

Article

How Myopia Archetypes Lead to Non-Sustainability

Piero Mella *  and Michela Pellicelli 

Department of Economics and Management, University of Pavia, 27100 Pavia, Italy; michela.pellicelli@unipv.it

* Correspondence: piero.mella@unipv.it; Tel.: +39-0382-986-237

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Abstract: Much of the literature on sustainability has tried to define the “virtuous behaviour” of “agents” (man and his social and economic organizations) so that it respects the “sustainability constraint.” This paper provides a “mirror-image” approach, based on the idea that it is above all necessary to understand why men and organizations tend to develop, at times unconsciously and dishonestly, damaging behaviour that turns into non-sustainability. In other words, to orient man toward sustainable behaviour it is indispensable to understand the “reasons” for the behaviour that produces non-sustainable effects. Regarding sustainability problems, we shall introduce the hypothesis that non-sustainable behaviour is not irrational in an absolute sense but derives from the action of three connected “behavioural archetypes” that accurately describe the “natural” behaviour of individuals in pursuing their aims: behaving in a way that will provide evident short-term advantages, both individual and local, while ignoring the disadvantages and harm such behaviour produces in the long run, at the collective and global level. To solve the problem, we shall try to identify the “levers” that weaken the archetypes and reverse their effects, thereby requiring sacrifices which are unacceptable to some. The paper presents four emblematic cases of non-sustainable behaviour and demonstrates that sustainability must become a fundamental strategic driver.

Keywords: sustainability; system thinking; archetypes of myopia; sustainability as a strategic driver; tragedy of the commons; waste disposal; global warming

1. Introduction

In recent years firms have been subject to increasing pressure in terms of sustainability and sustainable development—according to the well-known definition given by the WCED—the “Brundtland Commission” [1] (p. 43): “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*”—as regards both current processes as well as those being developed.

More than a definition, this quote is a “plea” to undertake sustainable behaviour to ensure that today’s benefits do not become harmful for future generations. It is also possible to reformulate the hopes of the Brundtland Commission as follows: if, on the one hand, agents—men and organizations—have to continually develop, on the other they must avoid non-sustainable environmental, economic and social behaviour. If such behaviour already exists, they should try to remedy the damage and above all avoid its repetition.

Over these decades, the definition of sustainable development evolved. This definition was vague but it cleverly captured two fundamental issues, the problem of the environmental degradation that so commonly accompanies economic growth and yet the need for such growth to alleviate poverty [2] (p. 1).

Why is this plea necessary? Are not human agents—men, organizations and nations—able to assess their own behaviour and choose that which does not cause irreversible harm for our future survival? Is there an “irrational” rationality? Does the non-sustainability of today’s actions and policies

derive from bad faith, ignorance, individual interests? Why are man and his organizations incapable of seeing into the distant future and instead behave in a myopic manner?

The aim of this conceptual paper is to build a suitable model to understand human behaviour that derives from a *myopic* vision of its consequences. The attempt will be made to demonstrate that the problem of non-sustainability originates from two fundamental factors or cognitive causes:

- (1) the tendency of the individual to repeat behaviour that gives him an “immediate advantage” that can be observed and measured and at the same to ignore, or not give much weight to, the disadvantages such behaviour will cause in future for the individual in question or for others.
- (2) the lack of an adequate information system for individuals regarding the present state of reality and its future evolution; such ignorance blocks them from modifying their myopic thinking avoiding the disastrous effects of their behaviour.

In fact, many authors and commentators confuse causes with effects. When one asserts that global warming derives, among other causes, from CO₂ emissions, or that the pollution of the seas is caused by the excessive consumption and failure to properly dispose of plastic materials, one does not explain anything; we must understand the causes that drive the economy to produce these emissions or consumers make extensive use of plastic materials and we believe in the need to investigate the behaviour of producers and consumers. The objective of this study is to present a simple but general recurrent model—an archetype—that can shed light on the motivations of irrational behaviours that produce non-sustainable effects and to outline a strategy to weaken these behaviours.

The Systems Thinking approach will be used to construct this model based on Peter Senge’s approach in *The Fifth Discipline* [3] (recently formalized by Mella [4]), one of the most effective instruments for observing, modeling and understanding human and organizational behaviour since it links a coherent conceptual framework and simple, symbolic language that allows one to easily build and quickly interpret operational sense-making models to describe, understand and simulate the behaviour of a wide range of dynamic phenomena [3–5].

2. Review of the Essential Literature on Sustainability

The concept of sustainability had its earliest origins in the international debate: “The limits to growth” [6], which centered on how man should intervene to create a curve of logistic accommodation to resources to limit exponential growth in population, food, industrial production, energy consumption and CO₂ emissions and to avoid a catastrophe.

Later, in the 1980s and ’90s, serious environmental problems, such as the reduction in the ozone layer and climate changes, caused a greater focus on the concept of sustainable growth. The nature of the debate shifted from ‘limits to growth’ to the concept of sustainable development, with the publication of the more celebrated reports: “World Conservation Strategy”, published by the International Union for the Conservation of Nature and Natural Resources [7] and “Our Common Future” published by WCED [1].

The modern concepts of *sustainability* began to take shape during the 1990s, after which there was a growth in the number of definitions in various contexts. We have seen a proliferation in the business and management literature, with an explosion in the international literature, in which sustainability is the main theme. The term sustainability is frequently used to describe problems related to technology, economic development and managerial approaches in various fields such as sustainable technology, sustainable economics and sustainable business. To ensure a sustainable economy, several key areas have been explored, such as environmental effects and the consequences for nature from unconstrained economic growth, along with the prospects for economic activity that takes greater account of the social and environmental consequences of market behaviour [8–10].

Costanza and Patten [11] take the meaning of sustainability from biology, where the term originated: “Biologically, sustainability means avoiding extinction and living to survive and reproduce.

Economically, it means avoiding major disruptions and collapses, hedging against instabilities and discontinuities. Sustainability, at its base, always concerns temporality and in particular, longevity”.

Sustainability is usually defined as: *“a broad interpretation of ecological economics where environmental and ecological variables and issues are basic but part of a multidimensional perspective. Social, cultural, health-related and monetary/financial aspects have to be integrated into the analysis”* [12].

With regard to the economics of production organizations, sustainability means adequately sustaining businesses, avoiding periods of instability and discontinuity and allowing economic activity to survive over time. The basic idea is that sustainability interfaces with the economy through the social and ecological consequences of economic activities [13].

Many economic definitions of sustainability had been put forth. We can mention several recurring aspects of the definition of this term [14]:

- (1) it refers to a way of observing environmental problems in relation to the economy and society;
- (2) the interconnections are usually described as a triangle, a ‘three-legged stool’; or overlapping circles in a Venn diagram, where the three elements can be diversely described as the economy, environment and society, or equity, ecology and the economy;
- (3) despite the fact the specific elements and their relevance can change, what distinguishes sustainability is the observation of the systemic connections and the idea that the constituent elements should be mutually sustaining and reinforcing;
- (4) the focus on intergenerational equity; that is, guaranteeing to future generations the same conditions available to the present generation;
- (5) a final aspect shared by the various definitions, which differs from the traditional way of observing the environment, the economy and society, is the need to go beyond the mere compatibility of existing laws and regulations.

Nevertheless, in general, as Pearce et al. [15] has commented: “defining sustainable development is not a difficult issue. The difficult issue is in determining what has to be done to achieve sustainable development, assuming it is a desirable goal”.

To increase the dissemination of sustainable objectives, numerous international, national, state and local government protocols and policies, as well as the ‘mission statements’ of corporations and NGOs, include a commitment to sustainable development. Based on the guidelines of the “Brundtland Commission” [1], the United Nations has defined a series of Millennium Development Goals. These goals aim at economic development and the elimination of poverty and the objectives include human rights, health, education and environmental questions. In this context the: *“efficiencies of markets, combined with the resources and managerial expertise of large multinationals, are considered crucial success factors in achieving these goals”* [16].

In addition, the Global Compact international initiative was strongly requested by the United Nations to get companies, together with UN agencies, to embrace a set of shared values and principles in the areas of human rights, labor and environmental standards. Along with this process to involve firms in promoting sustainable growth, the Triple Bottom Line has gained acceptance as a new instrument to measure company performance following three approaches: economic, environmental and social [17–21]. At the international level, this emphasis has led to a considerable effort to define the common standards for the drafting of sustainability reports and to identify performance indicators that could highlight the value created in the social and environmental areas as well. The GRI—*Sustainability Reporting Guidelines on Economic, Environmental and Social Performance* [22], are among the most widely used for sustainability reporting, with the purpose of communicating and calculating the impact of business activities on the economic, social and environmental areas.

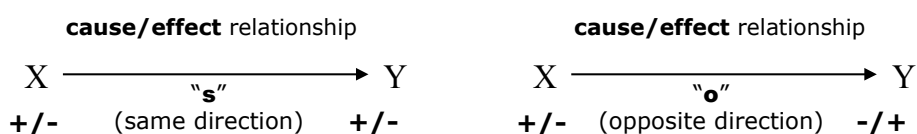
Recently, there has been interest in making company activities more sustainable and also in developing sustainability as a driver for corporate economic success [8,23–25]. A number of theoretical works have conceptualized the link between environmental performance, social performance and financial performance [26–29]. In this context, Schaltegger and Synnestvedt [30] underline

that corporate management would have to identify a specific set of restrictions/incentives for environmental protection and, as a second step, define objectives and goals, formulate plans targeting the cost savings and implement concrete actions. Therefore, today “there is wide consensus that the idea of sustainability figures as one of the leading models for societal development by indicating the direction in which societies ought to develop” [31].

3. Method: Senge’s Systems Thinking Approach

The logic of Systems Thinking can be summarized by this general rule [4]: if you want to understand the “world” you must observe the variables that represent the dynamics of its phenomena and link them together to form unitary, repetitive (often recursive) systems of interconnected variables whose macro-dynamics, on the one hand, derive from the micro-dynamics of the component variables and on the other condition the dynamics of these variables. To understand the global dynamics of these systems, it is necessary to investigate the “causal connections” between variables that constitute them by precisely identifying the linear *chains of causes and effects*, especially the circular ones and the *feedbacks* and *loops* which make the variables interconnected and interactive, so that when the values of a variable change even those of the causal, interconnected variables must necessarily change.

A formal and simple *language* to correlate variables and variations has been suggested by Peter Senge, who proposes to represent the cause-effect relations using oriented arrows, with the input variables (causes) in the *tail* and the output variables (effects) at the *head* of the arrow, as shown in the following Model 1.

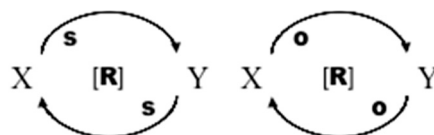


Model 1. Direction of variation in cause/effect relationships.

Two interconnected variables can show the “same” (“s,” or “+”) or “opposite” (“o,” or “−”) direction of variation. The “same” direction means that an increase or decrease in the former produces a consequent increase or decrease in the latter; “opposite” direction indicates that an increase/decrease in the tail variable produces a decrease/increase in the head variable [32,33].

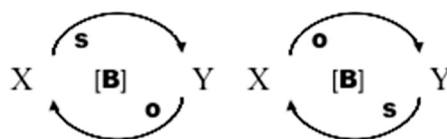
Two or more variables form a *closed causal chain*, or *loop*, when they are connected at the same time in two directions; the first causes variations in the second but this later causes variations in the first. There are only two basic types of loop:

1. *Reinforcing* loops [R], in which the values of the two variables have the same direction of variation: “s and s” or “o and o”; this interconnection—in successive repetitions of the system’s cycle—reinforces the reciprocal increases or reductions, as shown in the following Model 2:



Model 2. Reinforcing loops.

2. *Balancing* loops [B], in which the values of the two (or more) interconnected variables show a different direction of variation: “s and o” or “o and s” as shown in the Model 3:



Model 3. Balancing loops.

Senge proposed a particularly useful class of Systems Thinking models he named “systems archetypes”. These are general recurrent models of relations that recur in various situations and in different environments.

One of the most important and potentially more empowering, insights to come from the young field of systems thinking is that certain patterns of structure recur again and again. These “systems archetypes” or “generic structures” embody the key to learning to see structures in our personal and organizational lives. [. . .] Because they are subtle, when the archetypes arise in a family, an ecosystem, a new story, or a corporation, you often do not see them so much as feel them. Sometimes they produce a sense of déjà vu, a hunch that you’ve seen this pattern of forces before. “There it is again” you say to yourself [3] (p. 93).

The aim of archetypes is to rapidly increase the observer’s capacity to see the systemic problems and their structures and to accustom the regulators and managers to sharpen their perception in order to be able to easily identify the systemic structures that lead to problematic situations and the leverage effect of these structures, in order to formulate definitive solutions.

The systems archetypes—of which there are only a relatively small number—suggest that not all management problems are unique, something that experienced managers know intuitively. If reinforcing and balancing feedback and delays are like the nouns and verbs of systems thinking, then the systems archetypes are analogous to basic sentences or simple stories that get retold again and again [3] (p. 81).

We can state that the problems linked to sustainability arise, are maintained and are difficult to resolve because they derive from the effect of three fundamental archetypes that guide individual behaviour to generate non-sustainable effects.

4. Three Types of Instinctive Archetypal Myopic Behaviour

The first of the two factors that produce non-sustainable effects, indicated in Section 1, can be understood from the explanatory potential of three fundamental archetypes which, while not included in Senge’s list of archetypes, when taken together provide a convincing explanation of how and when a useful, repetitive behaviour of an “agent” (whether it be a man, a territorial organization, a community, a nation) can produce non-sustainable global results even if the behaviour is rational in itself.

The first archetype, called the “Short-Term Myopia Archetype” (Figure 1) [4] (p. 234), describes the behaviour innate in all men (agents) of preferring behaviour that produces short-term advantages (considered in a broad sense) without considering the possible disadvantages from the repetition of such behaviour.

As shown from the structure of the archetype in Figure 1, a rational agent that assigns a high value to short-term advantages deriving from his behaviour (vertical arrow “s”) will most likely repeat this behaviour numerous times, thereby reinforcing the desire to obtain immediate advantages (loop [R1]) without reflecting whether disadvantages that in the long-run produce considerable harm (downward vertical arrow) accompany those repetitive immediate advantages. The perception of short-term advantages reduces the capacity to assess the long-term disadvantages and motivates the agent to continue to repeat such behaviour (loop [R2]). The two loops [R1] and [R2], acting together, reinforce *short-term preferences*, inevitably producing *delayed* and large, often catastrophic, problems when the effect of the disadvantages becomes evident. The model in Figure 1 clearly shows why this archetype is called the “Short-Term Myopia Archetype”; it represents the typical structure

of the behaviour of agents who show an innate tendency to adopt a “short-sighted” rationality, thereby manifesting “temporal myopia”.

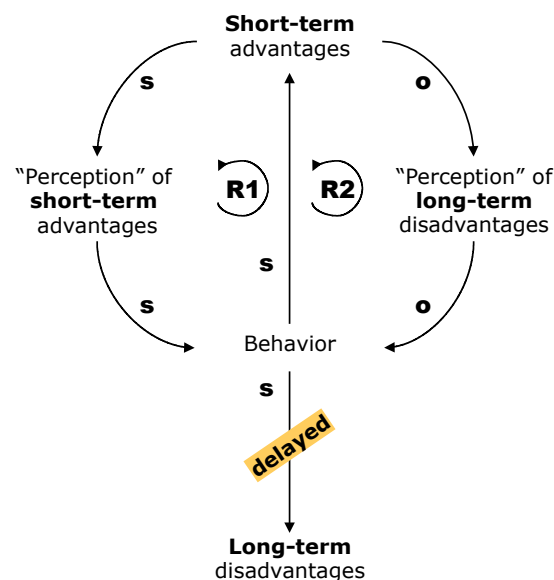


Figure 1. Archetype of Short-term preference (Temporal myopia) [source: [4] (p. 235)].

There is no way out: this archetype is always lurking and operates at all times and in all places, regardless of whether agents are carrying out repetitive behaviours. When we perceive its action, a strategy is necessary to weaken, dampen or mitigate its dangerous effects. Due to the human nature of the agent, it is very difficult to contrast loop [R1]; instead, it is necessary to weaken loop [R2] by implementing a convincing information campaign to make the decision-maker conscious of the long-term disadvantages the short-term behaviour can produce.

A second and equally frequent archetype, entirely similar in structure to the first archetype, is the “Local Myopia Archetype” [4] (p. 236): each individual-agent tends to prefer the repetitive behaviour that brings local advantages, ignoring the global disadvantages that such behaviour can cause. A third archetype, also similar in structure, is the “Individual Myopia Archetype”, so called because the agents prefer individual advantages even if the repetitive behaviour will produce disadvantages for larger groups. Local and individual evaluations provide even more incentive to repeat the behaviour that produced advantages linked to the great future global and collective disadvantages.

The “Local” and “Individual” Myopia archetypes are linked to that of the “Temporal” Myopia archetype in that the local and individual advantages from repetitive behaviour are usually perceived in the short term, while the negative effects usually occur in the long term. For this reason, we can refer to the three archetypes as particular cases of a unitary model called the “Short-Term, Local and Individual Myopia Archetypes”, shown in Figure 2.

It is natural to accept sacrifices more willingly for our family than for the collective. Local advantages or disadvantages from public works (pollution sites, dams, highways, nuclear power plants, etc.) prevail over the global advantages or disadvantages the public works will provide the larger collective or territory. “Not in my backyard” is the most common individual response to the community’s request to put up with the construction of public works for the advantage of the collective.

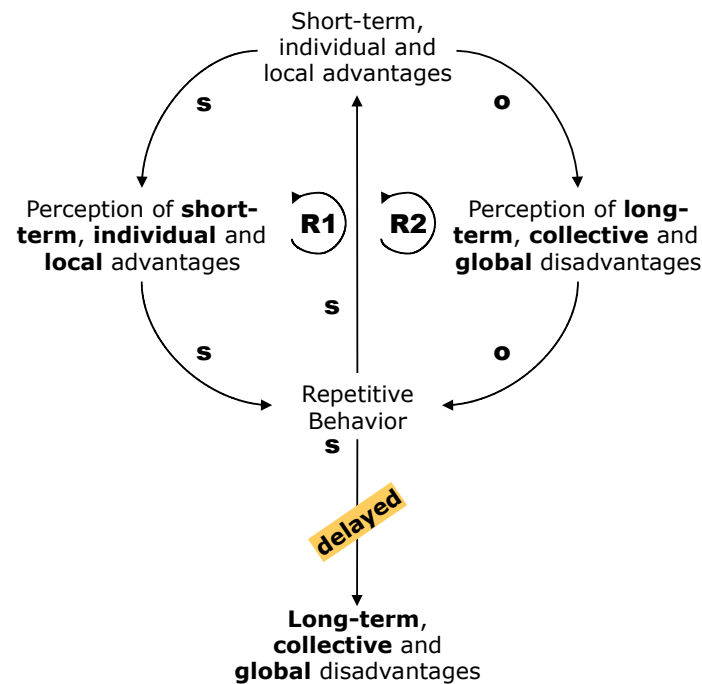


Figure 2. “Short-Term, Local and Individual Myopia Archetype” [source: [4] (p. 236)].

5. Three Strategies to Counter the Archetypes

The “Short-Term, Local and Individual Myopia Archetype”, shown in Figure 2, clearly illustrates that in many cases of repetitive behaviour the rationality of *short-term, local* and *individual* behaviour is illusory and the apparent rational decisions of the single agents are irrational in the long run in a broader context and for the entire collective. The individual advantages prevail and as long as the archetype continues to operate, every agent behaves based on his own “individual” rationality and, without restriction and adequate information, fails to perceive a “global” rationality. Figure 2 reveals that in order to deal with the problem of sustainability in individual behaviour, not only in the economic area but the environmental and social ones as well, it is necessary to weaken the loops [R1] and [R2]. The model in Figure 3, derived from Figure 2, allows us to understand that there are only three possible actions (levers) to counter the Myopia archetypes.

- (1) The first solution is to eliminate or weaken loop [R1] by activating an effective system of disincentives to diminish the short-term, individual and local advantages and decrease the agent’s perception of the convenience of the recurrent behaviour, thereby producing the balancing loop [B1]. The disincentives may take the form of sanctions for the agent’s behaviour or the imposition of costs or taxes proportionate in some way to the agent’s advantages.
- (2) A second solution is to eliminate or weaken loop [R2] through the balancing loop [B2] by stimulating an effective *stream of information* that highlights, in a persuasive approach proportional to the amount of short-term advantages, the negative long-run disadvantages the agent’s current behaviour may produce. The more relevant the agent’s advantages and disadvantages are, the more the information must be persistent over time and diffused over vast territories.
- (3) A third solution operates directly on the agent’s current behaviour through the balancing loop [B3], introducing incentives (social and economic benefits, rewards, tax breaks, etc.) to persuade the agent to decrease the intensity and frequency of his current behaviour and implement processes and technologies capable of reducing the long-term global disadvantage.

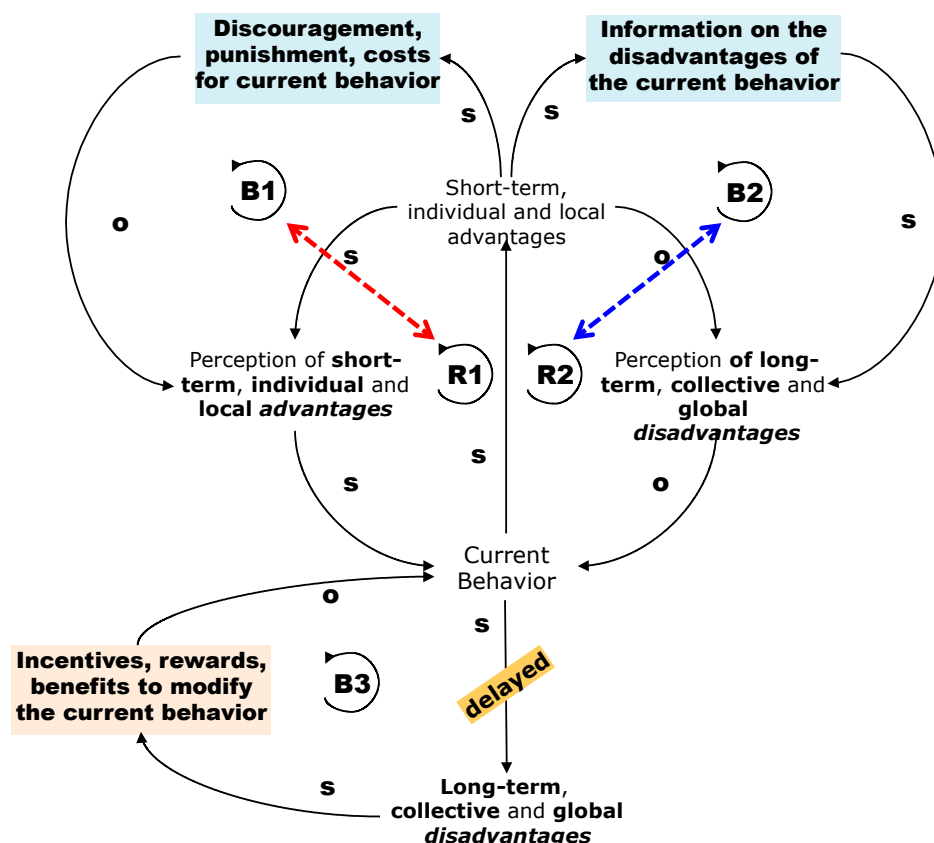


Figure 3. Actions to weaken the “myopia archetypes” that make it difficult to perceive the problem of sustainability [based on: [34] (p. 39)].

The three actions that produce loops B1, B2 and B3 do not necessarily have to be implemented at the same time to counter loops R1 and R2 and directly impact Current Behaviour. The choice of which to use to control the harmful effects of the archetype depends on the type of behaviour one wants/must regulate and on the nature of the agents that produce such behaviour. In many cases, the repeated behaviour produces such great advantages for the agents that to weaken the harmful effects the joint action of all three levers is indispensable.

It is necessary to state that the archetypes in Figures 1 and 2 act at both the level of the individual and that of the collective, or population of similar agents, who, by producing similar short-term behaviour/effects produce cumulative effects that, when summed, lead to long-term collective and global disadvantages for the collective or the population considered as a whole. If an individual uses a plastic bag, he produces garbage; if millions of individuals behave in the same way, pollution of the land and sea occurs, which is not anticipated by the individual agents.

On 5 October 2017, a conference was held in Malta on “Our Ocean,” with the objective of getting governments and firms to make more of a commitment to preserving the sea from plastic and non-biodegradable refuse.

The very properties for which plastics are famed can also be considered their greatest flaw. Longevity, robustness and abundance has led to marine plastic pollution being dubbed “one of the most serious emerging threats to marine biodiversity”, according to the Convention on Biological Diversity. The scale and quantity of plastic production is truly staggering—PlasticsEurope estimates that global plastic production now exceeds 280 million tonnes each year. The industry itself is worth over US\$1 trillion according to experts [35] (online).

Abandoned plastic bags have even been found on the highest peaks of the Himalayas.

Waste is an equally complex issue further up the mountain, where climbers frequent the same few routes to attempt safe ascents—and where they leave behind their refuse to avoid carrying any extra weight. Plastics, tents, oxygen tanks and even the corpses of past climbers lay scattered on the slope [36] (online).

In order to better understand the action of the “myopia archetypes”—both at an individual and collective level—and to become aware of the various forms of intervention available, it is useful to present some emblematic situations, while also recognizing that these represent only a small part of a wide range of possibilities.

6. Myopia Archetypes Describing Individual and Local Behaviour

To understand the *modus operandi* of the Myopia Archetypes, it is necessary to present as the first case the Temporal Myopia archetype, which acts in all parts of the world to determine the destinies of a large number of people that make recurring use of substances that bring great immediate benefits while also producing irreversible long-term harm: the hardened smokers who, to gain the benefit of nicotine intake cigarette after cigarette, year after year, increase their chances of serious long-term health damage (Figure 4).

In many countries, public health regulators have come up with two measures to combat this archetype:

- (1) activate loop [B1] to discourage the perception of a benefit from smoking (current behaviour) by instituting various bans, such as prohibiting smoking in most enclosed public spaces, while driving, in offices, etc., with fines for transgressors and by gradually raising cigarette and cigar duties;
- (2) activating loop [B2], with information campaigns aimed not only at habitual smokers (“smoking kills” is written on cigarette packets in many parts of the world) but also and mainly at potential smokers: youth and school-age children.

If we also consider the effect of individual myopia, the immediate individual advantages clearly produce very significant collective disadvantages: the growth in the number of people with smoke-related diseases leads to an increase in collective health costs, reduces individuals’ work capacity and leads to burdens for families.

The archetypes that regulate the behaviour of smokers can be applied to many other recurrent behaviours similar in nature—immediate benefits and considerable future harm—such as the high consumption of alcoholic beverages, drugs and stimulants (doping), sleeping pills and antidepressants and other addictive substances. Such repetitive behaviour not only causes long-term, serious harm to the health of individuals but also acts in the short term to interfere in their driving capacity or cause them to perceive an altered reality, etc. At the collective level, there clearly is serious damage to society. In these situations, it is possible to activate loop [B3] (Figure 4) to provide incentives for individuals to enter support groups and/or undergo treatment for alcohol and drug dependence. The immediate local advantages cause global damage and disadvantages in subsequent decades, as described in the model in Figure 5.

To stimulate economic development, some countries or areas within a country allow their businesses to use fossil fuels and processes that produce high levels of toxic gas emissions and polluting material. The local advantage is immediate: it allows these firms to win out over their competitors and to grow, allowing the country, or area, to develop in terms of employment and per capita income. Such permissive behaviour, when repeated over the years, produces long-term damage to the health of citizens and to the global environment.

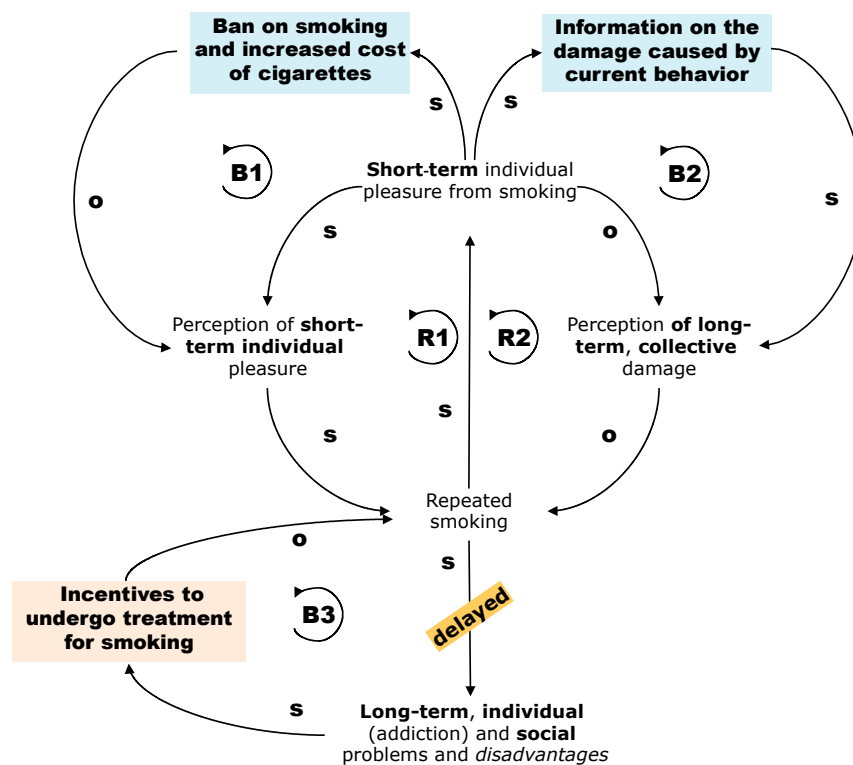


Figure 4. The “myopia archetypes” that guide the behaviour of smokers and consumers of intoxicating and narcotic substances.

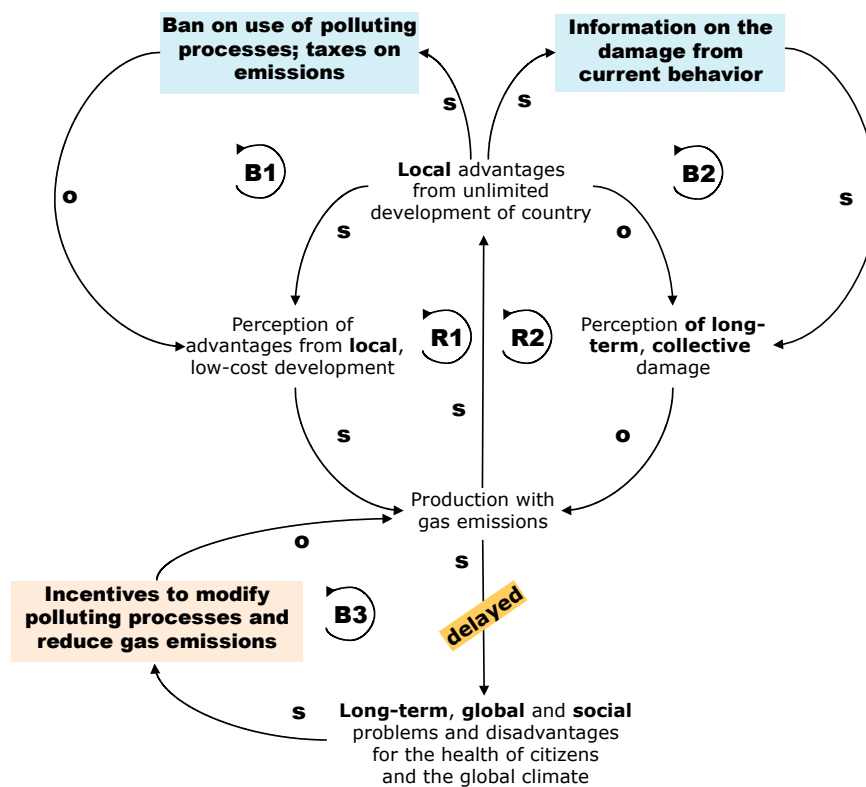


Figure 5. The “Short-Term and Local Myopia Archetype” that guides the local behaviour of areas packed with industries, which, to produce at low costs, use materials and processes with high levels of pollution.

7. The Effects of the Myopia Archetypes on Population Dynamics

The myopia archetypes act at the collective and global levels to guide the behaviour of individuals in a group or population viewed as a whole. As an example, consider the action of the Individual Myopia archetype, which guides the action of the average person who, instinctively, feels the need to reproduce, thereby gaining the immediate individual advantages of joy and pride from the birth of a child, advantages that reduce the perception of the global disadvantages and harm to the environment, society and the economy from non-sustainable overpopulation. It is important to note that “population” dynamics are not only triggered by the innate instinct to reproduce but are normally accentuated by the culture of society. Repetitive behaviour in the short term triggers an increase in population; in cases of abundant resources, this increase is an advantage for society. Once the resource constraints have been exceeded, there is the risk of overpopulation and non-sustainability for the environment, society and the economy, as shown in Figure 6.

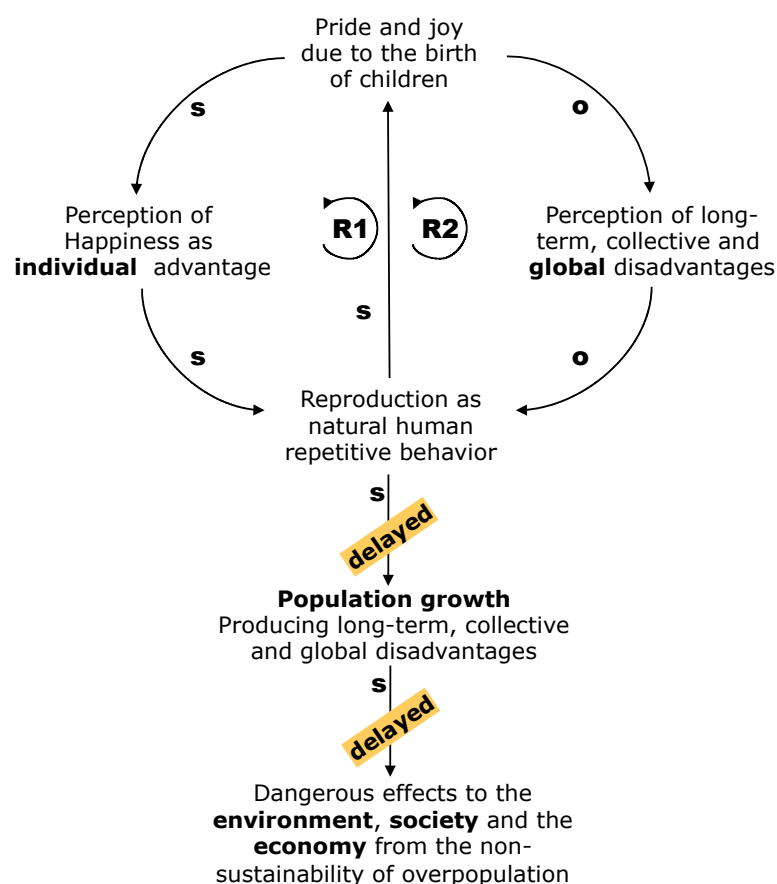


Figure 6. How the archetypes of myopia produce the non-sustainability of “population” increases.

The harmful consequences of overpopulation, which are heightened in the long run, are clear. However, it is useful to note the following unwanted harmful effects: the increase in the number of megacities, which today already number a dozen or so, the reduction in the availability of water resources, the non-sustainable exploitation of food sources and the need for a continuous increase in global activity. The most serious problems of global non-sustainability are associated with the effects of the latter, since the continuous growth in global economic activity—which is needed for employment and the production of goods to satisfy the needs of a growing population—leads to:

- (a) the depletion of resources, especially non-renewable ones, above all those defined as “commons” due to the fact they are limited, of common use and freely exploitable (Section 7);

- (b) the continuous increase in energy consumption;
- (c) the increase in waste, especially solid and liquid waste;
- (d) the reduction or exhaustion of disposal sites for solid waste and the risk of uncontrolled waste disposal in the environment (plastic in the oceans and radioactive waste buried indiscriminately);
- (e) increasing pollution and the dramatic effect of global warming and rising sea levels.

Note that the archetype in Figure 6 can also produce the opposite effect on the overall population. When the individual, repeated behaviour is less frequent and intense, then the global effect can be a reduction in the population, which can become non-sustainable when it does not allow the levels of economic growth, employment and welfare to remain unchanged and alters the fiscal and pension system equilibriums, thereby making it more difficult for new generations to maintain their quality of life at the level attained by the previous generations.

It is difficult for regulators to identify the actions that can affect the archetype in Figure 6 since this model describes behaviour belonging to the affective—and instinctive—sphere of agents in the social contexts in which they operate. In the case of overpopulation, a system of incentives and punishments to avoid new births is quite improbable; the introduction of laws or constraints to limit the birth rate has been experimented with but the joy from having new children has shown itself to be much stronger than the laws to combat this. Laws to limit the birth rate were adopted by the People's Republic of China, which, in 2001, implemented the "one-child policy" for the control of demographic growth with a law that forbid families from having more than one child. This policy was revised in December 2013, thereby allowing Chinese couples to have two children.

When the archetype has led to a non-sustainable decrease in the population, policies were introduced to spur population growth by activating various forms of economic incentives to produce large families, such as occurred in Italy from the end of 1925 to the end of the Second World War and by instituting measures to reduce infant mortality, improve living conditions and health, provide assistance to new mothers, increase the number of nursery schools, etc., as occurs today in many European countries with low birth rates.

8. Myopia Archetypes Describing Collective and Global Behaviour: The Tragedies of the Commons

The overpopulation effect has been noted by Garret Hardin regarding the problem of the exploitation of the "commons." Hardin states:

Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all. [...] As a result of discussions carried out during the past decade I now suggest a better wording of the central idea: Under conditions of overpopulation, freedom in an "unmanaged commons" brings ruin to all [37] (p. 1244).

In the exploitation of common resources, the main problems of sustainability derive from the need of individuals, usually productive organizations (the appropriators), to employ ever greater quantities of scarce resources in their processes to obtain the economic advantages from their use [38]. The continued and growing exploitation of non-renewable resources makes them even scarcer, so that in the long run their use becomes globally non-sustainable, as illustrated in Figure 7.

We can easily see that the free exploitation by individuals of non-renewable, scarce resources lessens their global availability for the collective and their use becomes increasingly less efficient and "less economic". To maintain their production and economic standards, the appropriators must intensify the search for residual resources, no matter how scarce, with increasing intensity in order to invent and utilize new methods of research and exploitation, as shown by loop [R3] in Figure 7. Such an effort leads to the complete depletion of the resources, producing the initial "tragedy": the interruption of the economic activities that were using the depleted resources, with negative effects for individual and collective outcomes. On the other hand, it is precisely this increase in population

that, in almost all situations of scarce common resources, accentuates the effects of myopic behaviour, since the non-sustainable effects of the exploitation can cause conflicts among the appropriators, which represents a “second tragedy”, as testified to by the numerous wars over water, oil and gold. It is thus appropriate to give the archetype in Figure 7 the title: “The Tragedies of the Commons”.

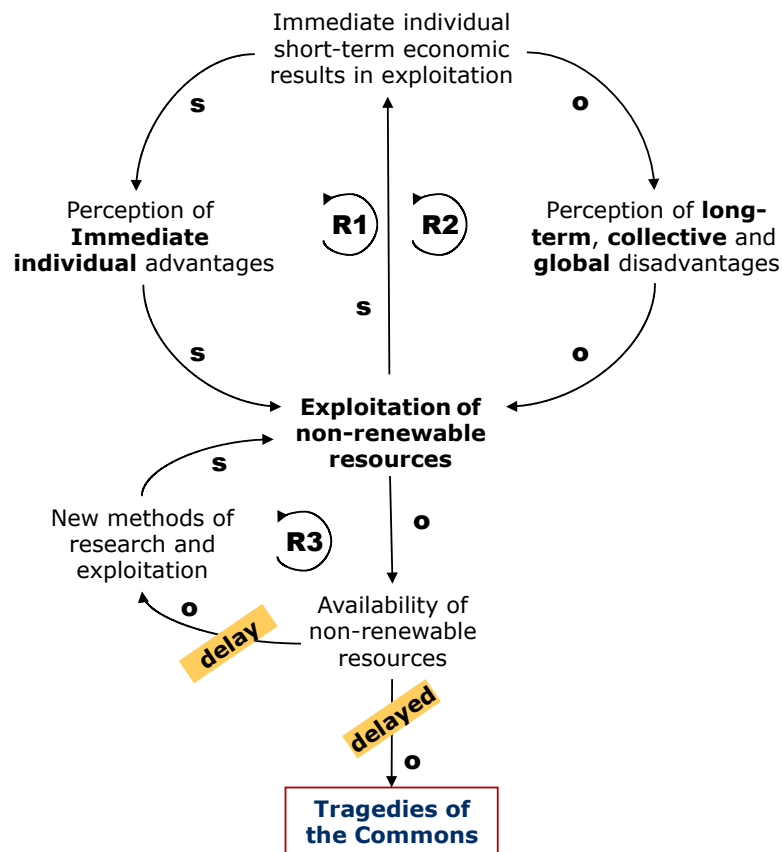


Figure 7. The Tragedies of the Commons.

The archetype in Figure 7 recurs to such an extent that the model which describes it is known in the literature as “The Tragedy of the Commons Archetype”. As with all archetypes, this one is always operating and understanding it is indispensable for identifying the causes of the Tragedies of the Commons and finding remedies [4] (p. 250). The fish in waters with limited populations of fish, the search for precious materials in a limited area, the reduction (often due to fires) of the tropical forests due to the needs of the local inhabitants to create space for arable land, the lowering of the water levels due to the need for intensive irrigation and the drying up of rivers due to the withdrawal of water to irrigate rice fields: these are all examples of this archetype.

The action of the archetype in Figure 7 is inexorable. Is there any way to combat the Tragedies of the Commons archetype? In general, individuals, producers and consumers must be informed about the long-term global non-sustainability of their current behaviour so that they may undertake educational campaigns to modify lifestyles and production processes, as indicated in the model in Figure 8.

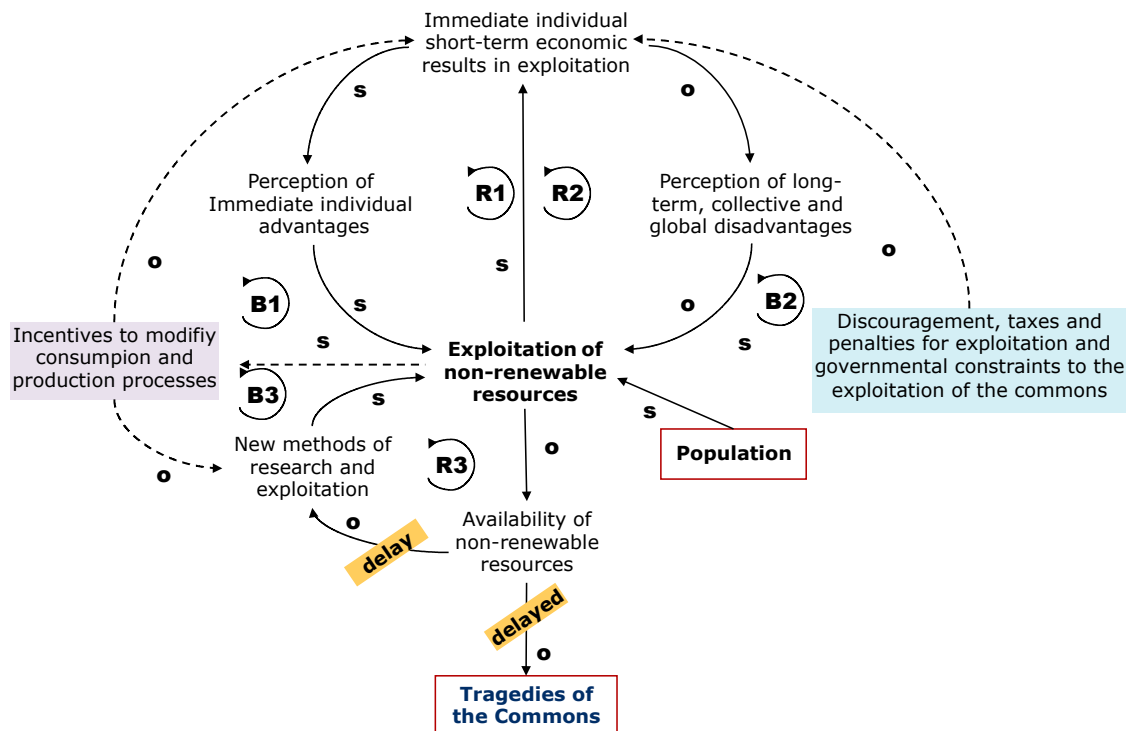


Figure 8. Actions to counter the non-sustainability of the appropriation of the Commons and avoid the Tragedies of the Commons.

Other actions which directly impact the appropriators are:

- (1) delimiting the area of exploitation of the common resources and limiting the appropriators; this measure often produces conflicts among the potential appropriators, who are trying to guarantee themselves the maximum availability of the scarce resource;
- (2) specify the admissible technologies and processes to exploit the resource;
- (3) set up an outside authority to encourage collective participation and draft common regulations for the appropriators, with precise rules for resource exploitation;
- (4) discourage conflicts among appropriators and set rules to resolve conflicts in a peaceful manner.

9. Myopia Archetypes and Global Warming

Global warming is a global phenomenon that has led to a rise in average temperatures on land, the oceans and at the Poles. This increase in temperature is the result of agents' economic activity, his consumption and his production processes, which emit greenhouse gases in the atmosphere (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride), thereby producing a greenhouse effect that traps the heat [39,40] and heightens the effects of solar radiation.

To understand how the myopia archetypes intervene in this process, we require a slightly different model than that in Figure 2; one that puts in the foreground Global Economic Activity (GEA) as recurring global and collective behaviour, year after year. Therefore, it is useful to use the model in Figure 9—which represents a variant of Peter Senge's model [3]—which, though seeming to be different, corresponds in fact to the general model.

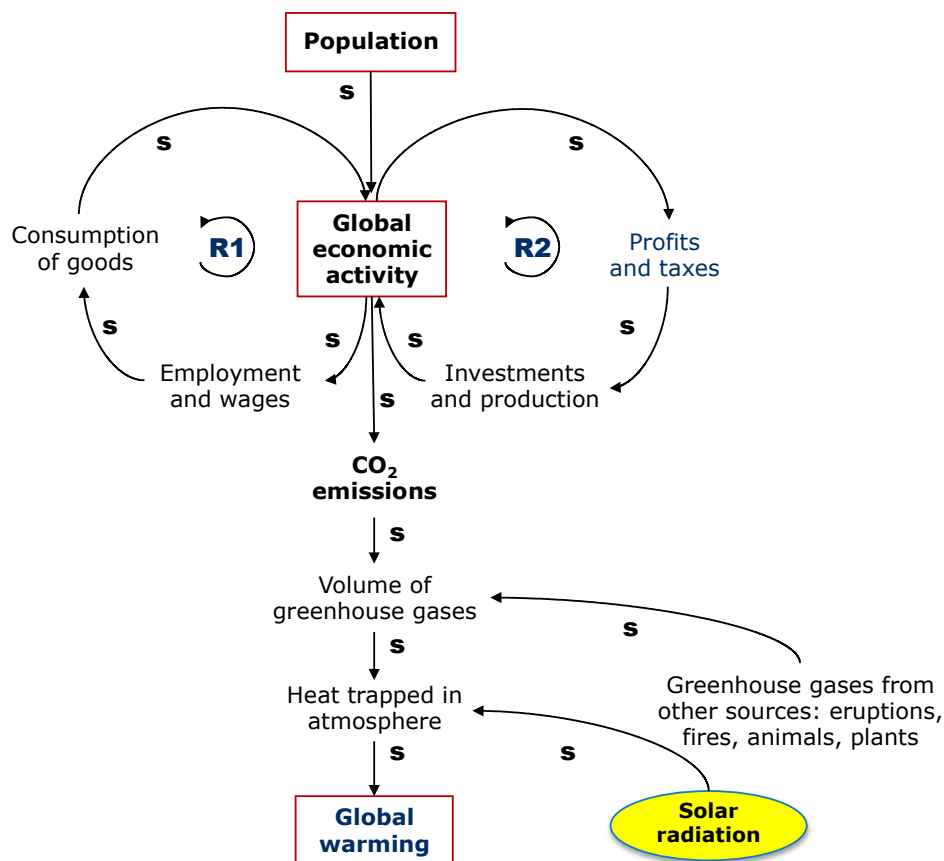


Figure 9. Global warming [source: based on [3] (p. 345)].

The upper part of the model in Figure 9 also shows the variable “population”, connected in direction “s” to GEA. This means that the dynamics of this last variable depend on those of the “population” and not vice-versa (Section 7); the connection is in a single direction and does not form a loop. Inserting “population” as an *exogenous variable* is significant: it is difficult to control or reduce Global Economic Activity when population increases. On the other hand, it is precisely this increase in population that, in almost all situations of scarce common resources, accentuates the effects of myopic behaviour.

The Loops [R1] and [R2]—due to economic development necessarily driven by the growing “population”—describe the *advantages* from the repetition of GEA, both for individuals and production organizations. The GEA produces employment and wages for workers, who then undertake consumption, while for production organizations GEA represents the source of investment opportunities in productive activities and consequently of profits, also providing tax revenue for public organizations.

Nevertheless, GEA also has some *disadvantages*, since it is one of the sources of the emission of CO₂ and other greenhouse gases, which produce Global warming and its expected long-term environmental damage: increases in sea levels, weather disturbances, the breakup of glaciers, drought, more frequent hurricanes, etc.; phenomena that appear to be occurring sooner than predicted. For Maslin [39], these effects are accompanied by more intense economic activity: houses to rebuild, entire cities to be moved, new products, etc., with a new increase in global economic activity. Global warming cannot be easily controlled through individual actions directly on global temperatures; instead, global actions are required to intervene on the causes of this phenomenon at the global level. Therefore, supranational actions are needed to identify and implement a strategy to limit emissions, as shown in the model in Figure 10, which highlights the three classes of possible strategic interventions (boxes 1, 2 and 3).

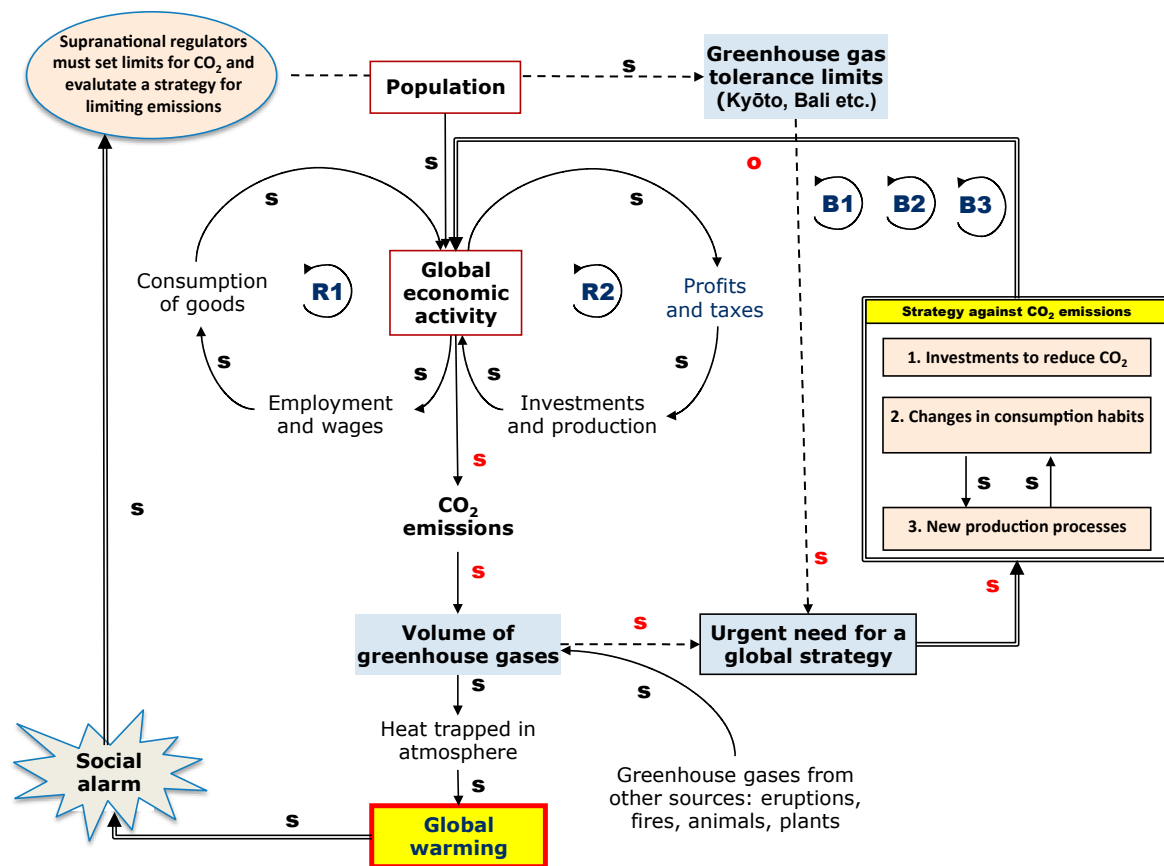


Figure 10. Strategy to counter global warming [source: based on [34] (p. 286)].

There is a simple interpretation of the challenging model in Figure 10. When the use of sophisticated measuring instruments revealed the global warming phenomenon and its associated disastrous effects on the environment, economy and society, a “social alarm” became ever more intense (s) and the nations tried to impose a series of tolerance limits to greenhouse gases (s) through international agreements such as the Kyoto protocol (signed in Kyoto on 11 December 1997, by over 160 countries at the COP3 Conference during the United Nations Framework Convention on Climate Change). These treaties obliged industrialized countries to intervene in their economies to reduce the emissions of polluting substances by at least 5.2% from 2008 to 2012, with respect to emissions in 1990 (base year). The recent Bali agreement (2007) established a drastic reduction (25–40 percent by 2020) in greenhouse gases. More recent agreements (Paris, 11 December 2015) have modified the percentages originally agreed upon while leaving unchanged the sense of urgency and danger from global warming.

The Nations that signed the treaties activated several operational levers [34] (pp. 284–289). One of these was *investment* to finance concrete actions to reduce CO₂ emissions below the maximum tolerance limits (box, 1 (these measures are too many and varied and thus are not detailed in the model), thereby producing loop [B1]. The “social alarm” also activates two other powerful measures: on the one hand, fostering the development of a culture that favours a *change in consumption habits* (box, 2), trying to get people to consume goods whose production takes place with limited emissions of greenhouse gases (loop [B2]); and on the other hand, fostering a change in *production processes* (box, 3), encouraging production organizations to reduce emissions of CO₂ and other greenhouse gases (loop [B3]). The function of these three balancing loops is to counter the two original reinforcing loops, [R1] and [R2], that produce continual global economic activity. If the three classes of strategic actions (boxes 1, 2 and 3) are successful and there are no emissions of greenhouse gases from other

sources, there will be a reduction (sense o) in CO₂ emissions which will allow the system to achieve the maximum allowable limits (Kyōto, Bali, etc.).

It is intuitively clear that the archetypes in Figure 9 never cease operating to counter the strategies imposed by the supranational regulators; in order to change consumer habits the structure of products and the production methods must be changed and this requires resources for the new productive structures for distribution. The individualistic behaviour of consumers and entrepreneurs results in an unwillingness to accept the necessary costs. Thus, the strategy for global intervention must contain *disincentives* for producers who do not change their products and production processes (for example, a carbon tax) as well as *incentives* for consumers (bonus for energy saving, incentives regarding the prices of new products, etc.) that will modify their consumption function. The archetype of local preferences is particularly active. The strategy to counter global warming must be adopted worldwide by a supranational authority; unfortunately, because of local interests not all nations have joined the various conventions aimed at carrying out a collective, global strategy against the emission of greenhouse gases. Moreover, there is a tendency to spread out over time any strategic measures, clearly displaying a short-term mentality.

10. Sustainability as a Strategic Driver

Attention to sustainability has led to an expansion of the concept to include more aspects. It has become a value-laden concept comprising many ideals such as equity, choice, confidence and quality. Given that the term now has environmental, economic, social and political dimensions, a broad, undifferentiated use of the term makes sustainability difficult to understand. Sustainable growth does not represent an option but is rather a necessary condition for success in the medium-long term; social responsibility becomes an important strategic factor [41]. Growth and development must be compatible with the needs and expectations of the citizens: consensus and social legitimization favour the conditions of trust necessary to achieve earnings and competitive advantages [42]. Sustainable development approaches everything in the world as being connected through culture and territory to the quality of life. For example, an island community may have to focus among other things on sustainable fishing, whereas a community dependent on forest products will have a different priority. Quality of life (QOL) is affected by internal or personal attributes of people and by the external or societal environment in which they live. The external/societal impact on QOL directly links quality of life to sustainability) [43,44].

It is appropriate at this point to redefine the concept of sustainability for production organizations, which are the fundamental actors in global economic activity. In general, corporate policies for sustainable economic development growth that respect environmental sustainability cannot be left to the discretion of entrepreneurs but must be guided and, where necessary, imposed on them. The sustainable economic development fits into the company's ethical conduct, within the framework of corporate social responsibility when adopting socially responsible behaviour [45], fulfilling the economic, environmental and social expectations of all stakeholders [46].

If, on the one hand, the rules of corporate governance, from the Cadbury Code [47] to the Sarbanes-Oxley Act [48], aim at stimulating the adoption of codes of self-discipline and favouring more ethical management behaviour [49], other institutional rules, in particular in the environmental area, constrain firms to adapt their behaviour, as for example in the case of the European market for emission permits, which obliges firms to act in line with the principles of sustainable growth [50]. Moreover, larger, publicly-quoted firms are asked to increase their sustainability and to publish their results in the economic, environmental and social domains. The Communication on the EU Strategy for Sustainable Development (15 May 2001) [51] invited all publicly-quoted companies with at least 500 staff to publish a "triple bottom line" in their annual reports to shareholders that measures their performance against economic, environmental and social criteria. In general, the quantity and quality of international, national and local environmental legislation has increased significantly and international agreements, as the Kyoto protocol, was the impetus to start a global policy change.

However, as we can observe, the results are still scarce. Highlighting the opportunities this presents to companies, considering in particular the concept of sustainability as a strategic driver to introduce innovations in products/services and thus achieve a competitive advantage [52,53].

We propose adopting for this purpose Systems Thinking as a powerful instrument to guide the firm toward the objectives of sustainable growth and the creation of shared value. Several interesting models should be mentioned that have recently appeared in the literature on this topic.

According to Nidumolu et al. [54] in the future, only the companies that will make sustainability a goal will achieve competitive advantage. That means rethinking business models as well as products, technologies and processes. The authors propose a five-stage process needed to emerge from the recession and make the firm sustainable [54] (pp. 2–12):

- Stage 1: Viewing Compliance as an Opportunity
- Stage 2: Making Value Chains Sustainable
- Stage 3: Designing Sustainable Products and Services
- Stage 4: Developing New Business Models
- Stage 5: Creating Next-Practice Platforms.

Porter and Kramer [55] emphasize the importance of redefining the purpose of the corporation in order to orient it toward the creation of shared value.

The purpose of the corporation must be redefined as creating shared value, not just profit per se. This will drive the next wave of innovation and productivity growth in the global economy. It will also reshape capitalism and its relationship to society [55] (p. 4).

Therefore, the authors propose a model illustrating three key ways that companies can take to create shared value opportunities:

- (1) Reconceiving products and markets;
- (2) Redefining productivity in the value chain;
- (3) Enabling local cluster development.

Thus, firms should “look at decisions and opportunities through the lens of shared value. This will lead to new approaches that generate greater innovation and growth for companies—and also greater benefits for society” [55] (p. 15).

On the other hand, as Baumgartner and Ebner [8] (p. 6) point out, management should pay more attention to several aspects that are indispensable for achieving business sustainability, such as:

- a. Innovation and technology, in order to reduce environmental impacts from new products and from business activities;
- b. Collaboration with the various business partners (for example, suppliers, R&D institutions, universities);
- c. Knowledge management, to implement the organizational knowledge base;
- d. Processes, that must be planned and roles assigned in order to integrate sustainability into daily business life;
- e. Purchase, being aware to sustainability related issues and relations with suppliers, in order to improve business sustainability;
- f. Sustainability reporting, in order to evidence the results achieved [56].

In conclusion, we hold there are good opportunities for firms who effectively base their activities on the fundamental principles of sustainable growth. In this sense, the concept of sustainability could be broadened by indicating the positive effects in terms of greater innovation and competitive advantage for firms that adopt sustainability as a goal. Thus, corporate sustainability could be defined as the capacity of the firm to adequately sustain its business and improve the medium-long term economic, environmental and social conditions. If effectively adopted as a goal and properly

implemented in the production of goods and services, sustainability can represent a strategic driver to develop innovation and achieve competitive advantage.

To this end, we feel it useful to allow firms to share their objectives of change in view of the actual interests of their stakeholders. In the interests of firms, it is necessary from this perspective to consider the strategic potential of sustainability to produce innovation and achieve competitive advantage.

A sustainable world, too, will only be possible by thinking differently. With nature and not machines as their inspiration, today's innovators are showing how to create a different future by learning how to see the larger systems of which they are a part and to foster collaboration across every imaginable boundary. These core capabilities—seeing systems, collaborating across boundaries and creating versus problem solving—form the underpinnings and ultimately the tools and methods, for this shift in thinking [57] (p. 11).

11. Conclusions

The main contribution of this paper is having shown that the problems of non-sustainability derive from agents' widespread "myopic behaviour" based on a simple and powerful systemic archetype whose *modus operandi* remains unvaried over time and space.

The action of such archetypes clarifies that the non-sustainability can be conceived of as the consequences of many (apparently rational) decisions that guide agents' behaviours. In particular, the paper has presented models for three archetypes, defined as the archetypes of "agents' myopic behaviour" (Figures 1 and 2):

- (1) Archetype of Short-term preferences (Temporal myopia)
- (2) Archetype of Local preferences (Local myopia)
- (3) Archetype of Individual preferences (Individual myopia)

These archetypes almost always act jointly and are mutually reinforcing (Figure 2). Facing the problem of non-sustainability means not only recognizing the action of those archetypes that produce non-sustainability but above all identifying those strategies that can oppose their actions and reduce their negative effects, as shown in Figure 3. Among the countless number of non-sustainable phenomena, we have presented those for which Global Economic Activity represents the engine that produces the non-sustainability of several relevant effects although many other more serious scenarios, often catastrophic, are possible:

Global catastrophes threaten the long-term sustainability of human civilization. The stakes are astronomical, given that humanity could potentially colonize space and achieve results of great value across the universe. Most research on global catastrophes has focused on preventing the catastrophes from occurring [58] (p. 1475).

Figure 11 correlates the action of three archetypes with three fundamental areas: environment, economy and society [59]. The joint action of the three archetypes clearly shows that individualism and localism prevail in human social behaviour, which can also become a form of "selfishness" that can run counter to the common good. Towards the environment, the prevailing behaviour involves the "short-sighted" and localistic use of environmental resources of all kinds, from materials to the territory.

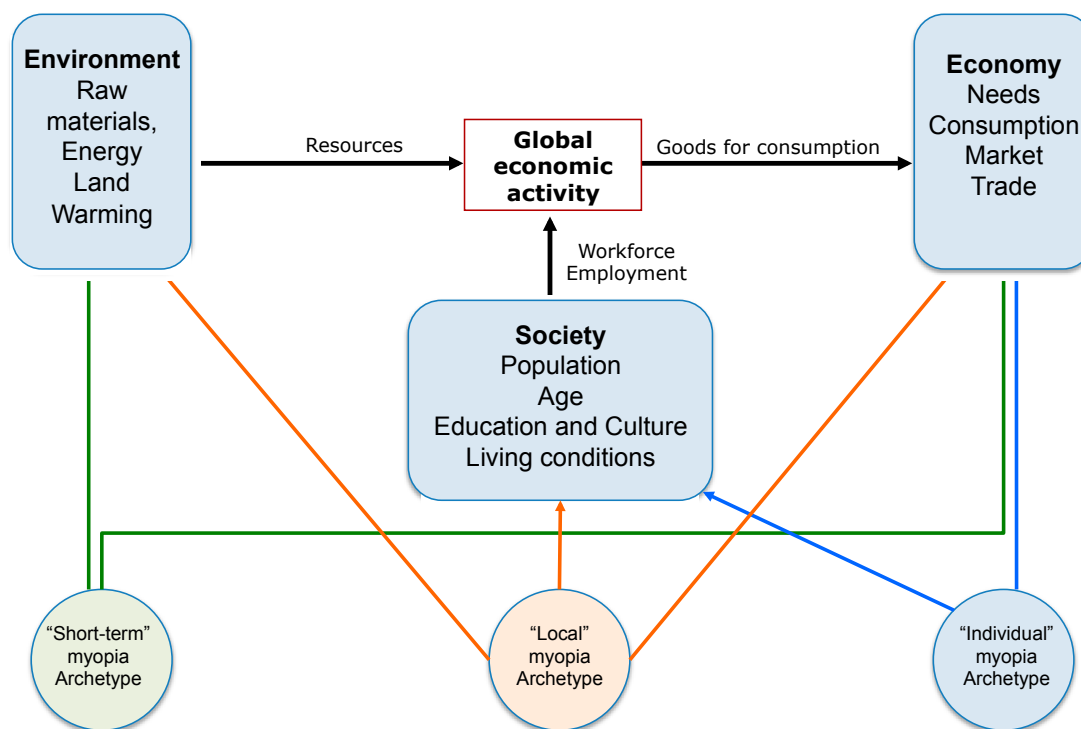


Figure 11. Impact of the three archetypes on Environment, Economy and Society.

When you begin to expand boundaries, you will start to see underlying limits and new forces at play, such as the increasing costs and risks of oil-based feedstocks (DuPont) or the need to reduce waste (Alcoa) or to conserve water (Coke and Alcoa). Many of the limits were there all along but have been obscured by previously assumed mental models, such as “We’re in the oil and gas production and marketing business, not the energy business and certainly not in the renewable energy business”. Additionally, the day when we’d need to take these limits into account seemed far enough in the future that they were easy to ignore and most companies did just that. But that day is here or rapidly approaching for many, often more quickly than people’s mental models are changing [57] (p. 189).

In the economic area, all three archetypes influence human behaviour; preference for a short-term perspective for production, consumption and the satisfaction of needs and the existence of individualistic and localistic attitudes often inhibit the economic integration of different areas, a focus on long-term social needs and forms of fair trade.

There are two clear consequences of the action of these archetypes:

- the problem of sustainability is not perceived at the individual level in the short run and in circumscribed environments; instead, the problem must be dealt with by “public (collective) regulators” oriented toward protecting the long-run collective interests;
- the need for people to be *educated* regarding sustainability in order to produce generalized cultural change.

In this sense sustainability must be associated with social innovation which refers to new ideas that resolve existing social, cultural, economic and environmental challenges for the benefit of people and planet. A true social innovation is system-changing—it permanently alters the perceptions, behaviours and structures that previously gave rise to these challenges. Even more simply, a social innovation is an idea that works for the public good [60,61].

Social innovation is an initiative, product, process, or program that profoundly changes the basic routines, resource and authority flows or beliefs of any social system (e.g., individuals, organizations, neighbourhoods, communities, whole societies) [62] (p. 259).

For consumers whose behaviour is strongly affected by the action of the myopia archetype, cultural change leading to a change in their preferences and consumption standards cannot easily be imposed by national or supranational regulators through laws but must occur at the collective, social and individual levels. For example, it is not enough to forbid by law the consumption of whale meat (since whales are in danger of extinction), forbid their hunting, or close down restaurants that cook them. Neither is it enough to forbid the use of plastic bags, which are convenient for shopping. It is necessary for consumers to become aware of the problem and to modify their consumption habits. Cultural change must receive incentives and support at the global level over a long period, since it must overcome the breaking power of the short-term and individualistic preferences.

Clearly evident is the importance of both extensive and convincing information on the negative long-term effects from short-term behaviour and extensive instructional systems to sensitize the individuals-agents in assessing the individual and global consequences of their behaviour and to modify this from a sustainability perspective. The OECD is aware of the importance of consumer education and recommends developing a policy of education in the use of new technology to enable “informed consumption” to be implemented and emphasizes: “*growth in the use of online technologies for work, leisure, electronic commerce and other activities has greatly increased the need for consumers to develop digital competence*” [63] (p. 12). The hope is that the consumer able to inform himself in an appropriate manner will become more aware and implement a consumption policy that does not conflict with the non-sustainability of his choices [64,65].

We feel that, in order to be effective, information and instruction must be spread over a vast territory and be very detailed, uniform, credible and convincing. Cultural change represents the definitive solution that exploits the potential of informed and educated individuals.

The advantage of systems thinking derives from the leverage effect—seeing in what way the actions and changes in the structures can lead to long-lasting, meaningful improvements. Often the leverage effect follows the principle of the economy of means, according to which the best results do not come from large-scale efforts but from well-concentrated small actions. Our non-system way of thinking causes significant specific damage because it continually leads us to concentrate on low leverage effect changes: we concentrate on symptoms of higher stress. We correct and improve the symptoms: but such efforts are limited, when things go well, to improving short-term factors, while worsening the situation in the long run [3] (p. 131).

Without such change, normative and structural efforts run the risk of being merely symptomatic interventions on individual variables and thus of not producing the *leverage effect* on the myopia archetypes needed to deal with sustainability.

Finally, in many cases the use of a single myopia archetype, while making it easier to understand the effect of the causal relation “repeated actions of agents”/“global systemic consequences”, is not enough to describe complex situations in which two or more archetypes often act together. In this case, the behaviour of agents’ changes, producing consequences which at times are combined and at other times interfere to such extent as to make it difficult to grasp the global effects. In such circumstances, the systemic consequences of different types of repeated actions produce unpredictable effects in the Environment, Economy and Society subsystems which at times are “counter-intuitive” (Figure 11). In these cases, for a thorough understanding of the variables that produce the effects of non-sustainability the observer must make an effort to identify and explain his point of view. The present paper has not dealt with this possibility, whose analysis would go beyond the aim of making the *modus operandi* of non-sustainability explicit.

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References

1. Brundtland, G.H. World commission on environment and development. In *Our Common Future*; Oxford University Press: Oxford, UK, 1987.
2. Adams, W.M. The future of sustainability: Re-thinking environment and development in the twenty-first century. In *Report of the IUCN Renowned Thinkers Meeting*; IUCN: Zurich, Switzerland, 2006; Volume 29, p. 31. Available online: <http://iucn.org> (accessed on 26 October 2017).
3. Senge, P.M. *The Fifth Discipline: The Art and Practice of the Learning Organization*, 2nd ed.; Doubleday/Currency: New York, NY, USA, 2006.
4. Mella, P. *Systems Thinking: Intelligence in Action*; Springer: Berlin, Germany, 2012.
5. Senge, P.M. *The Fifth Discipline Fieldbook*; Boubleday, Random House Inc.: New York, NY, USA, 1994.
6. Meadows, D.H.; Meadows, D.L.; Randers, J.; Behrens III, W.W. *The Limits to Growth: A Report to The Club of Rome*; Universe Books: New York, NY, USA, 1972; Available online: <http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf> (accessed on 26 October 2017).
7. International Union for Conservation of Nature (IUCN); Natural Resources, and World Wildlife Fund. *World Conservation Strategy: Living Resource Conservation for Sustainable Development*; IUCN: Gland, Switzerland, 1980.
8. Baumgartner, R.J.; Ebner, D. Corporate sustainability strategies: Sustainability profiles and maturity levels. *Sustain. Dev.* **2010**, *18*, 76–89. [CrossRef]
9. Dalla Chiara, B.; Pellicelli, M. Sustainable road transport from the energy and modern society points of view: Perspectives for the automotive industry and production. *J. Clean. Prod.* **2016**, *133*, 1283–1301. [CrossRef]
10. Lovins, A.B.; Lovins, L.H.; Hawken, P. A road map for natural capitalism. *Harv. Bus. Rev.* **2007**, *85*, 172.
11. Costanza, R.; Patten, B.C. Defining and predicting sustainability. *Ecol. Econ.* **1995**, *15*, 193–196. Available online: <https://www.pdx.edu/sites/www.pdx.edu.sustainability/files/Costanza%20and%20Patten%201995.pdf> (accessed on 26 October 2017). [CrossRef]
12. Söderbaum, P. *Understanding Sustainability Economics: Towards Pluralism in Economics*; Earthscan: London, UK, 2008.
13. Daly, H.E.; Cobb, J.B. *For the Common Good*; Beacon Press: Boston, MA, USA, 1989; pp. 401–455.
14. Vos, R.O. Defining sustainability: A conceptual orientation. *J. Chem. Technol. Biotechnol.* **2007**, *82*, 334–339. [CrossRef]
15. Pearce, D.; Markandya, A.; Barbier, E.B. *Blueprint for a Green Economy*; Earthscan: London, UK, 1989.
16. Seelos, C.; Mair, J. Social entrepreneurship: Creating new business models to serve the poor. *Bus. Horiz.* **2005**, *48*, 241–246. [CrossRef]
17. Elkington, J. *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*; Capstone Pub.: Oxford, UK, 1997.
18. Elkington, J. *The Triple Bottom Line: Does It All Add up*; Earthscan: London, UK, 2004; pp. 17–25.
19. Hubbard, G. Measuring organizational performance: Beyond the triple bottom line. *Bus. Strategy Environ.* **2009**, *18*, 177–191. [CrossRef]
20. Savitz, A. *The Triple Bottom Line: How Today's Best-Run Companies Are Achieving Economic, Social and Environmental Success—and How You Can Too*; John Wiley & Sons: Hoboken, NJ, USA, 2013.
21. Berkovics, D. *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*; Fiche de Lecture, Majeure Alternative Management, HEC Paris: Jouy-en-Josas, France, 2010.
22. Global Reporting Initiative (GRI). *Sustainability Reporting Guidelines on Economic, Environmental, and Social Performance*; GRI: Boston, MA, USA, 2000; Available online: <https://www.globalreporting.org/resourcelibrary/G3.1-Guidelines-Incl-Technical-Protocol.pdf> (accessed on 26 October 2017).
23. Epstein, M.J.; Buhovac, A.R. *Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts*; Berrett-Koehler Publishers: San Francisco, CA, USA, 2014.
24. Figge, F.; Hahn, T.; Schaltegger, S.; Wagner, M. The sustainability balanced scorecard—linking sustainability management to business strategy. *Bus. Strategy Environ.* **2002**, *11*, 269–284. [CrossRef]
25. Schaltegger, S. Sustainability as a driver for corporate economic success: Consequences for the development of sustainability management control. *Soc. Econ.* **2011**, *33*, 15–28. [CrossRef]
26. Carroll, A.B. A three-dimensional conceptual model of corporate performance. *Acad. Manag. Rev.* **1979**, *4*, 497–505.

27. Teece, D.J. Contributions and impediments of economic analysis to the study of strategic management. In *Perspectives on Strategic Management*; Fredrickson, J.W., Ed.; HarperCollins: New York, NY, USA, 1990; pp. 39–80.
28. McGuire, J.B.; Sundgren, A.; Schneeweis, T. Corporate social responsibility and firm financial performance. *Acad. Manag. J.* **1988**, *31*, 854–872. [CrossRef]
29. Wood, D.J. Corporate social performance revisited. *Acad. Manag. Rev.* **1991**, *16*, 691–718.
30. Schaltegger, S.; Synnøestvedt, T. The link between ‘green’ and economic success: Environmental management as the crucial trigger between environmental and economic performance. *J. Environ. Manag.* **2002**, *65*, 339–346.
31. Christen, M.; Schmidt, S. A formal framework for conceptions of sustainability—A theoretical contribution to the discourse in sustainable development. *Sustain. Dev.* **2011**, *20*, 400–410. [CrossRef]
32. Richmond, B. Systems Thinking: Critical Thinking Skills for the 1990s and Beyond. *Syst. Dyn. Rev.* **1993**, *9*, 113–133. [CrossRef]
33. Sterman, J.D. *Business Dynamics: Systems Thinking and Modeling for a Complex World*; McGraw-Hill: New York, NY, USA, 2000.
34. Mella, P. *The Magic Ring*; Springer: Berlin, NY, USA, 2014.
35. Cox, T. Conservation Challenge: Marine Plastic Pollution. Available online: http://www.fauna-flora.org/initiatives/marine-plastic-pollution/?gclid=CjwKCAjw64bPBRApEiwAJhG-fkV0w7oqV41yWpyXge0TTtAijl5t3UZULC5vXA4p4GGUIX2LaStk-xoCHXYQAvD_BwE (accessed on 26 October 2017).
36. Hoffman, M. One Year after Deadly Disaster, Climbers Are Still Leaving Shit All Over Mount Everest. Available online: <https://news.vice.com/article/one-year-after-deadly-disaster-climbers-are-still-leaving-shit-all-over-mount-everest> (accessed on 26 October 2017).
37. Hardin, G. The Tragedy of the Commons. *Science* **1968**, *162*, 1243–1248. Available online: <https://www.sciencemag.org/site/feature/misc/webfeat/sotp/pdfs/162-3859-1243.pdf> (accessed on 26 October 2017). [CrossRef] [PubMed]
38. Ostrom, E. *Governing the Commons: The Evolution of Institutions for Collective Action*; Cambridge University Press: Cambridge, UK, 1990.
39. Maslin, M. *Global Warming*; Oxford University Press: Oxford, UK, 2004.
40. Houghton, J.T. *Global Warming: The Complete Briefing*; Cambridge University Press: Cambridge, UK, 1994.
41. Clarkson, M.B.E. A stakeholder framework for analyzing and evaluating corporate social performance. *Acad. Manag. Rev.* **1995**, *20*, 92–117.
42. Ecologically Sustainable Development Steering Committee (ESDSC). National Strategy for Ecologically Sustainable Development. 1992. Available online: <http://www.environment.gov.au/node/13029> (accessed on 26 October 2017).
43. Mella, P.; Gazzola, P. Sustainability and Quality of Life: The Development Model. 2015. Available online: https://www.researchgate.net/publication/282671925_Sustainability_and_quality_of_life_the_development_model (accessed on 20 December 2017).
44. Glatzer, W.; Von Below, S.; Stoffregen, M. (Eds.) *Challenges for Quality of Life in the Contemporary World*; Springer: Dordrecht, The Netherlands, 2004; Volume 24, pp. 33–43.
45. Carrol, A.B. *Business and Society: Ethics and Stakeholder Management*; South Western Publishing Co.: Cincinnati, OH, USA, 1993.
46. Freeman, R.E. *Strategic Management: A Stakeholder Approach*, 1st ed.; Cambridge University Press: Cambridge, UK, 2010.
47. Cadbury, A.; Cadbury, C. *Report of the Committee on the Financial Aspects of Corporate Governance (Report 61)*; Gee Publishing Ltd.: London, UK, 1992.
48. Sarbanes, P. Sarbanes-Oxley act of 2002. In *The Public Company Accounting Reform and Investor Protection Act*; US Congress: Washington, DC, USA, 2002.
49. Van der Zee, A.; Swagerman, D. Upper echelon theory and ethical behaviour: An illustration of the theory and a plea for its extension towards ethical behaviour. *J. Bus. Syst. Gov. Ethics* **2009**, *4*, 27–43. [CrossRef]
50. De Falco, S.E.; Vagnani, G. Sustainability and managerial behavior in the perspective of the upper echelon theory. In Proceedings of the XXXV Conference AIDEA, Salerno, Italy, 4–5 October 2012.

51. Commission of the European Communities. A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development. Available online: http://ec.europa.eu/regional_policy/archive/innovation/pdf/library/strategy_sustdev_en.pdf (accessed on 26 October 2017).
52. Fowler, S.J.; Hope, C. Incorporating sustainable business practices into company strategy. *Bus. Strategy Environ.* **2007**, *16*, 26–38. [CrossRef]
53. Casalegno, C.; Pellicelli, A.C.; Pellicelli, M.; Civera, C. Innovation policy and environmental sustainability as strategic tools for reaching higher performances a regional empirical analysis to find the best practice. *Int. J. Sustain. Soc.* **2014**, *6*, 170–188. [CrossRef]
54. Nidumolu, R.; Prahalad, C.K.; Rangaswami, M.R. Why sustainability is now the key driver of innovation. *Harv. Bus. Rev.* **2009**, *87*, 56–64.
55. Porter, M.E.; Kramer, M.R. The Big Idea: Creating Shared Value. *Harv. Bus. Rev.* 2011. Available online: http://www.philosophie-management.com/docs/2013_2014_Valeur_actionnaire_a_partagee/Porter_Kramer_-_The_Big_Idea_Creating_Shared_Value_HBR.pdf (accessed on 20 December 2017).
56. Gavana, G.; Gottardo, P.; Moisello, A.M. Sustainability Reporting in Family Firms: A Panel Data Analysis. *Sustainability* **2017**, *9*, 38. [CrossRef]
57. Senge, P.M.; Smith, B.; Kruschwitz, N.; Laur, J.; Schley, S. *The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World*; Broadway Books: New York, NY, USA, 2008.
58. Maher, T.M.; Baum, S.D. Adaptation to and recovery from global catastrophe. *Sustainability* **2013**, *5*, 1461–1479. [CrossRef]
59. Adner, R. Match your innovation strategy to your innovation ecosystem. *Harv. Bus. Rev.* **2006**, *84*, 98–108. [PubMed]
60. Godin, B. Social Innovation: Utopias of Innovation from c.1830 to the Present. 2012. Available online: http://www.csiic.ca/PDF/SocialInnovation_2012.pdf (accessed on 20 December 2017).
61. Moulaert, F.; Nussbaumer, J. The social region: Beyond the territorial dynamics of the learning economy. *Eur. Urban Reg. Stud.* **2004**, *12*, 81–100. [CrossRef]
62. Cahill, G. Primer on social innovation: A compendium of definitions developed by organizations around the world. *Philanthropist* **2010**, *23*, 259–272.
63. Organisation for Economic Co-operation and Development (OECD). Consumer Education Policy Recommendations of the OECD'S Committee on Consumer Policy. Available online: <http://www.oecd.org/dataoecd/32/61/44110333.pdf> (accessed on 20 December 2017).
64. Gazzola, P.; Colombo, G.; Pezzetti, R.; Nicolescu, L. Consumer Empowerment in the Digital Economy: Availing Sustainable Purchasing Decisions. *Sustainability* **2017**, *9*, 693. [CrossRef]
65. Vătămănescu, E.-M.; Gazzola, P.; Dincă, V.M.; Pezzetti, R. Mapping Entrepreneurs' Orientation towards Sustainability in Interaction versus Network Marketing Practices. *Sustainability* **2017**, *9*, 1580. [CrossRef]



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