

CRITICAL QUESTIONS IN SUSTAINABILITY DEFINITIONS

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ABSTRACT

Sustainability is a current trend in almost every sector of scientist's interest and research. It can be projected to leadership concepts, organization rules and ethics as well as to the project management. Sustainable development does not only have to be the result of an adaptation to the increasingly stringent laws, standards, rules and peer pressure. The interest in sustainable development can be also motivated by searching for an economic advantage or as a marketing strategy of any organization. For the implementation of sustainability it is crucial to know the right definitions of the terms. The specific definition is associated with a specific measurement system and also other established tools. As there are many different definitions, misusing may result in wrong understanding of the concept and also wrong implementation of the principles. This paper critically analyses current definitions of sustainability and searches for additional characteristics which should be considered and may be included in the newly created definitions.

KEYWORDS

Sustainability; Definition; New Perspective.

Sustainability became an important value in many corporate cultures. The main changes in the behavior of companies are now tightening environmental standards, stricter laws and increased pressure from investors, customers, and other stakeholders in the relevant area of business. Sustainability does not only have to be the result of adaptation the increasingly stringent laws, standards, rules and peer pressure. Interest in sustainable behavior can be stimulated by economic advantage or marketing strategy of company.

The aim of this paper is to introduce and give theoretical possibilities of sustainability. The main research questions are: What is the definition of sustainability? Where is the difference between sustainability and sustainable development? What are the characteristics of sustainability? What have all definitions of sustainability in common? Where are the main bottlenecks in current definitions?

Methods used in research: Examine and analyze definitions and characteristics of sustainability.

MILESTONES IN HISTORY OF SUSTAINABILITY

Historians might find the roots of interest in environmental protection in ancient Rome and Greece, and perhaps can find some mentions also by the Egyptians. Interest in environmental protection in the modern sense was awakened in the middle of the 19th century. The theoretical basis can be found in ecology, science discipline, founded in the sixties by the German biologist Ernst Haeckel. Ecology is defined as the study of relationships between living organisms and their environment, no matter if it consist living or non-living components. (Moldan, 2003)

Czech Republic's places belong to the one of the first protected nature areas in the world – these are the area Sumava and Novohradské mountains.

Unlike ecology environmental protection has shorter roots. The term began to be used only in the sixties of the 20th century. Serious problems in the environment in many countries began to appear in the early sixties. One of the key publications of the time is the book "Silent Spring" written by American biologist Rachel Carson in 1962. The book sparked a public debate and has considerable merit in that the protection of the environment started to become a movement. (Moldan, 2003, Natr, 2006)

At the forefront of efforts to address and prevent the imminent environmental crisis stood up the United Nations. In June 1972 was organized the Stockholm conference with the main slogan “Only one planet”, which marked a fundamental turning point in the opinion of the environment on a global scale. There have been identified four blended threats. Civilization is threatened by excessive and rapid drawdown of renewable and non-renewable resources.

In those years was also formed the first institution entrusted with the protection of the environment. On the international level was established the United Nations Environment Programme (UNEP). In most states then adopted laws on environmental protection and establish ministries and other central bodies responsible for planning and implementing laws.

Quality standards have been introduced by limits allowable emissions of pollutants to air and water and gradually built system of protection, based on the laws and methods of using mostly prohibitions, limits and standards.

In the early eighties, it was clear that the existing technical measures will not be enough. At that time they also developed a deeper discussion about the causes of the environment threat. Key questions were asked suggestively by the known team of authors led by Meadows in the book *Limits to Growth*. Some of them will be introduced later on in this paper. The book *Limits to Growth* was based on the analysis of economic trends since the early 20th century until 1970 and shows that the main culprit of contamination and pollution of the environment is economic growth. He has an exponential character - during the last seventy years, every fifteen years was doubled steel production, mining, food production, but also the amount of pollution and waste of all kinds. Economic growth has had extensive, almost without exception applied correlation between GDP and energy consumption, economic growth curve increased in parallel with the curve of waste. The authors showed, that no corrective action subsequent cannot solve the basic problem. Therefore they suggested economic growth to stop. Although the world has considered a basic analysis of the *Limits to Growth* as correct, the theory of zero growth was fundamentally rejected as unrealistic and undesirable.

The General Assembly in 1983 has therefore set up the World Commission for Environment and Development. Commission should re-examine the relationship between economic development and environmental protection, and more efficient design solutions.

Another major milestone was the 1992 conference in Rio de Janeiro. The aim of the conference was to establish an agreement on how should sustainable development look like, how to achieve it and what should be a contribution in various countries. Change to sustainable development was the main goal of this conference. Some compare sustainable era to the industrial and agricultural revolution. These changes, however, were made in the last tens and hundreds of years. For this sustainable change we have only two or three generations. *“Such a move would be a modification of society comparable in scale to only two other changes: the Agricultural Revolution of the late Neolithic and the Industrial Revolution of the past two centuries. Those revolutions were gradual, spontaneous, and largely unconscious. This one will have to be fully conscious operation, guided by the best foresight that science can provide. If we actually do it, the undertaking will be absolutely unique in humanity’s stay on the Earth.”* (Ruckelshaus, 1989)

In Rio de Janeiro was also adopted so called Agenda 21. Document, which explains that population, consumption and technology are the primary driving forces of environmental change. It lays out what needs to be done to reduce wasteful and inefficient consumption patterns in some parts of the world while encouraging increased but sustainable development in others. Agenda 21 provides options for combating degradation of the land, air and water, conserving forests and the diversity of species of life.

The Agenda also included a chapter titled “Changing Consumption Patterns”. This chapter was later also the most frequently cited and discussed. It pointed out that consumption patterns are the most important factors on which will depend most probably the future of our planet. (Agenda 21) From the Agenda 21 grew up also document called Local Agenda 21, which has advised that local authorities take steps to implement the Agenda 21 plan locally, as was recommended in Chapter 28.

SUSTAINABLE DEVELOPMENT

Sustainability is usually defined by sustainable development. These two terms are highly connected. Still there are some differences between these terms. Development means change from the point A to the point B

in the time. Sustainability does not certainly need to mean some movement or change in the time. It specifies the basic statement and consideration of some typical characteristics of the term.

The widely accepted definition of sustainable development presented by the World Commission on Environment and Development (Brundtland Commission, 1987) embodies the non-positivistic character of the concept of sustainability: “*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*” From this widely known definition rises first question. What are the needs of current society? And what will be the needs of future generations? Is this only a basic food or we need our high living standards?

Requirement of at least the same conditions for future generations is not easy. Today is certain that we leave to future generations a planet with much higher levels of carbon dioxide than the way we did we took over from generations past. Similarly, waste (radioactive and other), forest clearings, disturbed ecosystems ... Because the country will be transmitted in a different state than we borrowed it makes it impossible for posterity to enjoy the same resources.

As Norgaard points out, we can maximize only one objective at a time: “*it is impossible to define sustainable development in an operational manner in the detail and with the level of control presumed in the logic of modernity*” (Norgaard, 1994). The strongly normative nature of the sustainable development concept makes it difficult to pin down analytically.

All definitions of sustainable development require that we see the world as a system—a system that connects space; and a system that connects time. Sustainable development ties together concern for the carrying capacity of natural systems with the social challenges faced by humanity. Carrying capacity is one of the terms we can often hear bonded together with sustainability. It is defined as “*the maximum population of a given species that an area can support without reducing its ability to support more of the same species in the future.*” (Nelson, 2009)

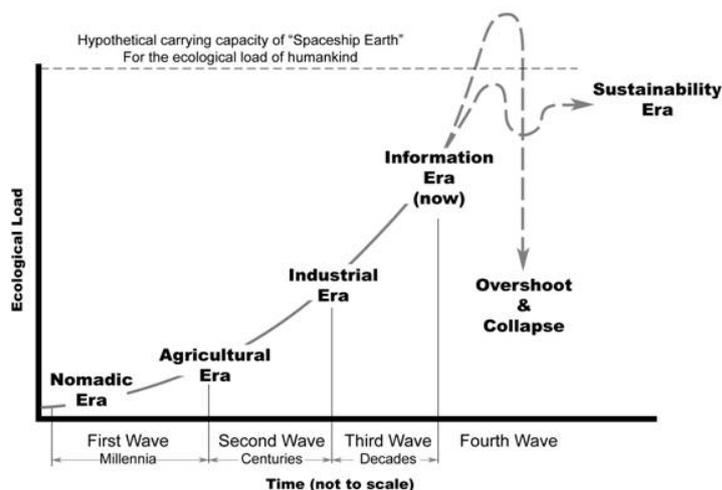


Figure 2. The Carrying Capacity. (Nelson, 2009)

The more nuanced definition of sustainable development is generated by Agyeman (2003): “*the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems*”. What does the term “better quality of life” mean? Can we determine just and equitable manners? This conception of sustainable development focuses equally on four conditions: improving our quality of life and well-being; on meeting the needs of both present and future generations (intra- and intergenerational equity); on justice and equity in terms of recognition (Schlosberg, 1999), process, procedure and outcome and on the need for us to live within ecosystem limits (also called one planet living). (Agyeman, 2005)

According to Hasna Vancock, sustainability is “*a process which tells of a development of all aspects of human life affecting sustenance.*” It means resolving the conflict between the various competing goals, and involves the simultaneous pursuit of economic prosperity, environmental quality and social equity famously known as three dimensions (triple bottom line) with the resultant vector being technology, hence it is a

continually evolving process; the 'journey' (the process of achieving sustainability) is of course vitally important, but only as a means of getting to the destination (the desired future state). However, the 'destination' of sustainability is not a fixed place in the normal sense. Instead, it is a set of wishful characteristics of a future system. (Hasna, 2007)

Prugh and Assadourian (2003) affirm that “*sustainable development and sustainability itself are about collective values and related choices and are therefore a political issue.*” Under this context, it is necessary to consider sustainable development as an integration of both conceptual (subjective) and practical (objective) dimensions, in which the first, referring to the principles and values, should trigger the second, referring to specific actions to solve current problems of industrialization. (Frankel, 1998) But what are our collective values? Are these the same for every country?

Economic growth (or development) in some form is required for those who lack essentials, but it must be subject to global limits and should not be the prime objective for countries already at high levels of consumption (e.g. Daly, 1996). How to set up those limits? How to know the high level of consumption?

In the extensive discussion and use of the concept sustainability since 1987 (e.g. Holmberg, 1992; Reed, 1997; Harris et al., 2001), there has been a growing recognition of three essential aspects (also known as pillars) of sustainable development (Harris, 2003):

Economic: An economically sustainable system must be able to produce goods and services on a continuing basis, to maintain manageable levels of government and external debt, and to avoid extreme sector imbalances which damage agricultural or industrial production.

Environmental: An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems or environmental sink functions, and depleting nonrenewable resources only to the extent that investment is made in adequate substitutes. This includes maintenance of biodiversity, atmospheric stability, and other ecosystem functions not ordinarily classed as economic resources.

Social: A socially sustainable system must achieve fairness in distribution and opportunity, adequate provision of social services including health and education, gender equity, and political accountability and participation.

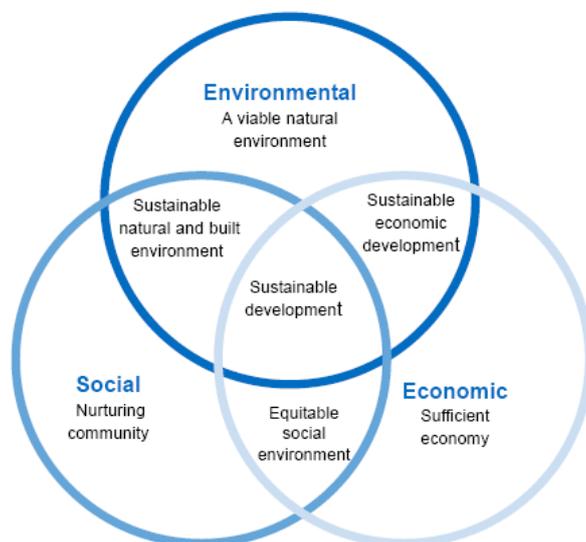


Figure1. The Triple Bottom Line – Hall, Jenkins, Kearsley (1997) in Global Tourism.

Environmental protection is not just stopping at the level of laws and government decisions. It is a matter of everyone. Environment is affected by many more things than we are willing to admit. If we make any decision, quite obviously the first we respect is the social dimension – i.e. taking into account our surroundings and society as a whole. The economic aspect is also taken automatically - considering the economic benefits of each decision. Likewise, we should be concerned about the impact on the environment.

SUSTAINABILITY DEFINITIONS

Defining the term sustainability has been difficult. It is a desire state, which should keep resources and our planet on the certain level. Resource needs and pollution emissions have grown in the last decades. There are actually three ways, how to respond to that growth. We can deny, disguise or confuse the signals. Some can say there is no worry about it as the market can solve it automatically alone. Others can claim we need to analyze and study more as we still cannot say, if resources are really limited.

Frequent use of the term "sustainable" entails a certain ambiguity and uncertainty. We can define, that the system is sustainable only over a defined period of time. The system cannot increase the inputs together cannot drop outputs. Some definitions specify the sustainability of a society or location. Such a formulation can ironically note that such systems are well feasible: one country will ensure sustainable development at the expense of the rest of the world.

The concept of sustainability has included notions of weak sustainability, strong sustainability, deep ecology, and just sustainability. "*Just sustainability*" offers a socially just conception of sustainability. Just sustainability effectively addresses what has been called the 'equity deficit' of environmental sustainability (Agyeman, 2005). It is "*the egalitarian conception of sustainable development*" (Jacobs, 1999).

Sustainability is more than limits on population or restraint in consumption - though these are important. It means that the choice of goods and technologies must be oriented to the requirements of ecosystem integrity and species diversity as well as to social goals. Elements of all three perspectives – economic, ecological, and social – are essential to an understanding of the requirements for sustainability. (Harris, 2003)

From the history point of view there have been first definitions of sustainability in the work of T. R. Malthus (1766-1834) – *An Essay on the Principles of Population* and J. S. Mill (1806-1873) in his work *Principles of Political Economy* (1848).

The sustainable society is defined also by Meadows in her work "Limits to Growth" (Meadows et al. 1972) and "Beyond the Limits" (Meadows et al. 1992). The simplest way is to say that a sustainable society can persist over generations, one that is farseeing enough, flexible enough and wise enough not to undermine either its physical or its social systems of support. "*From a systems point of view, a sustainable society is one that has in place informational, social, and institutional mechanisms to keep in check the positive feedback loops that cause exponential population and capital growth. This means that birthrates roughly equal death rates, and investment rates roughly equal depreciation rates, unless or until technical change and social decisions justify a considered, limited change in the levels of population or capital.*" (Meadows, 2004)

"Beyond the Limits" argued that in many areas we had "overshot" our limits, or expanded our demands on the planet's resources and sinks beyond what could be sustained over time. The main challenge identified in *Beyond the Limits* was how to move the world back into sustainable territory. (Meadows, 2004)

"*A global transition to a sustainable society is probably possible without reduction in either population or industrial output. A transition will require an active decision to reduce the human ecological footprint. This will require personal decision to reduce family size, lower goals for industrial growth and raise efficiency use of the earth's resources. There are many ways in which a sustainable society could be structured, many choices about number of people, living standards, technological investments and allocation among industrial goods, services, food and other material needs.*" (Meadows, 2004) Rising questions from those statements: How can we state those sustainable ways? Who will be responsible for people, countries and the world? And how long can we wait? How we measure human footprint?

The U.S. Environmental Protection Agency (EPA) defines sustainability as "*the ability to achieve continuing economic prosperity while protecting the natural systems of the planet and providing a high quality of life of its people.*" This includes broader issues in area of ecology, sociology and environment as well as well-being of people and standard of life. But what does it mean a high quality of life? Is it possible to achieve continuing economic prosperity?

Detten (2010) understands sustainability in two essentially different ways. First, sustainability can be considered as a principle, implying more or less definite and unambiguous criteria or qualities (linguistics would speak of a narrow denotation). Here, sustainability is the label for processes or behaviors within operational management or action programs. Secondly sustainability is considered as a goal whose achievement is regarded as a moral obligation. "*It thereby becomes a tangible and approachable principle capable of guiding action in connection with a specific concept.*" It can be understood as a moral principle.

Laszlo (2003) indicates that for a business to operate towards sustainability, it should start “with the belief that we are part of a larger system – a business ecology – and extends the willingness to examine the larger socio economic system and how we impact it at the individual, community, and organizational levels, and eventually at the planetary level.” This definition is also giving some questions. What are these indicators for measuring sustainability?

Sustainability does not mean zero growth. The main questions are, what the growth is for, and who would benefit, what it would cost, and how long it would last, and whether the growth could be accommodated by the sources and sinks of the earth. “A sustainable world would not and could not be a rigid one, with population or production or anything else held pathologically constant. One of the strangest assumptions of present-day mental models is the idea that a world of moderation must be a world of strict, centralized government control. For a sustainable economy, that kind of control is not possible, desirable, or necessary.” (Meadows, 2004) That strong control was already applied and demonstrated by former Soviet Union. Sustainability needs a freedom and also protects freedom. Main questions from this statement: Does freedom means, that everyone can use as many resources as he wants to? Are all people smart enough to realize all consequences of their behavior?

Use of the term sustainability only makes sense when it is alternatively understood as a guiding vision, ability or even appeal to action, which can imply further assessment of underlying values. Interesting concept and classification of sustainability was described by Addiscott (1995), which recommended use rate of entropy change. It points out that entropy is a measure of disorder and randomness. Processes increasing entropy are those which decompose completely ordered structure of high molecular weight small molecules. For example photosynthesis entropy decreases as small molecules incorporates into larger. In contrast, breathing increases entropy. The minimum entropy production can thus be taken as a measure of sustainability.

Sustainability is not just a question of the correct definition, because it is rather a prediction of what will endure. It is crucial for people to agree on what and in what form should persist (Constanza, Patten, 1995). The very concept of sustainability in the biological sense of the word can be interpreted as preventing the extinction of species and a way of life that allows survival.

The issue may pose terms of weak and strong sustainability. The distinction between weak and strong sustainability is discussed in Daly (1994). Strong sustainability is defended by Daly (1995) and criticized by Beckerman (1994, 1995), who rejects the concept of sustainability in general. A defense of weak sustainability is offered by El Serafy (1996), while Common (1996) argues that the distinction between weak and strong sustainability is invalid. Even in the neo-classical perspective the principle of weak sustainability is appropriate. Sustainability requires that the total value of manufactured plus natural capital remain constant over time. El Serafy has pointed out that in order to assess this value, there must be a full accounting for natural capital depletion (El Serafy, 1993). A strong sustainability approach is based on the idea that substitutability between natural and manufactured capital is limited. The two can be seen as complements -- factors that must be used together to be productive. From the point of view of neo-classical economic theory, sustainability can be defined in terms of the maximization of welfare over time. Most economists simplify further by identifying the maximization of welfare with the maximization of utility derived from consumption. According to standard economic theory, efficient resource allocation should have the effect of maximizing utility from consumption.

It is not easy to find only one true definition of sustainability. For the future it is important to identify important characteristics, which will support the main goal of sustainability – better future for our planet. It is a matter of measurement and control system as well as responsibility of everyone in the society. For example Epstein and Roy (2003) defined the nine principles of sustainability performance as: ethics, governance, transparency, business relationship, financial return, community involvement/economic development, value of products and services, employment practices, and protection of environment. These principles make definition of sustainability more precise, they can be integrated into day-to-day activities of management and they can be monetarized and quantified. (Epstein, 2008) Those characteristics could be incorporated into definition of sustainability. If, however, the sustainability is a truly useful criterion, in its characteristics must be included also the following elements (Hansen, 2006):

- Literality importance defining sustainability as the ability to continue in time.
- The orientation of a system ensuring that sustainability is an objective property of the system, its components, boundaries and hierarchical context are clearly specified.
- Quantitative characteristics that would allow evaluation and comparison of alternatives.

- Forecasts, which provides orientation to the future and not the past or the present.
- Stochastic characters taking into account the variability prediction.
- Diagnostic methods for the use of integrated sustainability parameters and identify possible constraints.

CONCLUSION

Managing sustainability has many positive effects in different areas. Potential effects of sustainable development can be found on the income side of the local company. Sustainable development strategy may lead to an expansion of market opportunities for existing products and services and to increase the opportunities for new products and services. It is a known fact that customers are willing to pay more for products which are made by cost savings methods and in ecological way.

Searching through all definitions we can find key elements, which are common for most of the authors. From definitions are raising many characteristics of sustainability. The most common principles are: Consideration of future, Protection of resources, Economic prosperity and Connection between environmental, social and economic areas. These principles make definition of sustainability more precise, they can be integrated into day-to-day activities of management and they should be quantified.

We can also state, that current definitions have their limits. As sustainability is much discussed topic nowadays, new definitions are raising practically every day. But this situation can be confusing for the society as whole and many can take the actions towards sustainability in their own ways.

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