definition of sustainable development as a starting point, he laid out certain sustainable tourism development guidelines and management practices, which are applicable to all forms of tourism and in all types of destinations and noted the importance of striking a balance between the environmental, economic and socio-cultural of tourism development in order to ensure the long-term sustainability of tourism. He provided practical examples of achieving that balance in these three dimensions, while pointing out that sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. According to Mr. Drakopoulos, achieving sustainable tourism is a continuous

process and it requires constant monitoring of impacts, introducing the necessary preventive and/or corrective measures whenever necessary. Finally, it was underlined that sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience to the tourists, raising their awareness about sustainability issues and promoting sustainable tourism practices amongst them.

6. Dr. Ch. Vlahokostas: He spoke of the notion of “smart citizenship”, which constitutes a socially oriented bottom-up approach towards sustainability. In the cities, the citizens are exposed to numerous environmental pressures. The urban climate is critical to sustainability, while it poses a great challenge for the authorities and the environmental managers. He underlined the importance of raising the public’s awareness about sustainable development on the one hand, and the strengthening of the collective behavior (need for a societal behavioral modeling), on the other. Smart citizens are required to create networks, enhance knowledge and increase censorship/ monitoring of the city’s activities. They can also push companies to change towards sustainability. In addition, smart citizens participate in the city’s governance and they are concerned about improving the quality of life of their fellow citizens. Dr. Vlahokostas also pointed out that efficient democracy comes with fostering e-democracy. The key to a successful, sustainable, smart city lies with the empowerment of its citizens.
7. Ms Z. Kantounatou: Her lecture aimed at demonstrating how sustainable development can become a useful tool for the creation of policies in order to tackle youth unemployment. The speaker’s opinion is that the entrepreneurial activity of young people could solve the problem of high youth unemployment in Greece.
8. Mr. A. Chatzinikolaou: He gave the audience an everyday example of active citizenship by presenting the case study of the University of Macedonia; the ‘environmental club’ of the University has voluntarily undertaken various ecological activities in order to create a clean and ‘green’ educational environment, as well as raise awareness among the student community about environmental issues in the city of Thessaloniki.

### **Open Discussion:**

It was, without exaggeration, one of the most interesting and vivid parts of the Conference, as the one-hour discussion was formed by brief questions, answers and opinions expressed by the speakers and numerous participants on the overall input from the preceding lectures. Some questions which gave birth to fruitful discussion were: 1) How can we apply sustainable development in Thessaloniki?, 2) Is it because of bureaucracy and high taxation that few or no inventions are made in the field of

sustainable development?, 3) How can young people put their ideas into practice in an effort to promote sustainable development?, 4) Do we protect the environment because we love and respect it, or do we do so out of fear for any negative consequences we may suffer due to it?

## ***Definitions of terms***

***Katerina Ongari***

### **Sustainable Development**

According to the Brundtland report, sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In other words, in order to fulfill the human needs and to ameliorate the quality of human life, development is of vital importance. That is the main reason why it should be based on a more effective and environmental uses of all of the insufficient resources of the society, such as, the natural, the human or the economic resources.

### **Natural resources**

Natural resources are mainly the natural goods, which are easily accessible and available to humans in order to fulfill their needs. When we are talking about the natural resources of a country, we usually refer to the protogenes materials that have economic value, such as the soil, the water, the atmosphere, the subsoil, the sun's light and even the biosphere. They all offer us sources of energy and therefore, it is only natural that in order to achieve sustainable development the following objectives should be met:

- a) the exploitation of natural resources should not exceed the possibility of their renewal
- b) the minimization of the use of depletable natural resources should be a priority, as well as the efforts to replace those resources with renewable ones.
- c) the disposal of waste on the environment should not exceed the ability of their absorption.

### **Sustainability**

Sustainability is a production model which aims at better economic results for both humans and the natural environment, not only in the present but in the indefinite future as well. Its main element is the balance between production of goods and raw materials which are spent with regard to achieve production. Therefore, the objective of sustainable processes is to achieve more production with lower cost of raw material, which is why sustainability is usually mentioned with concepts like recycling, renewable energies and bioclimatic design.

## **Climate Change**

At the United Nations Framework Convention on Climate Change (UNFCCC), climate change is defined as the change in climate due, directly or indirectly, to human activities. Indeed, the change of atmospheric composition and climate change act as an additional element in the natural climate variability. Moreover, climate change can be also considered a change in the statistical properties of the climate system when we consider it in long-term, regardless of the cause.

## **Biodiversity**

As biological diversity, biodiversity, is mainly defined the set of genes, species, ecosystems and cultures of a region. The large number and diversity of contemporary forms of life on Earth is the result of hundreds of millions of years of evolutionary history. Unfortunately, nowadays there is a reduction of biodiversity on the planet, due to a number of causes such as environmental pollution, deforestation, desertification of soils and water pollution.

## **Renewable resources**

The non-fossil renewable energy sources such as wind, solar and geothermal energy, wave energy, tidal energy and water power, all belong to the category of Renewable Energy Sources. Their use allows the reduction of emissions of gases that cause the greenhouse effect, derived from the production and consumption of energy. They can also help small and developing countries to be self-sufficient with energy, as well as to constitute the alternative solution in relation to the economy of oil.

## **Green Technology**

The field of "green technology" encompasses a continuously evolving set of methods and materials that address not only the techniques for power generation but also the production of non-toxic cleaning products. The goal is that this field will bring innovation and changes in our daily lives. The inventions of this kind of technology are environmentally friendly and often include energy efficiency, recycling, safety and health, renewable resources etc. Striking examples of "green technology" are solar cells and photovoltaics.

## **Corporate Social Responsibility (CSR)**

The voluntary commitment of businesses to include social and environmental actions in their activities beyond the legal requirements, in relation to all those directly or indirectly affected by them, is the concept of Corporate Social Responsibility. In other words, it is the responsibility of enterprises for their impacts on society, concerns that a balanced response to the economic, social and environmental impact of business operations for economic growth, sustainability and social cohesion.

## **Externalities**

Several processes of production and consumption create externality, which means that people who engage in them either do not reap all the benefits or they do not bear the full costs of their actions. Without a doubt, there are positive and negative externalities. Positive externalities raise the cost of production and reduce the quantity requested while negative externalities lower production costs and raise the asking and quantity. Furthermore, there are times where the externalities are capable of distorting prices so the market fails to deliver good results for social welfare.

## **Pareto Efficiency**

The Pareto-criterion explains that, a change in price or a quantity can improve one's position while in the meantime it does not aggravate the position of another. In short, the Pareto-criterion assures us that we are improving social welfare as a whole since we have ameliorated the situation of an individual or a group of persons without deteriorating the position of any other. The Pareto-efficiency is usually considered to be a prerequisite when examining the prosperity it brings on a specific mechanism but without this meaning that it is a sufficient condition.

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## *The Three Pillars of Sustainability*

*Lamprinaki Viktoria-Vasiliki, Lampridi Maria*

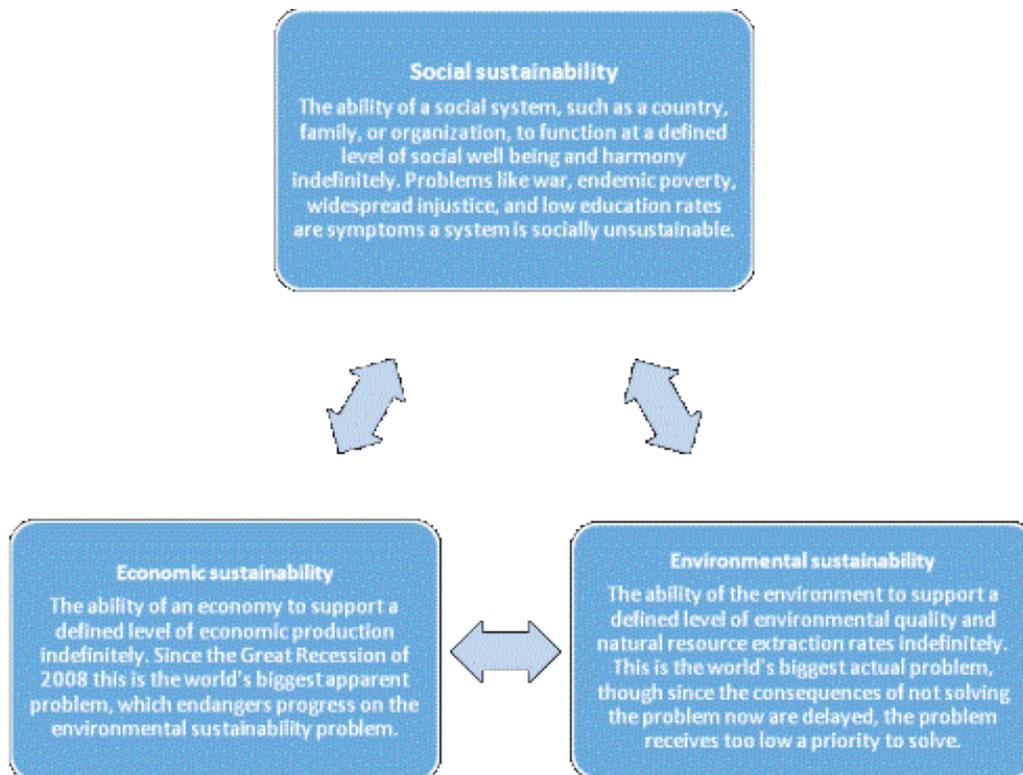


Figure 1 - Source: <http://www.thwink.org/>

The purpose of Sustainable Development is to “*Meet the needs of the present without compromising the ability of future generations to meet their own needs*”. In order to perceive Sustainability, someone has to take into account three main areas of influence, the so called “**Three Pillars of Sustainability**” and the corresponding aspects which are the Social, Economic and Environmental aspect.

This three aspects are interconnected and if they are combined and applied in real world situations they can create a steady base for a sustainable world from which everybody can benefit. “*Natural resources are preserved, the environment is protected, the economy is not harmed and the quality of life for our people is improved or maintained*”.

## **Environmental Sustainability**

In order to achieve environmental sustainability, natural environment should retain its total functionality and utility for a long period of time. It is preferable that actions taken should encourage a balance in our natural environment while simultaneously promote positive growth rates. Any actions that disrupt the balance of the environment should be avoided but if they occur they should be limited to a lesser extent. Environmental impacts of any action or decision should be taken into account.

There is a variety of issues related with environmental sustainability from pollution to the management of natural resources. The main purpose of Environmental Sustainability is to minimize the impact of human activities to the environment and furthermore encourage the restoration and preservation of our natural habitat.

## **Economic Sustainability**

Economic sustainability is the ability of an economy to support a defined level of economic production indefinitely. Economic value can be created out of every project or decision. Economic sustainability refers to decisions that are made in the most prudent way possible with respect to the other aspects of sustainability. True sustainability is not promoted when only the economic aspects are considered. On the large scale the usual approach used to be “business as usual” which meant that profit was the only concern and aim of firms. However, when good business practices are incorporated with the social and environmental aspects of sustainability, the result is significantly more positive.

Economic sustainability consists of many things. From "smart growth" to subsidies or tax breaks for green development. It is important though to reinforce and promote it with education programs, research and informing the public. Also, much emphasis should be placed on other areas such as reducing unnecessary spending.

## **Social Sustainability**

Social Sustainability relies on decisions and projects that promote the general improvement of society. Generally, the social aspect of sustainability supports the concept of intragenerational justice, which means that future generations are entitled with the same or greater quality of life as current generations. This concept also encloses many other socially related issues such as environmental law, human and labor rights, health equity, community development via public involvement and

participation, social capital, support justice and responsibility, cultural competence, community resilience, and human adaptation.

The social dimension of sustainability is equally important as the other two pillars. If it is not taken into serious consideration it can lead to the collapse of the whole process of sustainability as well as the society itself.

Nobel Laureate Amartya Sen gives the following dimensions for social sustainability:

- **Equity** - the community provides equitable opportunities and outcomes for all its members, particularly the poorest and most vulnerable members of the community
- **Diversity** - the community promotes and encourages diversity
- **Interconnected/Social cohesions** - the community provides processes, systems and structures that promote connectedness within and outside the community at the formal, informal and institutional level
- **Quality of life** - the community ensures that basic needs are met and fosters a good quality of life for all members at the individual, group and community level (e.g. health, housing, education, employment, safety)
- **Democracy and governance** - the community provides democratic processes and open and accountable governance structures.
- **Maturity** - the individual accept the responsibility of consistent growth and improvement through broader social attributes (e.g. communication styles, behavioral patterns, indirect education and philosophical explorations)

Sustainable development is a combination of these three pillars and it cannot be achieved properly if any one of them is not “functioning” properly. If anyone pillar is weak then the system as a whole is unsustainable.

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## *The birth and evolution of Sustainable Development*

*Maria Lampridi & Charoula Melliou*

“[...] one should harvest only the same amount of wood which equals to trees planted [...]”. It was by this simple phrase, back in 1713, that Hans Carl von Carlowitz (1645-1714) gave birth to the idea of sustainable development, stressing the importance of the right management of wood stock. Soon, Thomas Malthus, in his book entitled “An Essay on the Principle of Population” (1798), also underlined the fact that the population of our planet is not sustainable, as it increases at an exponential rate in relation to the resources available.

These ideas, which were revolutionary at their time, marked some early thoughts on the concept of sustainable development. Yet, it was only after approximately 300 years that said ideas acquired a more comprehensive form; three centuries in which humanity has been faced with the industrial revolution, two disastrous world wars and rapid technological development, whose impact on the natural and man-made environment is still visible and alarming.

In 1962, Rachel Carson publishes the book entitled “Silent Spring”, which condemns the use of pesticides and other toxic substances in crops, while in 1968, Paul Ehrlich readdresses the issue of the planet’s overpopulation in his book entitled “The Population Bomb”. This ever-increasing of certain scientists, but also certain leaders as well, leads to the United Nations Conference on the Human Environment, held in Stockholm, in 1972, which went down in history for the radical speech of India’s prime minister, Indira Gandhi, who pointed out a connection between high poverty levels in the world and the degradation of natural environment, putting the blame on developed countries for exploiting the natural resources of developing states in order to serve their own interests.

In the same year, an innovative organization by the name Club of Rome publishes the book entitled “Limits to Growth”, which associates ecology with economy in the demographic growth for the first time, thus providing an early definition to the notion of Sustainable Development.

The first official conference on Sustainability was accomplished by the World Commission on Environment and Development, also known as the Brundtland Commission, in 1987, which resulted in the study entitled “Our Common Future”, which established the definition of Sustainable Development as known to this day:

“[sustainable development] is development which meets the needs of the present without compromising the ability of future generations to meet their own needs”. Simultaneously, the notions of intragenerational (within the same generation) and intergenerational (between different generations) justice began to emerge.

Meanwhile, since the 1970's, the first green parties begin to appear in New Zealand and Great Britain, while the German Greens' party (Die Grunen) is founded in 1980, a party that managed to enter the Federal Parliament in 1983. In 1993, the European Federation of Green Parties was established, and eleven years later, in 2004, the European Green Party (European Greens) was also established.

In the years that followed, a series of conferences as well as international agreements marked the dialogue revolving around the environment and sustainable development. First of all, it is worth mentioning the Vienna Conference of 1985 and the subsequent Montreal Protocol of 1987 concerning the substances that deplete the ozone layer.

The Vienna Convention for the Protection of the Ozone Layer is a non-binding international agreement adopted for the purpose of tackling the issue of stratospheric ozone. The convention was under negotiation between 1981 and 1985 and thus far it has been ratified by 193 states. The protocol that came out of the Vienna Convention, the Montreal Protocol, was issued in September 1987 and it determines a framework for the reduction of ozone-depleting substances (ODS) production and consumption and binding obligations for the states that ratify it.

The Montreal Protocol entered into force in January 1989 and, since August 2008, it has been ratified by 193 states. The parties to the Protocol continue to convene on a yearly basis. Moreover, the parties to the Vienna Convention hold a meeting every two years, in order to assess the progress in meeting their obligations and to examine certain which need to be resolved.

Moving on, it is worth mentioning the United Nations Framework Convention on Climate Change (UNFCCC), which is an intergovernmental treaty adopted for tackling the problem of climate change. The convention, which designates an agreed framework in response to the issue, was negotiated from February 1991 to May 1992 and was open for signature in June 1992, at the United Nations Conference on the Environment and Development (UNCED) – also known as the Global Earth Summit in Rio. The UNFCCC entered into force on March 21<sup>st</sup>, 1994, and ninety days later, it was ratified by 50 states. Up to December 2007, it had been ratified by 192 states.

The parties to the Convention continue to meet regularly in order to assess the progress of the implementation of the obligations arising from the Convention, and to look for any further measures for handling the threat of climate change. The parties have also negotiated a protocol as a result of the Convention. The Kyoto Protocol was adopted in December 1997 in Kyoto, Japan, yet further discussions were required (1998-2004) for the finalization of certain details in the agreement.

The Protocol establishes the obligation for industrial countries and countries of the former Soviet Union (collectively referred to as “parties to Annex I”) to reduce their greenhouse gas emissions by an average rate of 5% for the period 2008-2012 in comparison with the 1990 levels. However, according to the terms agreed in Kyoto, the Protocol is to enter into force solely following its ratification by 55 states-parties to the UNFCCC, and on condition that these 55 states include a sufficient number of Annex I countries, so that at least 55% of the total carbon monoxide emissions for the reference year 1990 is represented thereby.

In spite of the fact that the state with the highest total greenhouse gas emissions, the United States of America, rejected the Kyoto Protocol in 2001, following the election of President George W. Bush, the majority of the rest of the states under Annex I, including Canada, Japan, and European Union states, did ratify the treaty. In November 2004, the Russian Federation ratified the Protocol, too, and thus the 55% threshold was reached. The Protocol began to produce effect as a legally binding document on February 16<sup>th</sup>, 2005. Up until December 2007, the Protocol had been ratified by 177 states, including Annex I countries which represent 63,7% of the greenhouse gas emissions under Annex I in the year 1990.

In the context of the United Nations Convention on Climate Change, and more specifically, of the 15<sup>th</sup> Summit of its states-parties (COP15), it is worth referring to the Copenhagen Agreement and the Cancun agreements. For the purpose of preventing the hazardous human interference in the climate system, these agreements propose that the level of increase in the planet’s temperature shall be lower than 2 degrees Celsius up to 2050, in the framework of sustainable development and combating climate change.

2000 was the year when the United Nations Millennium Development Goals were signed, and 2015 was set as the deadline for their achievement. Said goals were accompanied by the states’ commitment towards the adoption of certain measures for the reduction of extreme poverty, famine and inequality, the eradication of diseases and the reduction of mortality rates, particularly in regard to children and women, the safeguarding of primary education for everyone and the achievement of homogeneity

of both genders in education, the integration of the principles of sustainable development in the programs of all states, the protection of natural resources and the access of all people to drinkable water, as well as the achievement of global cooperation for development.

A few days later, in 2005, the UN World Summit acknowledged the existence of three pillars, whose harmonious coexistence forms the basis of sustainability: the economic, environmental and social pillar.



**Figure 2 - Source: <http://www.oryktosploutos.net/2010/06/blog-post.html#.VSL1gNysWSp>**

It is noteworthy that in 2011, the global population reached 7 billion, marking an increase by one billion in just 12 years. Meanwhile, in the same year, the UN Climate Conference that took place in Durban, South Africa, resulted in a last-minute agreement for a commitment regarding the reduction of greenhouse gas emissions in certain developed countries. The goal was to reach a complete agreement by 2015, which would enter into force by 2020, while in the meantime, the precise legal nature of this agreement would also have to be determined.

In 2012, 20 years after the Earth Summit, the Rio +20 Conference took place, at which the global community was required to ensure the existence of an agreement of shifting the world economies towards sustainability. The most recent development has been the 20<sup>th</sup> Session of the Conference of the Parties on Climate and the 10<sup>th</sup> Meeting of the Parties to the Kyoto Protocol, both of which were held in Lima, Peru, in December 2014.

Unfortunately, the long-standing and repeated efforts of the global community towards the implementation of precisely this necessary harmony have not borne fruit to this day in the form of a legally binding agreement on climate change. The hope now lies in the upcoming 21<sup>st</sup> Conference on Climate, which is to be held in Paris, in December 2015.

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## ***Sustainable Development and the Environment***

***Lampridi Maria, Lamprinaki Viktoria-Vasiliki, Ongari Aikaterini***

Sustainable Development is unbreakably connected with the environment. Since humans have a direct need of the environment for all their activities, its protection and proper management are the most important subjects that occupy the international community's agenda. Henceforth it has become obvious that beyond the big growth of human societies a big destruction of the planet has befallen also.

The importance of prudent management of natural resources, even though it is a factor that seriously influences the human growth, came relatively recently at the limelight. It began to be presented in the bibliography from 1990 although it had been mentioned from Malthus around 1798. For the most part of the human history the Earth was considered to have inexhaustible natural resources, capable to satisfy the needs of people forever.

The viability of environment concerns the environment (artificial and natural) as ecosystem. Ecosystem is a system that includes the biotic and abiotic factors of a region, as well as the interactions that exist between each other. Therefore the resistance of the ecosystem in changes and his adaptability is studied. Depending on the results of each study the suitable management plan for the ecosystem is selected. The resource allocation should be done based to their availability but also with regard to the needs of his members.

Attention should be paid not only in the process of production but also in the use of various sources of energy and natural resources. Equally important are as well the consumption outputs and the waste of each process. The rhythm of these two interrelated processes constitutes an important factor for the smooth operation of each ecosystem.

Apart from the interest for the correct use of environment in order to cover the human needs, sustainable development is also concerned with the protection of environment with the aim to leave it in a good condition for the future generations. The Earth is considered a closed system, that is to say it has a certain number of resources to use, thus the needs of its residents should be covered with caution without wastefulnesses so that the future ones are also capable to cover theirs.

An environmental ecosystem however is more vulnerable to changes than a social or an economic system. So it becomes clear that the economic growth, and consequently the social, has limits that are determined by the finite environment of the planet. Balance is achieved via sustainable development, because it combines these three systems and finds the optimal solution that will give the best possible result without disturbing the balance of each one separately.

Any policy towards sustainable development of the environment is controlled with environmental indicators. The indicators are decided with international collaboration and are widely acceptable. They can be adopted in anyone sector of the state or global level governance. There are indicators concerning water, land, air, various natural resources and waste. They are separated in qualitative, that describe the actions and their results, and quantitative, who deal with the numerical measurements of the involved quantities.

The environment constitutes one of the three pylons of Sustainable Development and perhaps, until some level, the base for the growth of the other two. Hence it is certain that the need of his protection and his prudent management are of critical importance if we want our growth, both social and economic, to lead us to a better future and not to destruction.

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## ***The Social Dimension of Sustainable Development***

***Kallithea Melliou***

The development and prosperity achieved by markets and economies in the framework of globalization throughout the past seventy years did not only lead to environmental degradation, but they aggravated social problems as well, such as extreme poverty and the complete deprivation of basic goods, which plague millions of people on our planet. Thus, ever since the second half of the twentieth century, it has become widely perceived that economic growth, social development and the protection of the environment are in constant interaction with each other, and the global community acknowledged the significance of achieving all three of these aims in a balanced manner, in order to ensure a form of long-term development on international level, whereby all present as well as future generations are to enjoy a decent living. This goal is identical to the essence of the principle of sustainable development.

In the context of the dialogue regarding sustainable development and the three pillars it comprises (economic, social, environmental), it is observed that, even though tracking all kinds of social problems appears simple, that is not the case in regard to the potential remedy for such problems, in that the elements of the social pillar of sustainable development are concepts filled with a very broad content, which can be subject to various interpretations.

Social sustainable development requires in principle the existence of equity and social justice. In this context, the fair redistribution of social goods and life chances is deemed an indispensable need, not only at national and international level, but also at the intergenerational level, in order for all citizens of the world, without discrimination, to have equal opportunities at survival and the development of their personality. This notion of equity comprises a broad spectrum of policy sectors, both in the form of important provisions, such as clean and drinkable water, food, labour, education, shelter, basic medicine and a clean environment, and in the form of relevant legislative reforms, in states where the latter are absent, with the aim of promoting freedom and combatting discrimination based on gender, race, religion and various other factors.

Social justice, however, does not seek to eradicate social inequalities solely as a purely social measure, but it also presents certain environmental dimensions, since socially and economically vulnerable groups of people are more prone to

environmental problems, while they are unable to respond to sustainable development requirements of environmental nature precisely due to their economic distress. It is worth mentioning indicatively that pollution and the effects of climate change, such as extreme weather conditions, have a disproportionate and stronger impact on people of low income and people living on the threshold of poverty, while they exacerbate inequalities, as economically vulnerable groups tend to live in marginalised regions, and possess fewer means of defence against environmental disasters. Respectively, the fiscal measures imposed as a means of tackling climate change, such as raises in energy prices and energy taxes, may deepen poverty levels, while achieving the opposite result to the one they aim at, since low-income households turn towards fuel resources with higher carbon content, namely to non-environmentally friendly solutions. Therefore, the social dimension of sustainable development, and particularly the principle of equity, stresses the need for providing help to said vulnerable groups, in order for the latter to adjust to the consequences of climate change (e.g. the provision of suitable technology to strongly affected countries and regions), and moreover, for their protection from fiscal measures which aim at tackling climate change, yet bear severe consequences for these groups.

Going back to the definition of sustainable development, we can further observe that the global community is required to safeguard both intragenerational and intergenerational equity. The ancient Indian proverb, according to which “we do not inherit the Earth from our ancestors – we borrow it from our children precisely conveys the sentiment of responsibility towards the following generations, which will have to tolerate in the future the impact of the actions of the present generation on the environment and the climate, as a result of the current economic growth. It is therefore deemed necessary that environmental and economic resources be handled in a manner that simultaneously responds to the provision of welfare to the non-privileged members of the present generation, as well as to the commitment towards future generations, through the adoption of measures such as the dissemination of technological solutions worldwide and the reduction of consumption.

Despite the fact that quite takes up the largest part of the social dimension of sustainable development, it could be held that the realization of this dimension depends on some additional components of the social pillar, which are inextricably linked with each other and whose common denominator is the active role of society. Social cohesion, for instance, has been characterized by the Organization for Economic Co-operation and Development (OECD) as a major social index with various meanings<sup>i</sup> and a dominant role in the sustainable development policy of the European Union, while it is also connected to the need for enhancing the participation of individuals and groups in decision-making procedures for the achievement of

environmental goals. Furthermore, the realization of social justice and sustainable development requires informing and raising awareness of the public on sustainability issues, through the support of every competent actor<sup>ii</sup>, in order for citizens, enterprises and states to shift towards alternative and sustainable forms of consumption, while simultaneously complying with the environmental legislation in force.

In conclusion, it is observed that the social pillar of sustainable development is in constant interaction with the other two pillars, the environmental pillar and the economic one, while, at the same time, each of them is underpinned by the need to ensure intragenerational as well as intergenerational development. The interpretation of this social dimension may vary from state to state and from region to region, yet, the comparative study of such varying perceptions, in the light of the particular social, economic and environmental problems with which said states are faced, could lead to the adoption of measures having a broad scope of implementation and a greater degree of effectiveness.

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# ***Basic Economic Principles of Sustainable Development***

***Konstantinos Karanikolas & Bakali Areti***

When Brundtland Commission defined sustainable development as “*the development that meets the needs of the present without compromising future generations to meet their own needs*”, included one of the most crucial and most influential sector in the entire world, the economic one.

Economy is a mechanism that surrounds every action we do and facilitates our everyday lives by making transactions easier, more efficient and more direct. Technology’s radical development has contributed the most to the connection of the global economy, as nowadays markets are strictly interconnected with the constant expansion and reaching ability of the Internet.

Economic theory states that people devote themselves into maximizing their utility deriving from the consumption of products and services (nutrition, clothing, transportation, healthcare, insurance, education, etc.). One of the most fundamental elements of the economy that defines every action is definitely the element of time. Time, not only surrounds every aspect of the global economy, but steadily and gradually makes money to lose its value in the depth of the ages (discount).

The major issue with the combination of time, global economy and sustainable development is that economies do not use resources efficiently. Current resources will lose their value in the long-term according to the discount rate of time. On the other hand, by establishing a conveniently low discount rate will eventually result in the provision of equity to future generations to come.

Furthermore, scarcity consists of one of the most essential economic principles of sustainable development. Scarcity of the earth’s resources makes it essential for the economies of the world to discover the optimum level of consumption and exploitation of the available resources. As the Italian economist Vilfredo Pareto stated the concept of the level of optimality, as *a state of the allocation of the resources in which it is impossible to make anyone individual better off, without making at least one individual worse off*, and as a result the term “Pareto Optimal” was named after the famous economist.

In addition, economic sovereignty at an individual and national level is one vital principle in order to achieve economic sustainability. People and nations must have

personal and national economic sovereignty correspondingly and should focus their efforts on not to be entirely dependent to excessive borrowed money, which decreases their economic future fertility.

Moreover, in order to cope with the perpetual adjustments in the entrepreneurial environment, as long as with the continuous alterations in the environmental business framework, companies should conduct an environmental assessment.

Moving towards environmental and social responsibility, many assessment tools have been developed to facilitate economy's transition to a more sustainable model, such as Cost-Benefit Analysis (CBA), Environmental Impact Assessment (EIA) and Life Cycle Assessment (LCA). The first two methods apply mainly to projects and programs, while LCA is used to examine the impacts of a certain product.

Cost Benefit Analysis is a tool for decision making that basically records all benefits and costs of a project or program and then, compares them. The origins of this method are found in the 1930's in USA, where such assessments were made for public projects. Its use expanded in Europe and the rest of the world in the 1960's. Nowadays, CBA is widely used and in many cases, it is required for the approval of large-scale projects.

The basic purpose of this method is the quantification of all types of costs and benefits and their expression in monetary terms. The expression of all values in money, as the unique unit of measurement, makes possible the aggregation of benefits and costs and allows for direct comparison. Based on welfare economics, CBA compares social costs and social benefits. It is difficult, though, to assign a price to non-commercial goods, especially environmental benefits. Moreover, some people disagree with the pricing of environmental attributes, as they believe that attaching a monetary value to nature underestimates its true value. Nevertheless, the supporters of CBA claim that even in the case of underestimation, it is better to include environmental and social costs and benefits in the analysis than not to take them into account at all.

Last but not least, one of the most essential terms in environmental economics is "externalities". Externalities express the impacts of an economic agent's (person, business, organization) decision on the external environment. These impacts, whether positive or negative, are not usually taken into consideration by the agent. For example, a negative externality is the pollution of a river from a factory's effluents. The pollution of the river affects both the natural environment and the society, because it could prevent uses of the river, as recreation site or resource of fresh water.

These impacts represent costs of the factory's production, but they are not reflected in the production costs and, consequently, in the products' price. As long as this externality is not taken into consideration, the society is burdened with its cost. In addition, a case of positive externality is the pleasure someone derives from the neighbor's garden.

As it is widely known, the level of production of a certain good is determined by the law of supply and demand. When negative externalities exist in this market, the cost of the product is lower than its social cost and thus, the market operates in a sub-optimal level. In order to achieve efficient allocation of resources, these externalities must be mitigated as possible. This could be accomplished by direct government intervention, in terms of environmental legislation, taxes etc. or by indirect intervention, in terms of raising awareness and increasing public pressure.

To achieve global sustainability, economies all around the world should cooperate under the umbrella of sustainable development. Economic growth should be reconsidered at an international level, as countries exceed the carrying capacity of the planet at the time being.

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## ***Environmental Policy and Governance***

***Charoula Melliou***

Environmental Governance is a notion of Political Ecology and Environmental Policy that affirms Sustainable Development as the primary principle for the management of the entire human activity – political, social, economic and environmental – as a single system. Moreover, it establishes a standard of consultation and governance that requires the contribution of all actors of governance, which unfolds in multiple levels, i.e. locally, nationally, internationally/globally. There are basically three such actors; the state, the market with the enterprises, and the civil society, among all of which there is continuous interaction.

The importance of the right and fair Governance in Sustainable Development is major, given that it can ensure a development that would simultaneously be in the benefit of man and the environment. Such a type of governance must include processes, decisions and outcomes appropriate to maintain the natural resources, to eradicate poverty and to ameliorate the quality of life. Certainly, it requires high levels of transparency as to the recording of use of public resources, the decision-making process and the provision of services, while the broadest possible participation of civilians in the formulation of policies is also required. The procedures that realize this governance are profoundly democratic and reliable, and the entire policy is shaped in the long run, by long-term programming and planning, a fact that highlights the intragenerational character of Sustainable Development.

In particular, Environmental Governance regards natural resources and the environment as public goods, from which everyone benefits, just as it happens with the atmospheric air that we breathe. As public goods, apart from their non-rivalrous (the enjoyment of the good by someone does not prevent the enjoyment of the same good by someone else) and their non-excludable (no one can be excluded from the enjoyment of such a good) character, the aforementioned goods also have value, since they cover needs.

Environmental issues do not have borders; they are global. This reveals that their resolution cannot take place solely on state or local level. International cooperation is required in order for such issues to be tackled effectively. Such cooperation must be simultaneously horizontal – with the involvement of international, continental, national and local governments – and vertical, in order to cover cooperation on state, international economic institutions and non-state and private initiative level.

Undoubtedly, states are the ones that exercise sovereign policy and can implement the principles of Sustainable Development. Cooperation between and among states is expressed through International Treaties, and in particular through International Environmental Treaties, since we are dealing with Environmental Policy. In order to achieve an agreement having legally binding effect, time-consuming negotiation, signature and ratification procedures are required, and, in reality, the states quite often do not reach even a simple, non binding agreement, due to conflict of interests. However, it is worth noting the following, in regard to what happens in case an agreement is reached in the end.

International Environmental Treaties set the goals which must be achieved in relation to certain environmental problems. From that point on, it is up to the governments to fulfill their commitments by implementing specific policies as deemed appropriate to meet these objectives. There is a large array of policies and measures that governments can employ in order to create motives for climate change mitigation. Such policies and objectives include legislative and tax measures, measures and means based on the market (a characteristic example is emissions trading through a system of tradable permits), as well as voluntary agreements between the public and private sector.

International Cooperation for the environment may also have the form of international economic governance, in such a manner that it can bring together international economic organizations for the resolution of environmental issues. It is generally admitted, though, that the relationship between the actors of economic globalization, on the one hand, and the environment, on the other hand, raises multiple doubts in regard to their compatibility.

The three major international economic institutions are the World Trade Organization (WTO), the World Bank (WB) and the International Monetary Fund (IMF). All three of them were established at the Bretton Woods Conference. (The WTO was founded in 1995, yet it constitutes a follow-up to the General Agreement on Tariffs and Trade (GATT), which was adopted at the Bretton Woods Conference and entered into force in 1947). Amongst the objectives of these institutions are the regulation of world trade, the reconstruction of countries, the provision of help and funds towards growth and the monetary and financial stability.

As far as trade is concerned, we shall note that, in principle, trade is in constant interaction with the environment, as trade, as well as all sectors of the economy, is affected by the consequences of climate change, while it also enhances the production

of emissions due to the extensive use of means of transportation. On the other hand, however, it may contribute to the adaptation and the restriction of the environmentally harmful consequences of the contemporary way of living and production models, primarily through the diffusion of efficient practices, products and technologies towards the prevention of climate change, as well as through the promotion of a more effective distribution of world resources.

The WTO is an important factor in the development of international cooperation, as it provides a platform of rules and principles, which regulate and facilitate world trade. Said platform simultaneously constitutes the framework of cooperation towards the resolution of environmental issues as well. This happens, quite simply, because the measures taken by national governments, in order for them to tackle climate change, may take the form of market policies, as previously mentioned, and treaties. A state imposing limitations to trade in relation to other states may create an issue of breach of the WTO treaties. Subsequently, the WTO treaties may now be formulated in such a manner, in that they incorporate environmental provisions, which shall acquire a legally binding nature, by virtue of the trade agreements, and not constitute mere recommendations.

Things are slightly different regarding the World Bank and the IMF, as these have been harshly criticized in regard to the manner in which they elaborate their program and implement their policies, especially in the light of the social and economic impact of the policies they adopt in countries that are under an economic assistance program led by these institutions. Furthermore, the loan terms imposed upon lending countries raise particular concern as well.

In spite of all the questions that may arise in regard to the legalization, responsibility and effectiveness of these institutions, since economic governance organizations have the means and the economic potential, they shall constitute the major factors in the effort to promote world environmental governance and the establishment of the principles of Sustainable Development.

Certainly, the field of international environmental policy requires the broadest cooperation possible between actors at a global level, while it provides fertile ground for the enhancement of various non-state/non-governmental or private forms of governance. On the one hand, there are enterprises, which, as will further elaborated in a following chapter, take part in the establishment of Sustainable Development, through the promotion of the Corporate Social Responsibility principle and the voluntary implementation of programs and systems verifying and ensuring

environmental management and efficiency, such as the ISO 14001 standard, but also by means of eco-label systems.

On the other hand, there are Non-Governmental Organizations (NGOs). These Organizations spread their activity at national, international or interstate level, and they may operate either in the form of powerful multinational networks of organizations, by which they essentially struggle for the protection of the environment, action against climate change, humanitarian action, the protection of human rights and the protection of consumers' rights, or in the form of multinational movements, as are, for instance, various social fora. NGOs cooperate with the Civil Society, together constituting the global public.

Non-governmental governance clearly offers the benefit of knowledge and specialization, by which businesses and NGOs can contribute to the dialogue concerning the environment and the implementation of policies for Sustainable Development. The role of said actors is to collaborate with the other actors of governance mentioned herein towards establishing a more coherent and effective environmental policy.

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# ***The Role of the Enterprise in Sustainable Development: Corporate Social Responsibility***

***Charoula Melliou***

Nowadays, factors such as globalization, the rapid developments in Information and Communication Technologies, the influence of consumers and Non-Governmental Organizations, politics, morally questionable advertizing, a large number of fraud cases, and the restriction of labor rights, as the latter had been attained and formulated over the past decades, are all elements which, on the one hand, justify the criticism exercised upon companies already since the beginning of the twentieth century, and on the other hand, altogether continue to compose the new sociopolitical and economic framework that imposes upon enterprises and organizations the obligation to reassess their role and obligations within society.

The 21<sup>st</sup> century finds the enterprise in the core of challenges for Sustainable Development, since the majority of economic activities take place in the context of the operation of big and small companies, but also because businesses determine to a great extent the choice of technologies and the intension of use of resources of the aforementioned economic activities. Particularly in regard to small and medium enterprises (SME), these companies are called upon to survive in an ever-demanding economy in times of recession, and at the same time, to contribute to Sustainable Development in the region of their activity as actors of economic activity. Such enterprises constitute the driving force of the economy in regard to entrepreneurial innovation, competitiveness and employment, especially if we consider the fact that in Greece, SMEs occupy the first place in number, as well as in labor employment.

All of the above led to the development of the idea of Corporate Social Responsibility (CSR), which has drawn increasing attention in the past couple of decades, even though many scholars have underlined the obligations of entrepreneurs towards society already since the 1960s. Despite all the attention focused on CSR, due to its complicated nature, there is no commonly accepted definition of the term. In any case, CSR can be defined on the basis of the elements that this notion comprises. Thus, in the framework of CSR, the business world commits to contribute to sustainable economic growth and the enterprise commits to operate in a manner that responds or even transcends the moral, legal, commercial and public aspirations of society through the voluntary taking of policies and measures (exceeding the requirements of legislation, while not being limited to donations and sponsorships) on its behalf for the purposes of social prosperity, the amelioration of the quality of life,

the protection of the environment, in collaboration with the employees, their families, and the local and broader community, and all that through a systematic and strategic approach. Enterprises are obliged to introduce environmental and social criteria, beyond economic results or the quality of the products and services provided, thus guaranteeing long-term entrepreneurial development. To that end, the respect of labor rights, the health and security welfare for the employees of the enterprise, and the constant training provided to employees hold a major role in the concept of CSR.

CSR may be the subject of theoretical approach in two ways: either through the idea of Sustainable Development, or through the Stakeholder Theory. In regard to Sustainable Development, as has already been mentioned in previous chapters, the Brundtland Commission defined it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The notion of Sustainable Development is based on the harmonious coexistence of three pillars: the economic one, the social one and the environmental one. CSR, therefore, constitutes the representation of Sustainable Development in corporate practices. As far as the Stakeholder Theory is concerned, we shall point out that by means of CSR, a company must take into consideration and focus on all stakeholders that are affected by its activities, be that its internal environment, namely its entire workforce, or the external one, namely consumers, customers, suppliers, shareholders, international organizations, trade unions, non-governmental organizations, the public and state sector, academic institutions, the mass media, et al. At the same time, CSR is closely linked to two more notions – movements; Business Ethics and Corporate Governance.

The implementation of the CSR principles and framework undoubtedly offers many advantages. First of all, the enterprise’s public image and reputation are improved and enhanced. All issues concerning the enterprise at any given time are approached, assessed and managed in a more systematic manner that helps achieve the most efficient and effective resolution of any arising problem or risk, as well as the best communication and collaboration possible with all stakeholders. Relationships of mutual trust and benefit are built both on the inside (with employees) and on the outside (with suppliers) of the organization, through the fruitful exploitation of healthy alliances, a factor that leads to an increase in productivity and ensures a competitive advantage for the business. Last but not least, compliance with the regulatory framework regarding the protection of the environment, labour rights and the provision of information, as may be effective from time to time, is significantly facilitated.

In the era of Sustainable Development, enterprises *are the ones who bear the responsibility* for their own impact on society, while it is certain that the sustainability of an enterprise, an organization, goes through the environment.

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## ***Sustainable Development and Tourism***

***Karanikolas Konstantinos***

Currently we live in an advanced world, which is dominated by several ideologies, many of which drive the market forces all around the world and stimulate decisions that have to do with personal ambitions and tangible needs. This short-term thinking is preserved for hundreds of years in the international tourism sector and this is the kind of thinking that very often destroys our natural environment. The efficiency of production is often, if not always, achieved to the expense of the natural environment, by destroying biodiversity and bringing catastrophic consequences in the long-term. Wilderness and natural regions, despite being in decline in quantity and quality, tourism activity in these areas is increasing significantly. On the other hand, tourism is a sector that comes along with a lot of criticism, as it is the main reason why these natural areas are at threat of being entirely destroyed. Tourism is strictly dependent on the existence of the natural environment, as it is on human environment.

Nowadays, tourism is completely dominated by the spirit of consumerism, which states that “big is always better”. According to that statement, tourists are at a constant pursuit of the biggest, cheapest and more impressive and unique experiences. It is impossible to develop such a product and at the same time support the natural environment in a region, its culture, lifestyle, its social and economic ecosystems, so that is the main reason why an alternative form of tourism had to be developed, in order to consider these important issues. One of these alternative forms of tourism that has been developed is sustainable tourism.

Sustainable tourism, as a term arose in the latest decades, as a result of the realization that tourism sector was in need to understand that sustainability practices were a direct obligation towards the community and its cultural values. According to the United Nations World Tourism Organization sustainable tourism can be defined as: *“tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and the host communities.”*

Sustainable tourism’s principles and practices can be implemented in every type of tourism, no matter if it is massive tourism or other niche tourism products. Sustainable tourism takes into consideration the balance between the three pillars of sustainability, which are the economic pillar, the social pillar and last but not least the environmental pillar and the relationship among them.

Therefore, according to UNWTO, sustainable tourism has three core functions:

- Making “*optimal*” use of natural resources, what are essentially and direct prerequisite of the development of tourism activity, managing vital environmental processes and support the heritage and the destination’s biodiversity.
- Respecting the local community’s traditions and ethical values, its “*sociocultural authenticity*”
- The prosperity of all stakeholders of the local community should be fairly distributed and the development of operations of sustainable tourism in a region should include “*stable employment and income-earning opportunities and social services to host communities and contributing to poverty alleviation*”.

Sustainable tourism, due to the heterogeneity of the tourism product itself, requires constant and strict cooperation of the local stakeholders and needs their consistent participation. In order to deal with several emerging issues inside the host community, the government should raise the awareness of its citizens about the central issue of sustainability and introduce several practices in order to improve the living standard of the host community and at the same time preserve its culture and ethical values.

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## *Cooperations and Sustainable Development*

*Giorgos Goniadis*

In recent years there is a new interest for cooperatives and their role and impact, as businesses, on the society and the environment, from various international organizations, especially from the United Nations. This tendency shows that cooperatives can play a very important role as a business model especially during turbulent economic times such as the economic crisis that started in 2007.

Cooperatives have a specific approach to business, which differentiates them from other economic enterprises. Even though they do not seek the profit maximization, they do not act in the framework of charity; they provide services in a certain context. More specifically, they are “*democratically owned and controlled by the people who benefit from them and are operated collaboratively for the purpose of providing services to these beneficiaries or members*”.

According to the United Nations, the world is facing serious threats concerning the food supply, especially taking into account the fact that the global population in 2050 will rise to 9 billion. In addition, the threat is becoming more evident considering the occurrence frequency of extreme weather phenomena, energy scarcity and various regional conflicts. A solution that is oriented to this direction is the local food framework that cooperatives promote. According to Feenstra, local food or the local food movement is a “*collaborative effort to build more locally based, self-reliant food economies - one in which sustainable food production, processing, distribution, and consumption is integrated to enhance the economic, environmental and social health of a particular place*”. Therefore, cooperatives by definition can play an important role in these global efforts for sustainable food production and distribution. In general, cooperatives can promote sustainability in various ways, since their nature is based on values and principles that directly or indirectly promote sustainable development.

There are six values that demonstrate the orientation of a cooperative as defined by the International Cooperative Alliance (ICA). Cooperations are based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity. These values promote, within the market, honesty, openness, social responsibility and caring for others. The value base of cooperatives may be considered as a significant comparative advantage, since these values are incorporated in their statutes as well as in their governance through a legal framework.

Cooperatives are following the economic democracy principle in their organization. Economic democracy means that people should have the right to take decisions, concerning economic issues, which affect their life in a direct way. In the framework of cooperatives, this principle is translated as the right of people who work within it, to participate and make economic decisions, that will affect the cooperative or in general the local community. To further develop the idea of economic democracy and its effects to local communities, it is evident that local communities have the ability to deal more effectively with local economic problems compared with national governments or large businesses, due to their proximity to the source of the problem, the better understanding of it as well as its smaller scale.

Moreover, cooperatives are based on seven international principles (Voluntary and Open Membership, Democratic Member Control, Member Economic Participation, Autonomy and Independence, Education - Training and Information, Cooperation among Cooperatives, Concern for Community) that strengthen their operational framework towards society.

This value – principle scheme of a cooperative has additional positive effects on various aspects on the three pillars of sustainability. For example, cooperations develop an engaged workforce while they give higher opportunities not only to their employees but also to their customers and their stakeholders to engage in the running of the business. These opportunities permit to communities and various social groups to take responsibility and act accordingly in order to fulfill their needs and promote or safeguard their social interest. As a matter of fact, the cooperative framework is encouraging its members to abandon the idea of a government introducing and enacting solutions, while at the same time is promoting a private, individual and self-driven action concerning the solutions of economic and social problems, meaning active citizenship and participation. What is more, through cooperatives, it is easier for individuals to combine their human and financial resources and raise higher capital. Additionally, many cooperatives have the tendency to assist and guide farmers, aiming at the improvement of their product quality. Not to mention the fact that through a close cooperation with farmers, a sense of security is emerged among them, since it becomes evident that any agreement between the cooperative and the farmer has a long-term perspective. Furthermore, the cooperative can raise the quality control level over the goods it purchases for members since it has the ability to negotiate directly with vendors.

There are some other ways that cooperatives can promote sustainability, according to the findings of the Expert Group Meeting organized by the Department of Economic and Social Affairs (DESA) of the United Nations in New York in 2009. The outcome

of the meeting focused on sustainability through economic security, social justice, ecological balance and political stability, which can be achieved by the contribution of cooperatives as a business model in the economy and in the society. The primary contribution of cooperatives in the promotion of sustainable development is the high importance that they put on local food distribution. Through the promotion of local food and their support to local producers, cooperatives reduce their CO<sub>2</sub> footprint since they reduce the emissions of CO<sub>2</sub> during the transportation of products. Additionally, cooperatives strive for sustainability with respect to resource and energy use. Moreover, a close cooperation with farmers creates a sense of security and trust among the contract parties while it can raise the quality control level over the supply chain of the goods it purchases for members, since it has the ability to negotiate directly with producers or vendors.

Apart from the positive environmental impacts, cooperatives have an additional positive impact to social and economical indicators. Through the promotion of local food consumption, the return of profits to local owners and its commitment to remain in the community for a long-term period by the cooperatives, promote the sustainability of the local economy, since there is a circulation of capital within the local economy, in contrast with the corporations and the private investors in a globalized economical environment. Moreover, their ability to create and maintain employment is of significant importance.

Finally, through the promotion of local food consumption, the return of profits to local owners and its commitment to remain in the community for a long-term period, promotes the sustainability of the local economy, since there is a circulation of capital within the local economy, in contrast with the corporations and the private investors in a globalized economical environment.

Nevertheless, globalization is not necessarily negative for cooperations. According to Williams, cooperatives can play a very constructive role concerning the globalization in an ideal framework. Cooperatives can not only raise the quality of life of their members and help them to survive monetary crises and economic downturns, but they can also promote intra and inter regional cooperation. Moreover, cooperation through cooperatives can be extended through the formation of legal alliances and networks across regions, nations and eventually globally. The main principle of cooperatives is to *“distribute goods and services more equitably among all its members, not to accumulate wealth for owners and share holders, they represent a more ideal, democratic, and functional globalization than has not been experienced so far—a kind of globalization from below”*.

All the above, while they can be traced separately, in a higher or lower level, in various corporates, taken together, can describe the comparative advantage of cooperations versus corporations concerning the promotion of sustainable development. Cooperatives can become a significant economic factor in a national economy, taking into consideration their comparative advantages and their sensitivity to social and environmental issues illustrated by their value-principle scheme.

Through the analysis of cooperatives and especially the case study of Bios Coop, it became evident that cooperatives have positive impacts in all the three pillars of sustainable development; social, economical and environmental, therefore they promote sustainable development. Moreover, the economic crisis is a chance for the development of cooperations since there are evident positive impacts of cooperatives on the economy and the society. More specifically in social terms, Bios Coop is creating employment directly by hiring employees for the operation of the grocery and indirectly by supporting and distributing locally produced agri-food. In addition, they require the participation of every member under a principle of “one share, one member, one vote,” and they remain relatively free of government and other outside intervention. As a matter of fact, the cooperative framework is encouraging its members to abandon the idea of a government introducing and enacting solutions, while at the same time is promoting a private, individual and self-driven action concerning the solutions of economic and social problems, meaning active citizenship and participation. Additionally, many cooperatives have the tendency to assist and guide farmers, aiming at the improvement of their product quality. Not to mention the fact that through a close cooperation with farmers, a sense of security is emerged among them, since it becomes evident that any agreement between the cooperative and the farmer has a long-term perspective. Furthermore, in terms of economy, through the promotion of local food consumption, the return of profits to local owners and its commitment to remain in the community for a long-term period, promotes the sustainability of the local economy, since there is a circulation of capital within the local economy. Moreover, Bios Coop encourages equitable distribution of resources, generates no profit for individual or group owners, and strives for sustainability with respect to resource and energy use. The primary contribution of Bios Coop in the promotion of environmental sustainable development is the high importance that it puts on local food distribution. Through the promotion of local food and its support to local producers, the cooperation reduces its CO<sub>2</sub> ecological footprint since it is reducing the emissions of CO<sub>2</sub> during the transportation of products.

Thanks to Bios Coop business organization and economic orientation, which is guided by the economic democracy and social solidarity, the cooperative can contribute in a significant level to the social integration and solidarity and can

generate regional employment, since it is distributing mostly locally produced agri-food as expressed by the data analysis of market performance from January 2014 to June 2014.

Finally, given the advantages of cooperatives, the cooperative business model will most probably play a key role in the efforts of international community to promote sustainable development, especially during instable economical conditions where classical business models fail. Even though the cooperative model provides comparative advantages, it is not a magical formula for success or a solution for social, economical or environmental problems. As every single business, it needs to focus on its values and principles while continuing the necessary efforts for further development.

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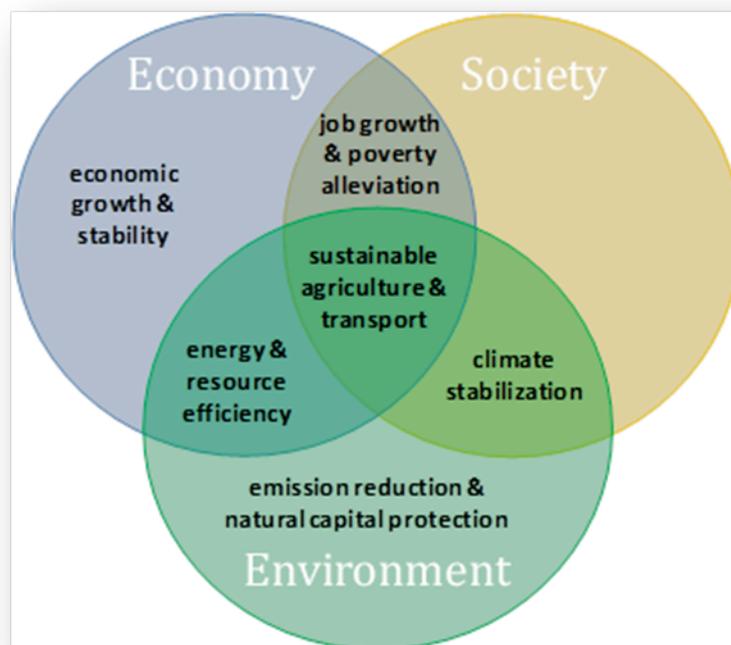
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## *The Impact of Urban Pollution in Sustainability – the Role of Citizens*

*Dimitra Mouchlia*

Despite the fact that its roots are traced back in the previous century, the term sustainable development is being extensively used day by day. Sustainable development is basically referred to the economic development that is being designed and implemented taking into consideration the needs of the environment so as it can be maintained safely in the long run. The guiding principle of sustainability is the acquisition of goods from the nature, but the three main pillars of the society, economy and environment, as illustrated in the figure below.



**Figure 3 - The three pillars of sustainability**

Today's society, in order to continue to grow steadily, requires high levels of education, justice and decent level of living for its citizens. Closely tied to the health and balance of the mankind and its activities in the urban or rural environment, has always been the controlled use of natural resources and the pollution resulting from any human action. The economic dimension of 'development' is the lever for growth since it is an indispensable element for evaluating any effort. For this reason the cost reduction activities (not only in monetary terms but also in energy units) can contribute to the maintenance of the vulnerable balance between humans and the

ecosystem. To enhance the transition to an efficient use of resources economy with low carbon emissions, decoupling economic growth from resource use and energy, it requires the following:

- reduce CO<sub>2</sub> emissions
- promote greater security in terms of energy
- the reduction of the exploitation of natural resources for the products we use and consume in order to protect biodiversity

*If everyone lived like the average American, we would need 5 planets to sustain, and if they lived like the average European (or Greek) we would need 3. In any case we have only **one**.*

The above phrase poses a question particularly to young people who had the chance to read or hear about the excessive, perhaps reckless and without worthwhile motives, consumption that characterizes modern society. The theory of the ecological footprint analysis is explaining this issue. Based on the fact that the planet has scarce and finite natural resources, this theory estimates the area of arable land and water needed for a population to produce all the products it consumes and to absorb the waste and pollutants. In practice, dividing the area of arable land and clean water by the population of the earth, what corresponds to each one of us was found. The stamp may involve one person, a building, a city or a country. Today, humanity, as a whole, consumes almost 1.5 planets. The average Greek produces 540kg of waste per year. This is equal to ~1,5kg per day, while the average American produces 2kg and in contrary the Indian 270gr daily! Even greater are differences between the 'developed' and the 'developing' countries, in terms of water consumption per capita, oil or CO<sub>2</sub> release. It is obvious that in order for the wealthy countries to have such large ecological footprints, the poor one should be limited to extremely little. It can be assumed that the rich countries “steal“ the consumption and pollution share of the poor.

1/5 of the inhabitants of the earth live at the expense of the rest 4/5. Moreover, natural disasters (hurricanes, floods) that cause climate change, mainly affect poor areas who are unable to deal with them. So, because of our "developed" lifestyle, the population of developing countries is the one who pays death, hunger, illness, immigration and poverty.

Clearly the difficult living conditions in some parts of the world should not represent an ideal point to be compared to, everyone should always strive for the best.

However, perhaps it should be a benchmark for assessing the size of the society's growth and until which point we can consume.

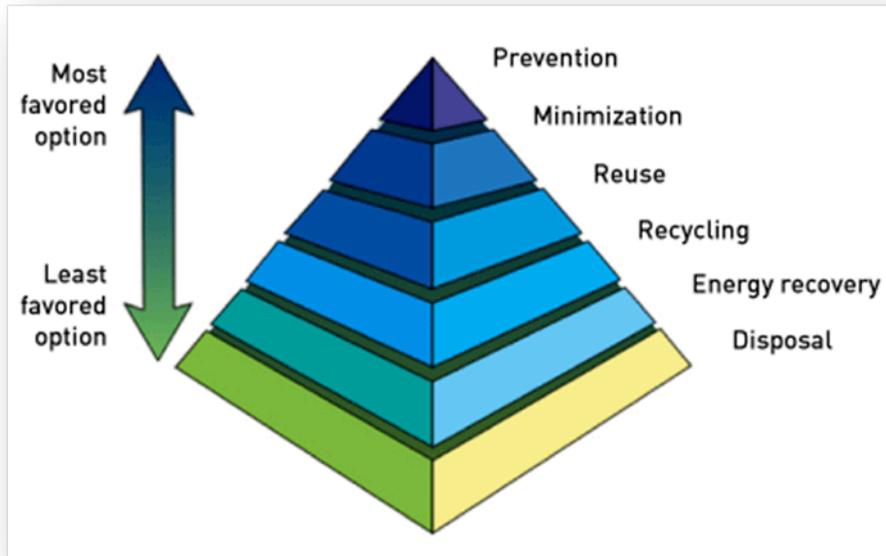
So far, rather than adapting our communities on the environment, we expected the environment to be adapted to the needs of our industry, economy and 'development'. Our greedy behavior has led to the creation of useless needs. To satisfy these needs, we have created an unlimited 'growth' on a finite planet. And unfortunately, this 'development' feeds and is fed by social inequalities which are growing intensively day by day. The need for pleasure, consumption and welfare is not reprehensible. Most of us receive pleasure from things such as excessive use of the airplane or of our car (related challenges: oil wars and CO<sub>2</sub>), our new clothes or mobile (our electronic waste travels to third world countries).

Really, do we think of our relationship with the environment when we take planes in a row or when we buy a new phone every year? Do we think about how much water, crops and farmland is being spent when we eat meat every day? Do we think how poor country people have been forced to become 'environmental refugees' when we get our car (which adds to air emissions) to drive to the next corner instead of walking?

A complex of designers, advertisers, psychologists and vendors, is working tirelessly to create new needs and desires, promoting products that have no real benefit to our soul or the environment, but are designed solely to boost our libido, or to raise our social status.

At the same time these are leading, among other things, the creation of a large volume of waste –hazardous or not- which presents a steadily rising trend (EU, 2010). And at this point the concept and the importance of “reusing” is introduced at the intersection of the two pillars "Environment" and "Economy" within the context of sustainable development, as shown in Figure 1.

Part of the European policy to achieve its environmental objectives in the short and long term future in order to reduce the environmental footprint, is the control and monitoring the waste production at the household level and industry. The EU Member States adopting the common European legislation must take measures in accordance with the Waste Management Hierarchy as shown below:



**Figure 4 - Waste Management Hierarchy**

Put simply, the hierarchy helps to determine the priorities and the best practices on waste treatment. In principal it is proposed to anticipate and avoid consuming a resource or a product when it is not really needed aiming at minimizing the garbage production of this action. Where this is not feasible, then the reuse part of the product is proposed. There are surprising different imaginative solutions for reuse. More specifically regarding the organic waste (a large part of household waste) the next less painful stage in the hierarchy is “composting” and for the other materials that can be exploited (such as plastic, paper, metal, glass) is the “recycling”. Then, from recycled materials, thanks to advanced technological achievements, it is possible to recover energy to provide electricity or heat through the technology of anaerobic digestion. As a final part of the hierarchy, and as less desired action, comes the deposition of waste in landfills. This method, although widely used in many countries has the largest ecological footprint because of emissions ( $\text{CH}_4$ ), but also it occupies a significant portion of the earth's surface as a dump instead of it to be used for creative and beneficial to the ecosystem activities (cultivation, spaces to connect with nature).

There are very good reasons that make the above route necessary to approach the balance of the ecosystem mentioned earlier. Initially reduced the volume and weight of waste going to landfill and pollute the air, soil and aquifer. It contributes to the saving of raw materials, energy and natural resources which are non-renewable (eg oil, minerals). We create "green" jobs in a period of economic and environmental crisis. Overall, recycling helps to mitigate the effects of climate change.

Surveys have shown the difficulty of social acceptance of some measures included in the EU directives, such as waste incineration plants, which is often related to the lack of awareness of the citizens (Not in My BackYard Syndrome), local political interests and inflexibility of the organizational structures of cities and regions. Specifically, with regard to organic waste there is distrust from the citizens about the actual destination of the waste collected by the Municipality. Investigations by the environmental group of the University of Macedonia confirm the existence of organized Centres for Management of Urban Residues (KDAY) where municipal solid waste after it has been collected, segregated -based on their molecular composition- is then forwarded to individual owners of industrial units of technological processing and waste utilization. The product of this process is called "recycled" material, which returns in the production process replacing the raw material and thus closes the loop, drastically reducing the depletion of natural resources. Therefore, all of us would do well to strengthen the effort of the Municipality and the related agencies, rejecting the attitude of passivity which is observed quite often. Most wraps and packaging of devices which consume can be recycled. It is valuable material to be protected and exploited and not get lost in the pile of landfill.

Another good practice, less common in Greek cities (the countryside and the periphery of course pioneers) is composting and concerns the category of organic residues.

Composting is an easy and natural way conversion of kitchen and garden waste into useful fertilizer. In composting bin we can pour fruit and vegetable residues, residues and coffee filters, tea bags, tree leaves, grass or lawn, etc. The time required for the production of fertilizer - compost is about 6-9 months.

The benefits of composting are presented below:

- It protects the environment, recycling valuable organic materials are reduced quantities to landfill (and produce methane) saves dump and water as the soil is kept moisturized.
- It saves money, freeing us from buying commercial fertilizer.
- Ensures healthy food and vegetables, keeping the soil fertile, without chemical additives.

If the EU is aiming to improve productivity and competitiveness, it is appropriate to maintain its leading position in green solutions, mainly in order to face the growing competition from China and North America. By achieving our energy goals, Europe would save 60 billion euros on oil and gas imports by 2020, something very important for our energy security and our economy.

From a financial perspective, further progress in the integration of the European energy market can increase GDP by 0.6% to 0.8%. Achieving the goal of meeting the energy needs of Europe from renewable sources to 20% can create more than 600,000 jobs in the EU, and an additional 400,000 if we achieve the energy efficiency improvement target of 20%. Of course, commitments to reduce emissions must be implemented in a way that maximizes the benefits and minimizes costs, while ensuring the spread of innovative technological solutions.

All in all the economy should become a mere tool of everyday life, not the existential reason. A market system based on sustainability -and not only on profit- would definitely help towards this direction.

But, since the society is formed by each one of us and thus the need for change is above all at individual level, let's question ourselves:

What we really need?

How much more 'development' will make us happy?

Let's start by redefining the concepts 'need' and 'want', 'need' and 'desire' and redefining the "what", "how" and "why" will be produced.

The more we procrastinate it, the more expensive will we and our children pay in the future.

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## ***Right to Environment: the principle of sustainability in the Greek legal order***

***Ellie Melliou , Thomas Psimmas***

*“The protection of the environment has a future, because without it there can be no future” (“Der Umweltschutz hat Zukunft, weil es ohne Umweltschutz keine Zukunft geben wird”).*

The above phrase highlights, in the simplest and clearest manner, the importance of the environment as a social good, which constitutes a prerequisite for safeguarding all the other goods that contribute to the evolution and survival of humanity.

We tend to perceive the environment as the natural environment in essence, namely the life bases or the natural resources required for humans to enjoy a decent living. Yet, apart from this narrow sense of the notion, the environment is also considered to comprise the natural, man-made and cultural environment as a whole; in other words, it consists of all social, political and cultural institutions which have been formulated by human intervention on natural raw materials.

Such a broad notion of the environment is also encountered in the Constitution of Greece, where the protection of the environment is symbolically recognized as a mission of the State and it is expressly established as an objective per se of state-organized action. Article 24 of the Constitution sets forth that the protection of the environment is simultaneously an obligation of the State and a right of each and every individual. The obligation of the State has a dual nature - preventive and corrective; on the one hand, it consists of taking positive measures, and on the other hand, it requires abstention from actions which could prove to be environmentally harmful. Furthermore, by virtue of the revision enacted in 2001, the principle of sustainability or, in other words, sustainable development is finally enshrined in the Greek Constitution as the need to protect the environment, not only within the current generation, but also to the benefit of the generations to come. It is worth mentioning that the regulatory scope of article 24 of the Constitution does not cover solely the natural environment – in the narrow sense of the term -, but the cultural environment as well, thus preventing the modification of the purpose of forest areas and archaeological sites.

However, apart from being a self-standing right, the protection of the natural, man-made or cultural environment also functions as a limitation on other constitutional rights, especially in regard to ownership (article 17 Const.) and economic freedom

(joint application of articles 5 par. 1 and 106 Const.). This particular apparent conflict between two or more constitutional provisions of balanced regulatory content and equal formal validity is shifted through the *ad hoc* application of the practical harmonization in favor of the constitutional right that bears greater significance in a given composition of social material, without that resulting in the subsiding right becoming inert or losing its regulatory force. The – almost unreserved – preference in favor of the right to environment lies in the indefinite number of right holders that benefit from its protection, in comparison with the finite number of the holders of an individual right (e.g. of a proprietor or an entrepreneur).

The legal right to environment, in its capacity as a collective good and a common legacy belonging to everyone, operates as a privileged field, wherein the duty of social solidarity (art. 25 par. 4 Const.) materializes, not only towards the present, but also towards the future generations (“intragenerational” and “intergenerational justice”). According to the definition adopted by the World Commission on Environment and Development in 1987, sustainable development is “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Consequently, the right to environment exceeds the traditional tripartite distinction of constitutional rights into individual, political and social ones, as it concentrates certain traits which are simultaneously particular to an individual right (abstention from harmful actions), a political right (collective right, participatory aspect of the personality of *homo politicus*) and a social right (implementation of positive measures for the amelioration of the natural and cultural environment). Therefore, we could as well characterize the right to environment as a third-generation right or a mixed right.

It is not mere coincidence that, prior to the financial crisis which severely hit our country in particular, the right to environment functioned as a rather popular specialization of a vague legal concept, the general clause of the public interest, within jurisprudence. Nowadays, unfortunately, the concept of general or public interest is predominantly interpreted in relation to the cash or financial interest of the State, and much less so in harmony with the protection of the biosphere and the constitutional principle of sustainability.

Despite the fact that the protection of the environment has faded, the principle of the environmental *acquis* (Council of State, Plenary Session, Decision No. 10/1988) remains an ever-topical issue and a persistent demand. The environmental *acquis*, as a special dimension of the principle of legitimate expectation in the field of environmental law, consists in making every possible effort, in order to avoid any

further deterioration of the environment, so that, even if its amelioration is not possible, at least its existing *status quo* remains intact.

The formation of free and responsible citizens, who, aside from the rest of their political, moral and legal duties, care first and foremost for the preservation of a sustainable environment for themselves and others, is served by the dominance of the principle “the polluter pays” in the field of environmental law. Based on this particular principle, the cost for averting or restoring environmental damage is to be incurred by the polluter himself, and not by society as a whole. Thus, entrepreneurs are obliged to incorporate the pollution cost within the production cost of their product, and, pursuant to the principle of proportionality or environmentally friendly development, they must choose the most environmentally friendly and least environmentally harmful production methods.

Last but not least, we must not disregard the fact that, even though environmental law is gaining ground as an autonomous field of special administrative law thanks to its progressively increasing significance, it is a legal field that does not cease to touch upon the surface of both private law (as an aspect of the right to personality enshrined in articles 57 and 59 of the Greek Civil Code) and public law (since environmental law provisions are incorporated in legislation covering land and urban planning). The environment, therefore, constitutes a paramount good, to which all of us are entitled, and which we are all obliged to safeguard both for the present and for the future, both as separate individuals and collectively as society.

In conclusion, it could be said that, year by year, the right to environment in Greece is enshrined in a more substantive way, since the members and groups of society are able to perceive more deeply the role performed by the protection of the environment in conjunction with the other two pillars of sustainable development – economic development and social prosperity. In this context, the current attempts of linking legislation on the environment to developments in the field of natural sciences promotes interdisciplinarity, a positive development in regard to the evolution of both knowledge and the law, in light of today’s challenges in the fields of the economy, society and the environment. At the same time, the notion of sustainable development as a means of commitment towards future generations does not render environmental legislation a mere regulatory instrument, but rather an important tool for effective planning, and managing the risks and needs that may lie ahead.

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## *Is sustainability worthwhile for companies?*

### **Editorial for the Telekom Austria Group Sustainability Report 2013-2014**

*F. J. Radermacher*

The world in 2014 is in a difficult situation. Globalisation means that the world's economic system is increasingly free to pursue its own path without being subject to the old boundaries and restrictions. The situation is being exacerbated by the rapid growth in the global population towards 10 billion, and the hundreds of millions of people who are joining those already pursuing resource-intensive lifestyles.

Sustainable solutions for the foreseeable challenges need to address the question of limiting the consumption of non-renewable resources and reducing the environmental impact while seeking a parallel solution to the global climate and energy problems from a worldwide perspective, as well as tackling the social aspect in its global form. Although technical progress alone may substantially reduce the environmental impact per unit produced (dematerialisation/increased eco-efficiency) and help to increase prosperity in absolute terms, the so called "boomerang effect" means that it often leads to a greater overall impact on ecological systems and more, not less, inequality. We find ourselves in the same predicament as the sorcerer's apprentice, lamenting: "The spirits I have cited my commands ignore".

Taking this situation as our starting point, a look forward to the next 50 years presents us with three potential scenarios. Two are extremely threatening and cannot be reconciled with the principles of sustainability, namely ecological collapse or alternatively the emergence of a two-tier global society. The only way to achieve sustainable development and a balanced world would appear to be tight-knit international cooperation with the aims of prosperity and sustainability in the form of a global ecosocial market economy (i.e. a green and inclusive capitalism) as a viable alternative to today's turbo and casino capitalism.

One key question is how likely it is that such a balance can be achieved. Are there hopeful signs? Certainly! For example, take the wide-ranging social progress that has been made since the Second World War, primarily in the developed world, but very much also elsewhere. Or the surprising closing of ranks among the OECD and G20 member states against aggressive tax planning and tax havens in the wake of the latest financial crisis. Hope is also provided by consumers and investors, who are

increasingly reflecting global developments, focusing on more than just financial benefit and applying ethical standards in evaluating economic activity (so-called “moralisation of the markets”). The latter development is closely linked to the serious efforts undertaken by many companies in the area of corporate social responsibility (CSR).

The main difficulty, however, is satisfying all of the demands that are emerging around the world within the existing global regulatory framework (the “rules of the game”, so to speak). This will require strong global growth over a number of decades – but, as we know already, this growth must be green and inclusive. In other words, growth that does not involve a further rise in the consumption of critical resources, that allows the 2°C climate limit to be upheld while enabling a move towards global social balance rather than a two-tier society.

Although this is a complex objective, the situation is far from hopeless. The goal is a challenging one, but one that we can still attain. However, this requires harnessing the best past experience in terms of what innovative technology and organisation can achieve. We need dramatic technical progress to produce better solutions, particularly in the area of green technology. More specifically, we need to increase the availability of energy throughout the world while using fewer resources, and in particular while significantly reducing the use of fossil fuels – and we need to achieve this at a reasonable cost in order to facilitate social inclusion globally. This is the key task in terms of technical innovation. However, the realisation of this programme requires the right price signals within the markets. None of this can be achieved if, all around the world, it pays to act in a manner that is incompatible with sustainability. It should not be possible for companies to earn good money by destroying the environment in other countries, by exacerbating the climate problem, by tolerating child slave labour at suppliers within their value chains, by circumventing the ILO’s social standards in this way, or by using globalisation as a means of aggressively reducing their tax bill. Many international corporations have done this with great success, with national budgets and the SME sector suffering further as a result – an entirely counterproductive development. Starting to make a difference in this area, i.e. by introducing innovations in global governance, is a difficult task – but certainly not a hopeless one. And it is successful companies in particular that can, and should, take up a position and go on the offensive.

The starting point for commitment on the part of companies is the wholly unsatisfactory situation in terms of the global development of sustainability. This situation means that companies are subject to growing pressure to make a major contribution to the development of sustainability in their own right. This is shaped by

the main theorem of business ethics: “the systematic place of morality in a market economy is the framework”, and of corporate ethics: “in the case of deficits in the framework, responsibility for legitimation falls upon the companies”. As a result, companies are coming under ever-greater pressure. Their “licence to operate” is put under question. Something needs to be done. There is undeniable pressure on them to act. One illustration of the potential consequences is provided by investors in prestigious properties who are seeking to attract DAX companies in Germany as tenants. Nowadays, these investors only construct “green buildings”, irrespective of whether this is worthwhile from an energy efficiency perspective or not. They are motivated by a simple perception that no DAX company would be able to move into a new property that is not a green building. In other words, offering green buildings is a question of elementary business economics: any investor that fails to do so will also fail to find a tenant.

As a result of these developments, companies are responding to market conditions by intensifying their commitment to sustainability. In some cases, their actions are also driven by an inherent motivation or because of what their owners want. This applies in particular to brand companies and family-owned enterprises. Among other things, this is due to the name recognition and intrinsic value of brand companies and the corresponding expectations of customers and lenders, employees and suppliers, NGOs and the public – but self-motivation is often also a reason. Consumer behaviour is also directly noticeable. One particularly important consumer group in this respect is “LOHAS”, which describes a group of the population that is committed to a “lifestyle of health and sustainability”. Members of this group are generally well-educated, economically well-positioned people who like to consume but seek to avoid causing damage through their consumption. They want to be part of the solution, not part of the problem. Where problems are not resolved at a political level, they expect companies to step in (as per the main theorem of business ethics cited above).

All of this explains why companies are increasingly becoming involved in sustainability, whether as part of the UN Global Compact, the Global Reporting Initiative or their own CSR strategies. Companies around the world are becoming active in the fight against poverty and for environmental protection, reducing and reporting on their carbon footprint, and striving to make a varied contribution to protecting the climate and the environment.

Companies can also make a considerable difference in their core processes in order to ensure greater sustainability, e.g. in selecting technologies and primary products and the way in which they deal with customers, suppliers and employees. Companies can ensure that they are climate-neutral, such as by supporting major global reforestation

projects so that their net carbon emissions are zero. By exercising an influence over public opinion and the political process, companies can help to ensure that sustainability is enshrined in the financial system to a greater extent as it is today, among other things – be it through a financial transaction tax or the introduction of a “roadworthiness test” for new financial products, for example – to prevent our society from being surprised again by opaque, dangerous structures with consequences we are unable to comprehend. It is essential that, in their role as clients, companies support other companies that are seeking to adopt a focus on sustainability, even if this could result in somewhat higher costs. Achieving a balance is what matters. As the buyers of new products, it is also important that they support those companies that are developing technologies that help to ensure a better future for all humanity. The aim should be to achieve all of this in a manner that is economically adequate for the companies concerned, as operating within adequate economic parameters is the only way to enable companies to act sustainably in the long term and on a broad basis while also improving their own future.

In a competitive environment, then, the aforementioned can only apply to the extent that companies have or can develop an appropriate business model or other parties act in a similar manner (e.g. on the basis of agreements), such as by observing industry codes. If premium providers are subject to equal pressure, conditions will move in the right direction and exceptions will relate to “no-names”, both as competitors and as suppliers along (global) value chains. Scandals often take place along these chains, with one example being the serious incidents involving numerous fatalities at textile factories in Bangladesh and Pakistan in recent times. Problems like this keep occurring and there are always calls for action in the aftermath, but the situation is difficult. The regulatory framework - the rules of the game - also imposes limits on well-intentioned companies.

At the ceremony for the 2013 German Sustainability Award, Björn Stigson, formerly President of the World Business Council for Sustainable Development, had some words to say on the matter: “We do what we can to promote sustainability, but we have reached a limit. We are reaching a point where the regulatory conditions will need to improve in order for us to continue – which is something that is urgently required. Without structural change, there will be little room for further improvement on the part of companies.” Since late 2013, the website of the German Council for Sustainable Development has contained the following news item: “Sustainability managers call for political action: Pioneers from the world of business are largely disillusioned by the lack of speed when it comes to sustainable development and would like to see clearer guidelines on the political front.”

All in all, then, the findings when it comes to the question in the title of this editorial can be summed up as follows. Today, a certain degree of commitment to sustainability is a matter of course for premium companies, companies in the public eye and companies with high standards: corporate social responsibility is a megatrend. Being a part of this trend is not only worthwhile; that would be too little. Moreover, being a part of it is an essential condition for having a “licence to operate”. These days, a brand company would be unable to survive on the market in the long term without positioning itself accordingly. This is also one of the basic theses of sustainable marketing management.

But how will things proceed from here? Companies must become active within the possibilities available to them. They must talk publicly about the systemic barriers to what they can achieve. They must also seek to pass the pressure along the value chain. Above, it was described how DAX-listed corporations in Germany can shift many of the challenges relating to their carbon footprint onto their upstream suppliers, e.g. in the case of green buildings, logistics or business flights. This is changing the world. It means that the changes in terms of the “demand” for sustainability is also reaching companies in the supply chain, whose “no-name” status prevents them from being subject to direct pressure from consumers observing them – but who are now increasingly coming under pressure from brand companies insofar as they are their suppliers. This is a good thing. And it is even better if brand companies discuss these relationships publicly and help politicians to change the economic conditions in order to promote the trend towards behaviour that is compatible with sustainability among all companies. Encouragingly, this process has now begun. The pressure on companies, the measures that have been initiated, competition from “no-names” that are not subject to scrutiny on the market – all of these factors are encouraging commitment at a meta-level. The relevant topics are being discussed. Something is happening in the triangle of informed consumers, brand companies and politicians. This is important and should be welcomed.

At the same time, however, sustainability as a whole is becoming ever more of a hot topic around the world. One of the main sources of motivation for good entrepreneurs is reputational risk and the risk of scandals arising from business activity – including along global value chains. After all, in addition to the aforementioned LOHAS, there are many critical NGOs who play a watchdog role, closely observing proceedings along corporate value chains, analysing companies’ behaviour in detail and publicising anything that they consider to be wrong - from measures that fail to comply with the relevant legislation to company announcements that they dispute. The same applies for global value chains. If people within the value chain die or are poisoned, if products become associated with faults affecting consumers in the rich

world, if even wide-scale product recalls are necessary, things can get expensive for companies. This can place a heavy burden on them, diminish their international value or potentially lead to insolvency. In this way, the “moralisation of markets” is combining with globalisation in a favourable manner to become a driver of sustainable development.

Many companies have learned that becoming involved in supposedly low-cost operations somewhere on the “other side” of the world, or using suppliers who primarily work in such environments, can end up being an expensive endeavour. This affects their reputation, market value, customer and supplier relationships and more besides, and hence has become an explicit element of corporate risk management that is regularly discussed at management board and supervisory board meetings.

Employee loyalty is another important aspect. Good employees are vital for any company seeking to position itself successfully on the market in the long term. The central question is how to attract and retain ambitious employees. Another question is how to find such employees in a world where demographic problems are becoming increasingly relevant. There will be attempts to find employees around the world under the mottos of global recruiting, diversity and diversity management. Incidentally, this also touches on an important component of the social side of sustainability. But the limited local pool of talent will naturally remain an issue. Succeeding in this environment and attracting and retaining good employees requires a credible focus on the major social and ecological topics, both today and with a view to the future. This is particularly relevant when it comes to encouraging employees to do more than just work by the rulebook. Tapping into this potential can be vital for companies seeking to enjoy success in future markets. Here, too, ensuring that corporate policy is geared towards sustainability criteria is important, just as it is for motivating existing employees.

To answer the question as to whether sustainability is worthwhile, it is true that – as discussed above – the certain degree of focus on sustainability that has become part of the process of equilibrium at brand companies is not only worthwhile, but absolutely necessary for a company to act on the market and retain its “licence to operate”.

Going above and beyond this requirement is a different matter, and one that depends on the adequacy of the company’s business model and the long-term nature of their approach. Of course, companies cannot be expected to do everything that observers and other stakeholders might wish them to do in order to secure sustainability for the world. But there is a great deal they can do – and they are increasingly acknowledging

their responsibility and doing exactly that. One company displaying such a commitment is the Telekom Austria Group, as this report demonstrates once again.

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Is sustainability worthwhile for companies? Editorial, Telekom Austria Group  
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## ***Creating motives and tools in order to enable citizens to become “Smart Citizens”: A “socially-oriented” bottom-up approach towards sustainability.***

***Ch. Vlachokostas, A. V. Michailidou, E. Feleki, Ch. Achillas***

Citizens are under numerous environmental pressures, especially in urban areas. This is the reason for which the quality of urban climate has become an issue of critical importance for sustainability and a major challenge for environmental managers and public authorities around the globe. Urban areas are characterized by high levels of both population density and environmental pollution, which adversely affect environmental quality, with profound negative effects on human health and well-being.

Although environmental pollution is an undisputable problem, high levels of exposures to environmental health stressors are constantly reported in cities, which are the result of unsustainable practices, e.g. the fossil fuel use. These exposures mainly characterize densely populated urban environments, such as spaces in metropolitan centers or urban core microenvironments (Vardoulakis et al., 2011). Ongoing environmental exposures, such as air and noise pollution, toxic substances or radiation give rise to citizens' worries about possible impact on human health.

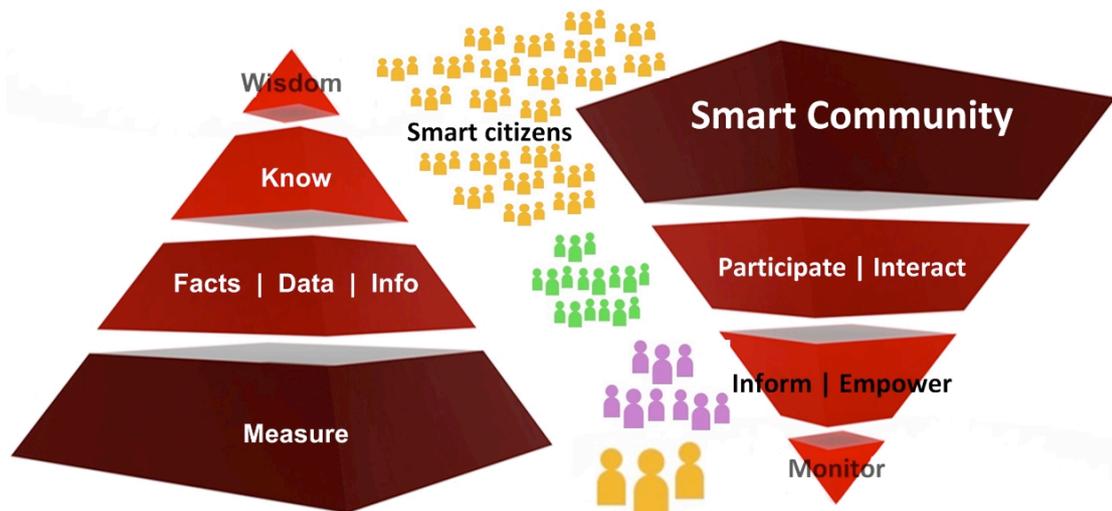
Firstly, air pollution in urban areas has important implications for health and environmental management (e.g. Sokhi et al., 2006). A consensus has been emerging among public health experts that, even at current ambient urban levels, chemical air stressors and aerosols aggravate morbidity (especially respiratory and cardiovascular diseases) and may lead to premature mortality (e.g. World Health Organization, 2014; European Environment Agency, 2013; Pope et al., 2011; Kassomenos et al., 2011; Curtis et al., 2006; Triantafyllou et al., 2006; Petaloti et al., 2006). Additionally, air pollution leads to restricted activity days or/and work loss days and is associated with productivity and economic losses (Vlachokostas et al., 2012). Although, air pollution causes damage and imposes risks not only on humans, but also on ecosystems, crops and materials, existing literature shows that health risks constitute the majority of environmental and societal damage (e.g. Muller and Mendelsohn, 2007).

In parallel to the chemical health stressors of the air pollution mixture, excessive exposure to physical stressors such as noise is associated with annoyance and reduced quality of life (e.g. Murphy et al., 2009; Prasher, 2003) or even higher risk of cardiovascular disease (e.g. Babisch et al., 2005). Moreover, part of the population is also

concerned about the potentially harmful effects from electromagnetic fields (EMFs), emitted in urban areas (e.g. Blettner et al., 2009; Frei et al., 2008). Health impacts are also reported to be associated with modification of meteorological variables due to climate change - e.g. extreme cold and heat stress have acute and medium term health effects (e.g. D'Ippoliti et al., 2010), as well as with aeroallergens, i.e. pollens with high allergic potentials especially for children (e.g. Reid and Gamble, 2009).

Exposure to numerous environmental stressors is a sustainability threat which our society is still facing at social, environmental and political levels. It should be emphasized that the health burden from environmental exposures in EU is estimated to be very significant (WHO, 2009), since they induce direct and indirect health risks to humans. Simultaneous exposure to multiple health stressors represents an increased risk to public health. Exposure to chemical and physical stressors endangers human health, longevity, quality of life and the “ageing well” of citizens. As individuals are exposed to several pollutants simultaneously there is a need to address combined exposures in a more integrated way (Vlachokostas et al., 2012a; Mauderly et al., 2010). This space could be a relatively open one (e.g. a street, a square, a pedestrian path in the urban center, or a combination of those) or even a more defined one (e.g. the interior of a car, the saddle of a bicycle/motorcycle, a bus stop). Environmental quality varies in time and space as a result of the combined action of different pollutants and ultimately impacts on humans (Carnevale et al., 2012). Thus, in order to reliably characterize urban spaces, maximum information for the levels of all existent health stressors is required, both for chemical and physical ones.

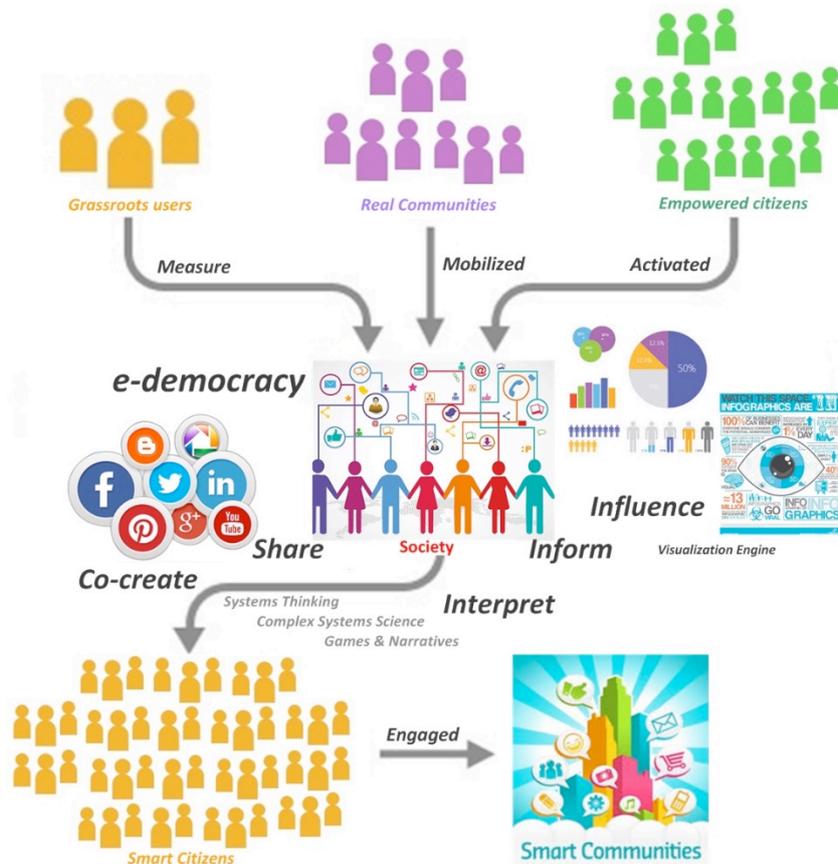
In order to encounter this urban sustainability threat, a multi-disciplinary framework should be outlined that requires ***the combination of the involvement of a wide range of networks of people, knowledge and sensors***. Up-to-now problems such as air or noise pollution in urban areas were mainly addressed by stakeholders, policy-makers, local authorities and scientists. The solution was seen with a top-down perspective. Furthermore, these problems were usually addressed separately, with a top-down approach and not in a holistic way. However, smart cities are about “***smart citizens***”, who participate in their city’s daily governance, are concerned about increasing the quality of life of their fellow-citizens, and about protecting their environment (Figure 1).



**Figure 5 - Pyramid of the levels of citizens' interaction in order to enable citizens to become "Smart Citizens"**

Technology may facilitate, but is no solution per se (JRC, 2014). Although research into the determinants of environmental behavior has shown that an improvement of the individual and collective behavior can be obtained if citizens are more exposed to information, and engaged as part of a community (Aoki et al., 2009; Paulos et al., 2008; Corburn, 2005) *the participation of citizens was not sufficient enough to leverage realistic control in numerous chemical and physical health stressors.*

In this light, scientific effort is required to provide methods within communities' empowerment ("**Real Communities**" i.e. people with the same interests/behaviors e.g. bicyclists' unions, citizens' unions, mothers' unions etc.) and to foster e-democracy for efficient governance, through new creative ways of collaboration between various citizens, stakeholders and actors of the urban fabric. Towards this effort "different" citizens in terms of expertise, gender and priorities need to become collectively intelligent and empowered. Empowerment is all about making citizens stronger and more confident, especially in controlling their lives, encountering societal problems and claiming their rights. This is of vital importance, in order to *put forward a "socially-oriented" bottom-up approach to efficiently and simultaneously address multiple health stressors in urban areas.* Concepts of participatory governance recognize that it is no longer sufficient to provide lists of environmental facts or reports to inform citizens of environmental changes (Owens, 2005). Accomplishing this challenge, *provision of motives, incentives and smart tools for citizens* are required in order to change their lifestyles and behavior in a more sustainable way. Thus, collective awareness for a bottom-up participatory effort is the basis to effectively improve urban environmental quality (Figure 2).

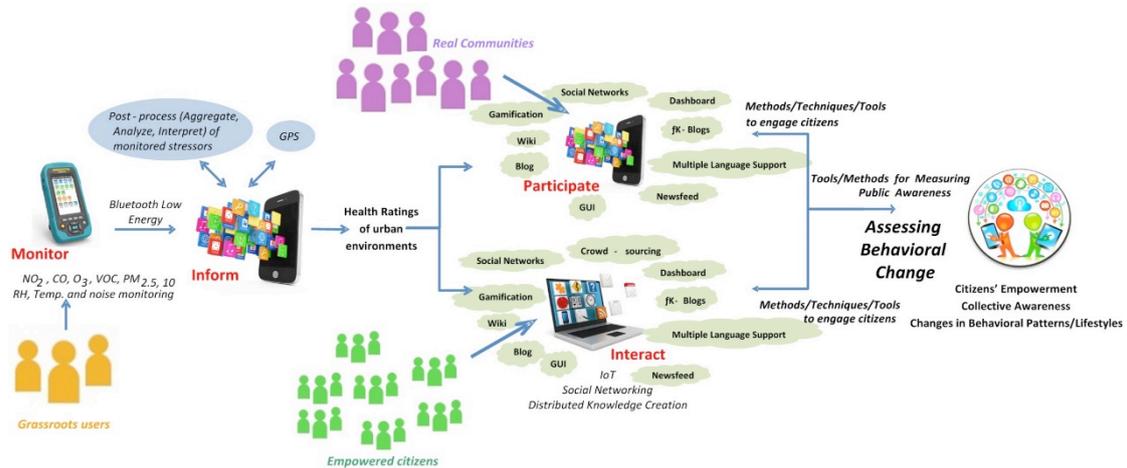


**Figure 6 - The overall collective intelligence concept**

As a conclusion, in order to create motives for citizens, tools are required in order to enable citizens to become “Smart Citizens”: A “socially-oriented” bottom-up approach towards sustainability requires:

- Approaches that will empower citizens, through participation and interaction to adopt more sustainable individual and collective behaviors and lifestyles in order to reduce the exposure levels to health stressors in outdoor urban environments;
- Bottom-up participatory paradigms via ICT-based collective awareness and collaborative activities of citizens;
- Collaborative Awareness Platforms (CAPs), which facilitate decision-making by providing increased transparency as well as opportunities for citizens’ empowerment in order to fully collaborate and promote better informed decision-making processes;
- Crowd-sourcing techniques to engage citizens in sharing knowledge and expertise and improve their quality of life;
- Tackle citizens’ opinions, willingness and knowledge regarding alternative behaviors/possible solutions;
- Societal behavioral modeling;

- Include ICT solutions for social networking and collaborative technologies (Figure 3);
- Enable citizens to become “smart citizens”;
- Assure improved transparency of information related to the impact of environmental policies;
- Drive society’s effort towards sustainable development;



**Figure 7 - ICT towards collective intelligence**

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## ***Multi-criteria decision analysis as a decision making tool towards adaptation of urban sustainability policies***

***Dr. Georgios Banias***

Over the years, sustainable development has been defined in different ways. However, the most widely quoted definition is from the Brundtland Report, where “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts; (a) the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and (b) the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs”. To that end, sustainable urban policies, regardless of whether those refer to urban mobility, use of energy in buildings, urban land use planning and green spaces, air quality or municipal solid waste management, are considered as a prerequisite towards sustainability.

Anthropogenic pressure on the urban environment has recently reached critical levels in numerous conurbations worldwide. In this context, taking specific measures as a response has become a necessity for environmental managers in an effort to confront such pressures and to move towards sustainable development. However, in practice, funding of abatement strategies is often limited and decision-makers are obliged to prioritize them in terms of performance, viability, social acceptance, maturity or other case-specific criteria. In order to arrive at an effective, successful and realistic bundle of measures, a consensus between experts and the public needs to be built. In the material to follow a methodological approach that focuses on the multicriteria prioritisation of abatement strategies for urban areas is presented.

Environmental quality contributes significantly to social welfare, public health and sustainability (Mozer, 2009; Pugh, 1996). In recent years, anthropogenic pressures on the environment have reached critical levels in numerous areas worldwide, resulting in the continued deterioration of local environments (e.g., Atash, 2007; Moussiopoulos, Achillas, Vlachokostas, Spyridi, & Nikolaou, 2010). The problems are more intense for conurbations, which are crucial engines of local socio-economic development and, where human activities are inevitably concentrated in relatively small areas (Vlachokostas et al., 2009). In this context, urban areas concentrate environmental decay, and air, waste and noise pollution, congestion, fresh water shortages and energy demands seriously threaten social welfare and development (Van Dijk & Mingshun, 2005).

Defining urban environmental quality is difficult because it is affected by multiple parameters. Air quality directly affects the natural environment. Transportation systems, municipal waste management, noise and the presence of green spaces influence public welfare. The quality of drinking water also impacts the domestic environment. All of these parameters are interrelated. Specific responses have become necessary to confront such pressures. Urban sustainability is a multi-dimensional concept that includes environmental, economic, social and political dimensions (Huang, Yen, Budd, & Chen, 2009; Olewiler, 2006). Thus, the achievement of sustainability in urban areas is a demanding challenge for local and regional governments (Holden, 2006; Luque-Martínez & Muñoz-Leiva, 2005).

Despite the need for abatement strategies, planners of urban infrastructure are often constrained by budget limitations that prevent the implementation of projects aimed at environmental improvements. Therefore, the hierarchy of strategies for confronting concerns in urban areas is an issue of critical importance. The views of both environmental experts and the public should be considered simultaneously to achieve consensus and to produce effective, successful and realistic strategies. In addition to determining the most significant environmental concerns, other issues are pivotal in the decision-making process. The performance, viability, social acceptance and maturity of projects and alternatives are factors that must be considered. Thus, more than one criterion must be considered simultaneously to produce an optimal bundle of measures. In this article, a detailed methodological approach that focuses on the prioritization of abatement strategies for urban areas is presented. The methodology is based on multicriteria analysis, which accounts for mutually conflicting criteria. The developed methodology is then applied to a real-world case study for the metropolitan area of Thessaloniki, Greece.

Environmental managers and public authorities regularly handle multiple topics simultaneously. However, all such concerns are not equally important in urban systems; therefore, they must be prioritized. The proposed methodological framework follows the typical path of a multicriteria analysis method. In this context, it is the decision-makers' responsibility to qualitatively evaluate all environmental issues, taking into account the study area's special characteristics and identifying those that are the most urgent for local sustainability (Phase I). Environmental concerns are case-specific, and global strategies are not practically useful. For instance, many areas across the globe face severe problems related to potable water [e.g., Harare, Zimbabwe (Manzungu & Machiridza, 2005). In the Aegean archipelago islands and Greece (Kaldellis & Kondili, 2007)] water is the top-priority. Other areas [e.g., Beijing, Shanghai, Hong Kong and Guangzhou, China (Chan & Yao, 2008), Istanbul,

Turkey (Elbir et al., 2010), and Tehran, Iran (Atash, 2007)] are characterized by a significant deterioration of local air quality, which poses a considerable threat to public health. The current status of an area must be thoroughly documented as an intermediate step.

The second step of the methodological scheme (Phase II) focuses on the identification of the most urgent environmental pressure to which local authorities should immediately respond. Public opinion is considered in this step for two reasons: (a) the public is most familiar with the “real” problems of an area because citizens deal with environmental burdens in their everyday lives and (b) planners of urban infrastructure should involve social communities from an early stage in the project planning process to achieve a broad consensus. The implementation of abatement measures is a “hot” political topic; thus, social acceptance should be considered. The public is often provided with a closed list of environmental concerns that appear to be dominant for an area. In fact, this list is the outcome of Phase I.

To accurately capture public opinion, the method of data collection must be determined. Among the most frequently used survey techniques are telephone interviews, in-person (face-to-face) interviews, mailed questionnaires and web-based questionnaires. According to Assefa and Frostell (2007), the factors that determine the data collection method to be employed include the type and depth of information needed, the ease of data quantification, the scale of applicability, representativeness, staff requirements, time constraints and cost constraints. To optimally detect public beliefs about a wide range of environmental topics, face-to-face interviews based on simple questionnaires are the most appropriate technique because citizens often have inadequate information on specific topics. However, ignoring time and resource constraints, combined methodologies may seem preferable. The study site must be precisely defined, and a representative sample of the population should be appropriately selected. Responses from different regions within a study area may vary as a result of site-specific characteristics.

To identify an area’s most pressing environmental concern, public opinion should be thoroughly recorded, and the relative importance of the various pressures and public dissatisfaction should be considered. A very dissatisfying situation related to an environmental topic that is not highly important for one citizen may be less oppressive than a less dissatisfying situation related to a top-priority topic. Assessing the significance of environmental topics for each region within a study area and for all ages and educational backgrounds is conducted, and the weighted average of responses is used.

Once the major environmental concern for an area has been identified, the decision-making process proceeds with an assessment of alternative responses (Phase III). For this step, expertise is required. Thus, all involved stakeholders with an “active” role in terms of the specific environmental topic must be identified, and experts must be appointed. Experts are then requested to rate performances for all alternative improvement strategies available, based on criteria that describe the particular topic. The list of criteria used to describe the most “important” environmental concern (i.e., the outcome of Phase II) is created by the experts through discussions.

Once the major environmental concern for an area has been identified, the decision-making process proceeds with an assessment of alternative responses (Phase III). For this step, expertise is required. Thus, all involved stakeholders with an “active” role in terms of the specific environmental topic must be identified, and experts must be appointed. Experts are then requested to rate performances for all alternative improvement strategies available, based on criteria that describe the particular topic. The list of criteria used to describe the most “important” environmental concern (i.e., the outcome of Phase II) is created by the experts through discussions.

A critical turning point in the decision-making process is the choice of the multicriteria analysis technique to be employed. In the literature, multicriteria methods have recently gained wider acceptance than quantitative models because they embody many quantitative and qualitative variables. The characteristics of several scenarios are simultaneously assessed, and the alternatives are classified according to different criteria to identify the optimal solution. The literature lists a large number of multicriteria analysis techniques. There are no universally preferable multicriteria analysis techniques, but some techniques are more or less appropriate according to the problem under study and its specific characteristics.

In the proposed method, the ELimination Et Choix Traduisant la REalité III technique (Roy, 1978), commonly referred to as ELECTRE III, is used, based on its merits compared to other available options. The ELECTRE III approach is a common multicriteria analysis technique with a long history of successful practical applications in various thematic areas such as the environment, energy and construction. One of the significant advantages of the method is its utility in examining environmental issues (Rogers & Bruen, 1998). In addition, ELECTRE III has the ability to incorporate a large number of evaluation criteria while considering a large number of decision-makers (e.g., Xiaoting & Triantaphyllou, 2008). Moreover, this method is used due to the imprecision and uncertainty of input data, which in many cases, may drive decision-makers to misleading conclusions.

ELECTRE III requires the determination of three thresholds: the preference threshold (p), the indifference threshold (q) and the veto threshold (v). With the inclusion of the three aforementioned thresholds, ELECTRE III is considered to be well-adapted for uncertainties (Roy & Bouyssou, 1993). The technique uses three pseudo-criteria to represent all aspects of a problem, and it begins by comparing the alternatives' criteria scores. The results are aggregated, and a model of the fuzzy outranking relation, according to the notion of concordance and discordance, is built. The method, in the second phase of the fuzzy relation exploitation, constructs two classifications (complete pre-orders) through descending and ascending distillation procedures. A final classification consists of the intersection of the complete pre-orders. A sensitivity analysis tests the result by varying the values of the main parameters and observing the effects on the final outcome. A comparative analysis of the classifications leads to either a final robust result or re-analysis of the model (Roy & Bouyssou, 1993).

The multicriteria evaluation of available improvement strategies consists of a problem that is formulated from a set of alternatives ( $A_1, A_2, A_3, \dots$ ) and a set of criteria ( $C_1, C_2, C_3, \dots$ ). The evaluation of criterion  $k$  for alternative  $A$  is described as  $V_k(A)$ . The approach adopted in the framework of this analysis uses a ranking scheme that follows ELECTRE III principles and is based on binary outranking relations in two major concepts: “concordance” ( $ck$ ), which describes the situation in which alternative  $A_1$  outranks alternative  $A_2$  if a sufficient majority of criteria favour alternative  $A_1$ , and “non-discordance” ( $d_k$ ), which describes the situation in which the concordance condition holds and no criteria in the minority should oppose too strongly the outranking of  $A_2$  by  $A_1$ .

The methodological approach concludes with the determination of an optimal bundle of improvement measures. Considering expert views on available alternatives, the approach prioritizes improvement strategies. As already mentioned, the methodology provides an easy-to-use tool for local authorities and decision makers tasked with developing integrated plans to tackle environmental problems.

Environmental quality is an issue of critical importance for urban sustainability and a major challenge for environmental managers and public authorities. Numerous conurbations around the globe are confronting significant environmental pressures and decay. In such cases, investments in environmental infrastructure at the local level must be accelerated. Nevertheless, despite the need for investments, capital is limited in most cases. Thus, the prioritization of strategies to confront environmental deterioration in urban areas is critical for local authorities, and this need triggered the development of the proposed approach. Public opinion and the views of

environmental experts are simultaneously assessed to achieve consensus and produce an effective, successful and realistic strategy.

With the presented methodological approach, the public is involved from the early, conceptual stages of a project. This involvement is essential for a project's applicability and efficiency. A number of organizations, including the UN and the EU, have recognized the importance of public input to the formal planning process (Johnson & Dagg, 2003). Additionally, the public is familiar with an area's specific problems and is expected to provide an accurate outlook on the importance of a topic. Identifying the optimal bundle of measures to address environmental topics and thus minimize environmental burdens is a demanding task. In principal, this process involves options with different technical and economic characteristics and a number of mutually conflicting economic, environmental, social and technological objectives and criteria. Adequate expertise is required, and experts are questioned to identify the most promising alternative improvement strategies.

Finally, the identification of the most effective measure will not provide a global solution. An efficient environmental strategy must include a bundle of integrated measures. The proposed approach provides a method for developing such a bundle. The only required adaptation is that determination of the "alternative available improvement strategies" be replaced by determination of the "alternative available bundle of improvement strategies". In such a case, the proposed approach is essentially unchanged.

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<sup>i</sup> Some of the meanings of the term are the promotion of prosperity, the minimisation of social conflicts, the reduction of crime, the promotion of interpersonal trust, the eradication of cases of bullying, et. al.

<sup>ii</sup> At international level, there has recently been a noteworthy undertaking of the United Nations under the coordination of UNESCO known as the “Decade of Education for Sustainable Development 2005-2014”, aiming at the incorporation of the principles, values and practices of sustainable development into all aspects of education and learning.