Sustainability **2010**, *2*, 2849-2872; doi:10.3390/su2092849

OPEN ACCESS

sustainability

ISSN 2071-1050

www.mdpi.com/journal/sustainability

Review

Can New Perspectives on Sustainability Drive Lifestyles?

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Received: 21 June 2010 / Accepted: 3 September 2010 / Published: 13 September 2010

Abstract: Understanding sustainability engages multiple views in a wide spectrum of technological, social and political positions. Over the last two decades it appears that an evolutionary process reflects a changing sustainability paradigm. At the basis of this changing paradigm remain strong principles of dematerialization, reflected in cuts in natural resource consumption, changing pathways to overcome lock-ins, mastering the art of economic innovation with ecological principles. This may engage new consumption attitudes and behavior. This review paper adopts a holistic and integrated sustainability perspective, suggesting a mix-and-match approach to engage more context specific designs for sustainability to look into principles of consumption behavior and people's motivation in choosing their lifestyle.

Keywords: sustainability; lifestyles; consumer behavior

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1. Introduction

Initial discourses on sustainability in the mid-eighties mostly considered the dichotomy of environment-economy and the need for a process of convergence and conciliation between the two. The dominant discourse was based on material dimensions, represented by (simply stated) generation of wealth on the economy side and over-exploitation of resources on the environment side. The challenge was that given the limits of the environmental resources, the economy would have to pursue its objectives within the existing resource limits. The debate was fundamentally based upon material, physical issues. The social dimension was limited to the eventual beneficiaries of an improved economy-environment relationship. Many hopes were placed on technological solutions that would

enable the maintenance of a growth-based development, and the enhancement of wealth-based lifestyles, while reducing pressure on the environment. However, how this could be made possible in the short-term was the challenge!

The Brundtland report in 1987 [1] had a very strong message, encouraging the adoption of new forms of development that could be sustainable, pointing towards a new society model where the environment and the economy would be well balanced, while taking an intergenerational perspective, that is, with benefits to current and future generations. The bottom-line was that for things to go well, things needed to be different. In essence, the Brundtland's key message was about people's values and societal choices.

Sustainability has different meanings for different persons, ranging from short- to long-term visions, from individual to communities perspectives, from technological innovations to changes in people's attitudes, behaviors and preferences. Sustainability requires changes in values and norms, a collective wisdom toward desired purposes. Much effort and emphasis has been placed on metrics, indicators, on the measurability of sustainable development, however often without agreement on the meaning of what is being measured, in the absence of a collective shared meaning of sustainability. People and organizations have been anxious to reach sustainability and be able to demonstrate how sustainable they are. But they have missed to realize, first, that sustainability is perhaps not exactly around the corner, and second, that more important than reporting on small changes is to actually operate these changes through choices made in different ways to do things, different lifestyles, different values and norms.

This paper addresses the relationship between sustainability, consumption and lifestyles. To that purpose, it adopts an analytical framework based on the assumption that the unsustainable patterns of our current society stand upon two main critical drivers: the over-consumption of natural resources and the attitude-behavior gap. These are subsequently driven by societal and individual preferences, underpinning people's lifestyles. The vicious circle of consumption is stimulated by a growth driven economic model, dependent on natural resources. Western societies display a lifestyle based on consumption, on the assumption that it improves happiness and well-being. Developing societies tend to obviously follow that path, if only because they feel they also have the right to higher levels of comfort and affluence. The challenge discussed in this paper concerns changes needed such that people consume less, and consume differently, to improve their lifestyles.

With this review paper, we wish to humbly contribute to the extensive literature and debate on the need to change the society model in which we currently live, with the purpose of stimulating more sustainable lifestyles and patterns of consumption. In Section 2, we review the current debate concerning sustainability. We then discuss the two critical drivers mentioned above; addressing people's attitudes and consumption behavior in Section 3, and in Section 4, the over consumption of natural resources. Section 5 critically discusses the relationship of these two drivers in light of an evolving economic development discourse and its influence on societal attitudes towards consumption. Finally reasons and options for more sustainable lifestyles will be highlighted in Section 6, calling on recent initiatives to demonstrate possible ways forward. Our underlying argument is that perhaps we have been investing more on the symptoms—over consumption of resources and economic welfare—rather than on the causes—people preferences, attitudes and behaviors. To change current unsustainable patterns, we may also need to change the way we define the problem.

2. Perspectives on Sustainability

The sustainability idea is both very ancient and quite recent [2]. While exploring the intergenerational evolution of sustainability, Gibson *et al.* [2] refer to a process of change driven by technological and economic advances. Earlier cultures that aimed for stability, continuity and respect for traditions have been progressively changed into cultures with major political and economic powers, promoting progress through faster and greater economic growth. In the last few hundred years this belief of "progress in perpetuity" [2] has marked the economic and political agendas, driven by various forms of innovation.

Despite largely reported benefits for the global society, the economic development process has enlarged the gap of inequities and destroyed its own foundations [2-5]. Earlier critiques in the mid-20th century already pointed to the persistent growth of poverty, the increasing environmental degradation, destruction of fundamental ecological systems and proliferation of risky technologies [6,7]. Daly [8] pointed out that the economic subsystem is now very large relative to the economy that sustains it and questioned "how big can the economy possibly be before it overwhelms and destroys the ecosystem in the short run?" [8].

The recent idea of sustainability (as a noun, as a vision or as an objective), and of sustainable development (as an adjective or as a process to achieve sustainability) has its stronger resurgence with the Brundtland Report [1]. The main message of the Brundtland Report was based on the need for a fundamental change in the model of society, recognizing that the world was moving towards unsustainable trends that needed to be reversed. "Conventional growth was not just an unreliable route to real progress; it was a path in the wrong direction" [2]. But, as discussed by various authors, the meaning of sustainability, or of sustainable development, has been diverse and often contrasting, suggesting multiple perspectives and interpretations. This justifies the claim of Faber *et al.* [9] that sustainability is a complex and confusing concept.

In research conducted in 2004, a review of the definition of sustainability found out that ecologists, economists, sociologists and biologists—to name just a few disciplines working with sustainability—all had their favorite perspectives on sustainability, but most of them would not take into account other perspectives [10]. Based on such findings, Jorna *et al.* [10] treated sustainability as a concept impossible to be rigidly defined; that the essence of sustainability could not be easily determined. The most common interpretations of sustainability found in the literature can be systematized as follows:

(1) Consider the combination of the three pillars—environmental, social, economic—in a more or less intertwined way, depending on the context;
(2) Add a fourth institutional dimension to the three fundamental pillars of sustainability;
(3) Look into the relationship of the society with its most direct environment;
(4) Address the intergenerational factor of sustainability;
(5) Address sustainability pinpointed on specific issues or sectors such as sustainable energy, sustainable construction, sustainable tourism or sustainable transports, to name a few.

A downside of this diversity of sustainability perspectives could be that, within limits, anything works for sustainability. For example, Phillis and Andriantiatsaholiniaina [11], cited by Jorna *et al.* [10],

consider that, because of the large quantity and diversity of approaches, sustainability is a concept that lacks consensus and direction, and is ill-defined, not defined or contradictorily defined. While diversity in sustainability is unavoidable given its complexity and context-dependency [2], the above cited perception may limit intended substantive achievements and undermine the credibility of sustainability discourses.

This suggests ambiguity in the concept of sustainability [12]. Priorities laid out for a sustainable development always result from individual or collective objectives, associated to moral, cultural and material concepts. Often these are non-universal as they tend to reflect social constructions associated to different communities in specific societal contexts. While this appears to create unlimited scope and perspectives of sustainability, generating the discomfort expressed by Phillis and Andriantiatsaholiniaina [11], it also reveals a significant opportunity. The diversity of sustainability perspectives, reflecting multiple social values and political priorities, express differentiation enabling a richer, robust, resilient and more sustainable society to develop.

Although sustainability is essentially an integrative concept, the realm of sustainability has often been depicted as the intersection of social, economic and ecological interests and initiatives [13]. Because the respective underlying concepts are epistemologically different, it is not always easy to cross-relate them as alluded to by Gibson [13]. It is not uncommon to see sustainability being understood as environmentally-oriented, or as economically-oriented. It is also not uncommon to see one of the three pillars of sustainability being adjectivally used when referring to sustainable processes (such as economically sustainable, socially sustainable or environmentally sustainable). The 7th Millennium Development Goal—Environmental Sustainability—is an outstanding example of how sustainability can be amputated out of its broader, holistic and interwoven character.

Local communities, particularly in rural, natural and indigenous contexts, do not have such a compartmentalized view of their living and development contexts. People, wealth and earth are profoundly inter-connected and cannot be separated. When we take traditional knowledge and approaches into account [14,15] it becomes very clear that the three pillar compartments are artificial, fundamentally supported by rational scientific-based, technocratic oriented minds and structures, and a product of the developed, mostly urban and industrial world. The same happens with global challenges we face such as climate change: is it an environmental, an economic or a social problem? All three dimensions provide determinants for climate change, as well as impact sources and effects. Perhaps difficulties in pragmatically addressing climate change result from the incapacity of governments and organizations to take a holistic and integrated perspective in addressing climate change.

The pursuit of sustainable development pathways requires these, and other fundamental changes of perspective. There is a need for systemic and holistic approaches, with new dimensions, entities and drivers reflecting the integrative, and interwoven, understanding of relevant conventional themes to enable a renovated approach, enabling objectives and dialogs for a sustainable throughput. The valuation of natural resources and ecosystem services, business and biodiversity approaches, low-carbon societies or socio-ecological systems are examples of already on-going integrative attempts to embrace the world's challenges differently [12]. These may represent a genuine integration of conventional dimensions, the creation of new entities with their own underlying principles, objectives and concepts, or only a compromise through dialogs and trade-offs in negotiation processes. But if we

recognize that sustainability requires a fundamental change in business as usual ([1,3]; and many others), then our analytical and evaluative framework for sustainability will also need to change.

Gibson *et al.* [2] refer that some authorities, and we would add private organizations as well, have been adopting sustainability as a form rather than as substance. The proliferation of corporate sustainability-oriented reports, following the Global Reporting Initiative (GRI) guidelines [16] and other standards, national sustainability (or sustainable development) strategies [17], as well as local agenda 21, are not always accompanied by a changing course, or their changes are slowly incremental. Business as usual often persists, even though differently wrapped. Gibson *et al.* [2] convey that commitment to sustainability voiced particularly by governments mostly failed to ensure a change in behavior, even though public images were wrapped in a veil of sustainability. The call on private businesses for changing course [18] was strongly followed up in the discourse and outstanding cases were built as a show case for sustainability [19], but were eventually limited in generally concrete business changes [3,20].

International literature on policy sciences, decision and organizational theories reveal clear trends of investment in organizational learning, on knowledge-creative and sharing processes [21,22] as well as in the establishment of agreement platforms that enable on-going dialogs and interactions among stakeholders, for increased cooperation. Faber *et al.* [9] speak about a new course for the sustainability discussion: a knowledge approach focusing on transparency and dialogs. These approaches are fundamental in transition processes for sustainability, recognizing the importance of shared knowledge and the strong linkage between knowledge and the power of implementation, through social networks.

Sustainability approaches are always complex—sustainability is not limited to objective metrics, outputs or outcomes. Sustainability relates above all to the capacities of systems and organizations to maintain development processes driven by universal and holistic objectives of diversity, transparency, quality, capacity, intergenerationality and justice [12]. Increasing knowledge, learning capacities and the practice of convergence, based on dialog and social respect, are indispensable factors in transition processes to sustainability.

The importance of discussing the perspectives on sustainability in this paper is to relate progress in sustainability forms and achievements in sustainability substance to effects on behavioral consumption changes. This embraces new challenges, including the need for change in our current economic model claimed by a large group of scholars and professionals, widely cited by Jackson [3].

An extensive body of literature attempts to provide reasons and arguments on why we are facing an on-going global crisis ([20]; and others), which became visible in the 1960s with the recognition of resource limits and environmental degradation, the multiple social turbulences and a vertiginous scaling up in poverty levels, to reach a major global economic crisis at the dawn of the 21st century. The world seems to be taking small steps to resolve immediate apparent problems, while the real problem persistently fails to be addressed. Jackson [3] eloquently discussed this paradoxical situation, which he relates to the way current society is over-exploiting natural resources, on one hand, and to what he calls the iron cage of consumerism, on the other hand. Jackson [3] further advanced a model of prosperity without growth, based on the concept of ecological macro-economics, which clearly establishes the challenge to adopt a different society model of consumption.

The 2008 economic crisis should make us reflect upon the type of society model we have been living in, and the one we want to leave as our legacy to future generations. Despite intensive speech on

sustainable development and sustainability, over the last decades, it can be questioned if we are already on the right track for sustainability. Economic development is still mainly evolving by default, as frequently evoked by prominent economists. Is that because the form of sustainability did not shape in substance, because we did not walk the talk, and consequently seem to be crashing in successive environmental, social and economic crisis? Is it because the sustainability concept is still ill-defined and tends to represent anything that sounds new, efficient or environmentally-oriented? Or are there other reasons? We will explore these in the next sections.

3. People's Choices. Knowledge, Attitude and Behavior

The last 50 years have shown a rapid growth in consumption, reflecting the world's economic rise, especially in developed countries. During the EU-15—the short abbreviation for the period when the European Union had 15 member states—household consumption expenditure, for example, increased by almost one third between 1990 and 2002 [23].

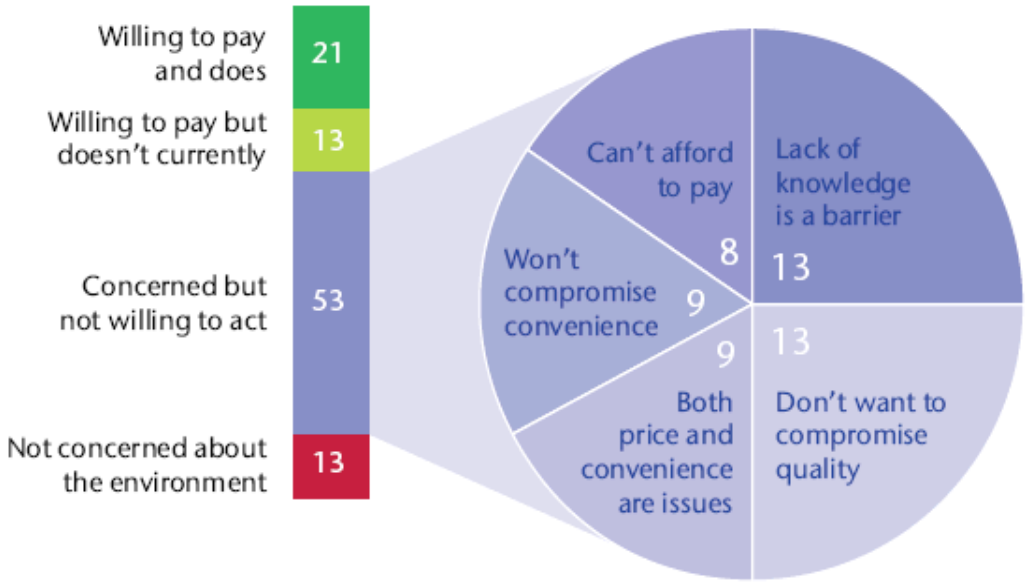
Consumption patterns have also evolved. Currently we are faced with a complex set of attitudes and behaviors, especially due to an increasingly consciousness towards environmental, social and economic issues. A recent global study [24] concluded that consumers in most countries are becoming more aware and willing to act on an environmental basis, reflecting their concerns in their daily lives through reduced consumption and waste and through making greener purchasing choices (Table 1).

Table 1. Consumer environmental awareness and willingness to act. (Reproduced from [24], with permission from WBCSD).

Reported behavior change	2007 (%)	2008 (%)
Saving power	76	81
Recycling	65	70
Reducing water consumption	65	69
Using less packaging and bags	56	68
Buying green products	53	61
Buying energy efficient devices	53	59
Informing oneself about climate change	46	58

Regardless of significant changes in people's choices, consumer willingness is not always converted into shifts in lifestyles. According to Young *et al.* [25], about 30% of consumers report that they are concerned about environmental issues but they struggle to translate this into greener choices. This phenomena is commonly known as the 'attitude-behavior gap', and is supported by a variety of studies that argue that enhancing knowledge and creating supportive attitudes often has little or no impact upon behavior [24-27]. Figure 1 shows the results of a survey conducted in Brazil, Canada, China, France, Germany, India, UK and the USA, concluding that 52% of consumers were concerned about environmental and social issues, but were not willing to pay for products with environmental and social benefits [24].

Figure 1. Global retail consumers segmented by willingness to pay for products with environmental and social benefits. Results are from a survey of consumers in Brazil, Canada, China, France, Germany, India, the UK and the US. (Reproduced from [24], with permission from WBCSD).



A worldwide survey on sustainable consumption [24] explored why consumers are sometimes unwilling to pay more for environmental performance, concluding that the four main factors for this inconsistency were related to lack of understanding, resigned lifestyles, selfishness, and associated costs and taxes. Figure 2 shows the factors that are believed, by a large group of cross-sectoral sustainability experts, to be the most relevant obstacles to an increased willingness to pay for the full costs of the ecosystem services that society uses.

Figure 2. Why consumers are sometimes unwilling to pay more for environmental performance. (Reproduced from [24], with permission from WBCSD).

Young *et al.* [25] point out that green purchasing is a less popular activity compared to recycling or energy reducing practices. This could suggest that greener behavior is strongly influenced by economic

motives, a common principle for many environmental strategies that rest upon financial incentives. McKenzie-Mohr [26] argues though that this perspective underestimates the difficulty of understanding consumption behavior and that several campaign programs based upon this premise have been unsuccessful, mainly because they assume that the public is 'rational' and is driven by the same economic self-interest.

The factors that shape consumption patterns are then the result of complex and subjective individual (or family) everyday decisions, which may, or not, be linked or underpinned by a belief set [25] or by purely economic motivations. Biel and Dahlstrand [27] argue that people's choices are also related to the cognitive effort required in buying green products, especially when the choices demand the expression of intrinsic values (Table 2).

Table 2. Different kinds of choice processes in everyday situations. (Adapted from [27]).

Demand of mental resources	No decision made in the situation; memory-based choices	A decision is made in the situation; motivated choices
Low	Routine	Need-driven
High	Intended	Value-driven

Moreover, consumption decisions are also influenced by the context of purchase, such as demographic (age and gender), social, political and psychological factors [28]. For example, female preferences may prevail when choosing certain household goods, while male orientations are more important in guiding larger purchases such as cars or electronics [29]. That is why some authors, like in the Millennium Ecosystem Assessment study [30], sustain that without changes to the cultural environment in which people live, some changes in behavior cannot take place (see also [31]). More fundamentally, to quote Young *et al.* ([25]; p. 20), "'being green' needs time and space in people's lives that is not available in increasingly busy lifestyles". Based upon the analysis of a set of green consumers decision-making processes, this author concludes that the main barriers and facilitators of green criteria for purchasing are those listed in Table 3.

Table 3. Main barriers and facilitators for green purchasing. (Adapted from [25]).

Barriers	Facilitators
Lack of time for research	Green labels
High prices	Specialist information
Lack of information	Availability of green products in mainstream retails
Cognitive effort	
Non-green criteria	Personal guilt

However, as Young *et al.* [25] recognizes, these results rest upon conscious and rational records of consumers practice and not upon the influences that consumers could be unaware of, and that are contextually subjective for social, cultural or simply psychological reasons. For Jackson [3], the iron cage of consumerism (see Section 5) is one of the major barriers to changing consumption patterns. For Mackenzie-Mohr [26], there are numerous barriers for any behavior change, and those barriers appear to be behavior specific. He explains: "what impedes an individual (…) from walking to work is distinct from what might preclude him/her from closing the blinds each morning". Therefore, for this

author, the identification of barriers to behavior change need to be context specific and account for internal (e.g., lacking the perceived skill to install a programmable thermostat) and external (e.g., local unavailability of programmable thermostats) factors. For that reason, the initiatives to promote behavior change are often most effective when they are multiple, engage collective thinking, are conducted at community level and involve direct contact with people [26], and do not rely only upon a dogmatic model that is generally and blindly applicable to every case.

There are many sociological and psychological factors that could help to explain the complexity of people's consumption behavior, which are explored namely by behavioral economics. But whatever the window of observation, factors influencing consumption behavior always need to be analyzed on a context specific basis. That is why some consider that there is currently no globally recognized or agreed definition of a sustainable lifestyle [24], although it is increasingly acknowledged that behavior change is central to the transition to a more sustainable future, as we will explore in the final sections of this paper.

4. Natural Resources, Sustainability and Consumption

Natural resources, such as raw materials, environmental media, resources flow or spatial areas, are at the core of any economy. Whether they are used as sources for materials and products or as sinks for waste and emissions, they are vital to the functioning of a country's economy and to the quality of life of its population, as developed in [3] and [4].

Paradoxically, however, the current patterns of natural resource use are depleting the natural resources base and causing environmental degradation in such a way and extent that the earth's capacity of continuously providing these ecosystem goods and services is becoming imperiled [30-33]. The findings of the Millennium Ecosystem Assessment report [30] provide an outstanding perspective on the dimensions of this situation. It states, on the basis of robust empirical analysis, that over the past 50 years humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, to a point where more than approximately 60% of the examined ecosystem services are currently being degraded or used unsustainably.

The same report indicates that these ecosystem changes were largely caused to meet rapidly growing demands for food, fresh water, timber, fiber, and fuel. This increase in resource use is particularly evident when analyzing the annual extraction of natural resources at a global level, which has been continuously growing over the last decades [34-36]. According to Behrens *et al.* [35], who performed a global analysis of used domestic extraction from 1980 to 2002, resource extraction increased by one-third (around 36%) during this period, from 40 billion tons to 55 billion tons. Up until 2005, this number had grown to 58 billion tons [36].

The same authors also show that this increase has been widespread among all the major material categories—biomass, fossil fuels, metals and minerals—although at an uneven rate. Metals have shown the highest growth rate (56%), indicating the continued importance of this resource category for industrial development, followed by extraction of industrial and construction minerals (40%). On the other hand, despite still having grown significantly, extraction of fossil fuel and biomass increased at a rate below the average (30% and 28%, respectively), where the global share of biomass (which includes renewable resources) actually decreased from 30% in 1980 to about 28% in 2002. This

evolution in global resource use is shown in Figure 3. Figure 4 presents more detail regarding extraction trends on selected materials between 1980 and 2005. Here it can be seen that extraction has almost doubled, or even tripled, for some materials (such as gas, sand and gravel in the first case and nickel ore in the second) or, on the contrary, how extraction is decreasing for some renewable resources, such as fish, as a result of overexploitation of several stocks worldwide [37].

Figure 3. Global used resource extraction by material category (Fossil Fuels, Metals, Industry and Construction Minerals and Biomass; in billion tons) between 1980 and 2002. (Reproduced from [35], with permission from Elsevier).

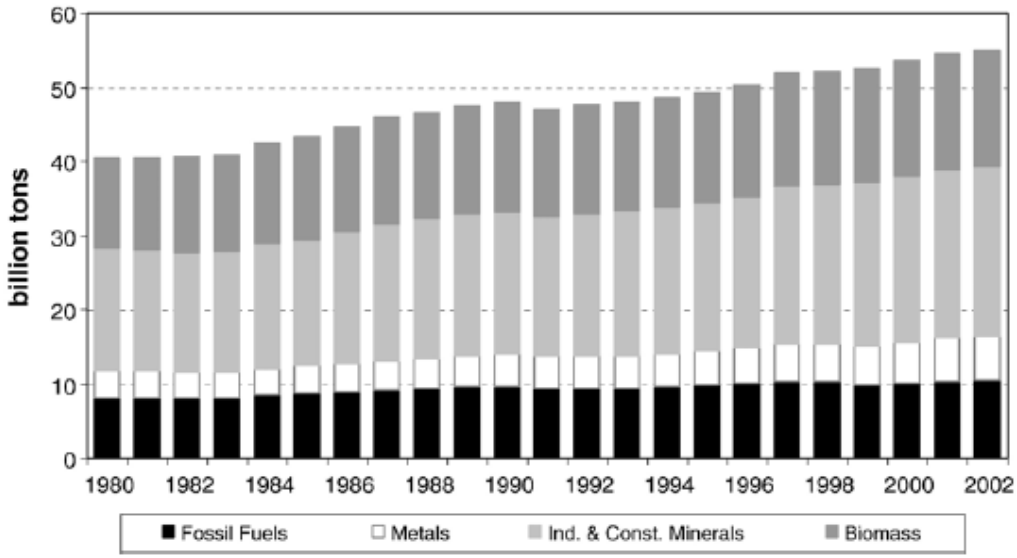
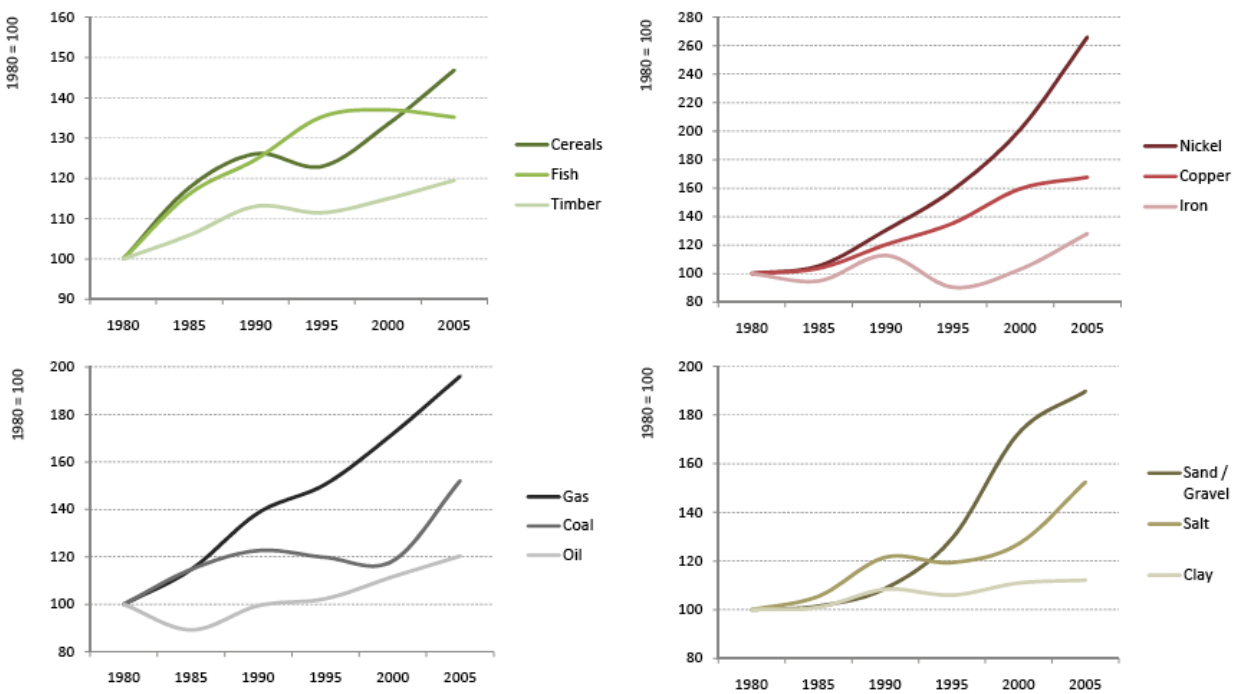
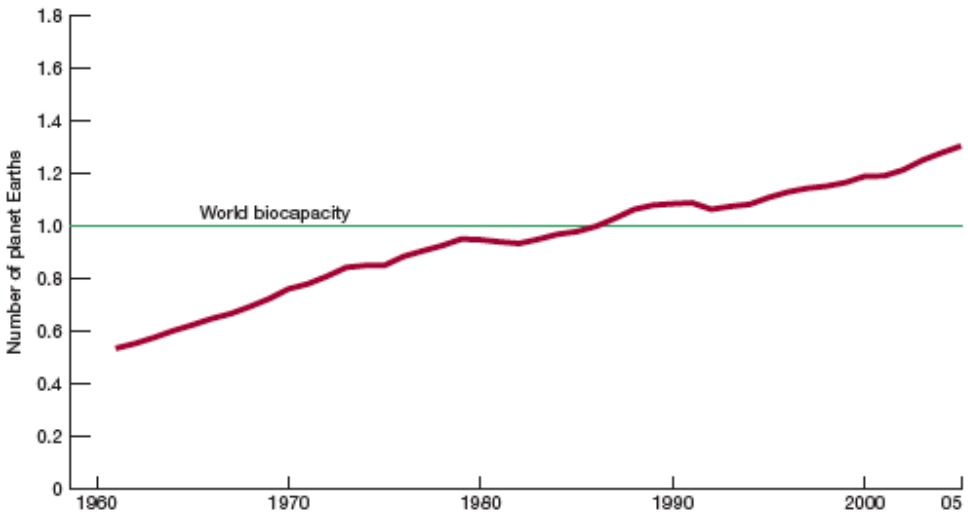


Figure 4. Global resource extraction trends of selected materials between 1980 and 2005 (in percentage, according to 1980 levels). (Reproduced from [36], with permission from Friends of the Earth).



These unsustainable patterns of resource use are also evident in recent calculations performed on human demand on the planet's living resources through its Ecological Footprint, which currently exceeds the planet's regenerative capacity by about 30% [38] (Figure 5).

Figure 5. The evolution of Humanity's ecological footprint from 1961–2005. (Reproduced from [38], with permission from WWF).



Although the growing use of natural resources is a global issue, as discussed above, there are critical differences between world regions and their share in total used extraction, with significant disparities of resource extraction according to its geographic distribution. Thus, in 2005, the highest rates of resource extraction took place in Asia (48%), as a consequence of rapid industrialization in countries such as China and India, followed by North America (with 19%), Latin America and Europe (13% each), Africa (9%) and Oceania (3%) [35,36].

This situation has been further exacerbated by the increase in international trade of raw materials and products over the past 50 years. Resources redistribution around the world is mainly determined by countries purchasing power [33,36], with the countries with higher purchasing power consuming more resources than they actually produce domestically. Developing and emerging economies have become net exporters of natural resources to developed economies, causing resource extraction to be very unevenly distributed across the world, reinforcing the inequalities between countries in per capita resource use [36,38], as reflected in per capita consumption rates.

According to the latest report by SERI *et al.* [36], Europeans consume around 43 kg of resources per person per day, against an extraction rate of about 36 kg per person per day, meaning that Europeans consume more than what they produce. The same report clearly reveals the disparity between production and consumption when developing regions, such as Asia or Africa, are put into perspective: Europeans consume three-times as many resources as an inhabitant of Asia and four-times more than an inhabitant of Africa. In Asia, resource consumption is almost equal to resource extraction, at around 14 kg per person per day, while in Africa resource consumption is only 10 kg per day and resource extraction 15 kg per day. The situation appears more extreme when we look at the USA consumption rates. The World Resources Institute [39] reported that materials consumption in the USA was over 50% higher than in the EU-15 in 2000, with a total of around 65 kg per person per day in that

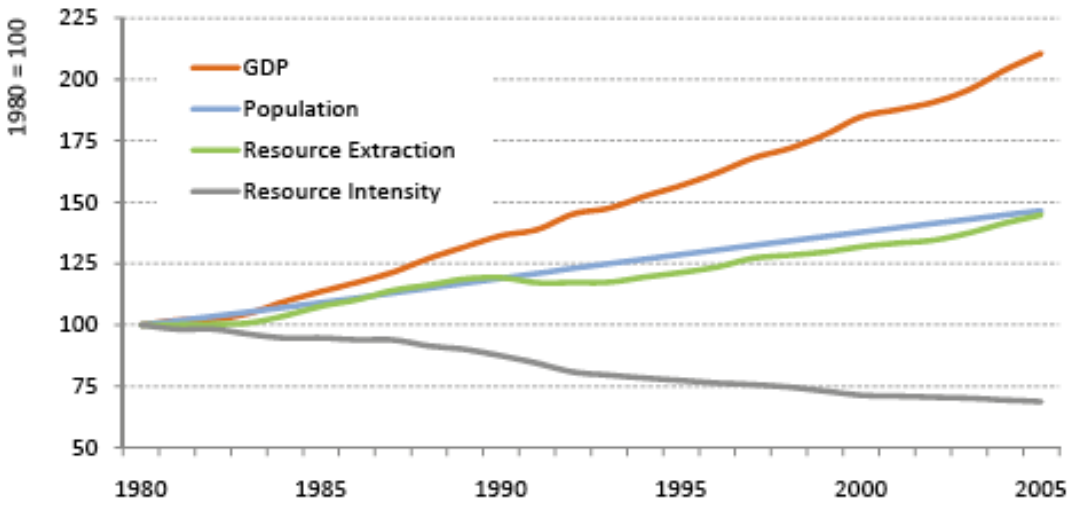
year. The materials consumption rate in the USA actually increased more than twice in relation to the rate of population growth between 1975 and 2000, due to highly resource intensive lifestyles, making the USA rank among the highest in the world's countries natural resource net-importers, despite its high national resource availability and extraction [40].

Globally, resource use will be further aggravated by the projected world population trends, since it is expected that it will increase by almost 50% in the first half of the 21st century, from around 6.1 billion in 2000 to 9.1 billion by 2050 (on the assumption of medium fertility), with most of the population increase occurring in developing countries [41]. This rapidly rising population will require more goods and services to support their needs. If this part of the world is to adopt similar consumption patterns to the ones in industrialized countries, it has been estimated that global domestic extraction could as much as quadruple with a population of 9 billion in 2050 [34].

Jackson [3] indicates that if the estimated 9 billion people all achieve the level of affluence expected in the OECD nations, in 2050 the economy would need to be 15-times the size of today's economy (75-times what it was in 1950), and by the end of the century 40-times bigger than today's economy (200-times bigger than in 1950). This is consistent with Daly's [8] previously cited statement that the economic subsystem is now very large relative to the economy that sustains it.

Although resource use has been growing, there have been significant improvements regarding the sustainable use of resources (e.g., worldwide diffusion of cleaner technologies and products; targeted policies and regulations) [33], which has actually permitted a relative decoupling of global economic growth from resource use, as shown in Figure 6. Between 1980 and 2005, worldwide resource extraction grew by around 50%, whereas the world economic output, measured by its Gross Domestic Product (GDP), increased by 110% in the same time period, showing that economic growth was higher than resource extraction, as a result of increased resource efficiency in relative terms [36].

Figure 6. Relative decoupling of economic growth from resource use between 1980 and 2005 (in percentage, according to 1980 levels). (Reproduced from [36], with permission from Friends of the Earth).



Nevertheless, efficiency gains brought by technology and new management practices have been offset by the scale of economic growth and consumer choices that favor energy- and material-intensive

lifestyles. Increased production volumes outpace these clean technology environmental improvements or efficiency gains [42,43] and, as a result, overall levels of resource extraction are increasing in absolute terms in all regions of the world [35]. Furthermore, decoupling environmental degradation from continued economic growth is correlated to the structure of an economy, where resource efficiency is expected to improve as the share of services in the economy increases. However, early stages of industrialization are usually accompanied by increasing resource use, and this is where several developing countries are now (e.g., China, India, Brazil) with their economies largely based on the extraction and processing of basic natural resources The industrialization of these large, emerging economies will further increase resource consumption and the pressure on the global environment [3,34]. Despite investments in resource efficiency technologies, current world trends show production rates directly related to rising consumption rates, a trend that is scaling-up in emerging economies. This is one reason why, as argued by Jackson [3] and others, policy measures such as decoupling will become insufficient to outpace the existing rate of resources consumption.

In a period characterized by globalization, with rapid increases in international trade and cross-border investment, production and consumption of natural resources is thus expected to grow, as well as the environmental burden of extraction (*i.e.*, wastes and emissions). This is unless we change the model of society and the inherent cognitive perceptions, founded on a call for change in values, attitudes and preferences and consumption patterns.

5. Driving Forces—What Drives Consumption Patterns

The causes behind the above-discussed growth in material and energy use are numerous and interrelated, and vary by location and through time. In a macro perspective, the main driving forces behind resource consumption can be linked to three main factors: population, economic growth and the patterns of development, which includes technological level, economic structure, and the patterns of production and consumption [34].

World population, as discussed above, is expected to grow considerably over the next decades, meaning more resources will be consumed in order to cover the material needs of these people. Most of this increase is estimated to happen in developing countries (where the population is expected to increase significantly [34]), in parallel with their rising economic standards, particularly in emerging economies like China and other Eastern Asian countries, India or Brazil. But as Jackson [3] discusses, this rising consumption trend still applies also in the rich nations where subsistence needs are largely met and further proliferation of consumer goods is adding little to material comfort. From this we could assume that population will still be a determinant driver for resource consumption particularly in the developing parts of the world.

As discussed, consumption patterns result from several factors, especially linked to the cultural, social and economic contexts of communities. Amongst the range of subjective factors, individual expectations are captured and driven by the engine of growth, in what Jackson [3] calls the iron cage of consumerism: probably the most powerful barrier to changing consumption patterns. Associated with this is the perpetual desire for novelty, strongly linked to the role that consumer goods play in people's lives [3]. This self-perpetuating cycle—continual design, production and market of cheaper, newer and exciting products—is vital to keep the economy growing, sustained by this circular flow of production

and consumption as a way of organizing the human society, to ensure that people's needs are satisfied. This contributes to strengthening the gap between environmental knowledge (attitude) and consistent action for change (behavior) discussed in Section 3.

Global economic growth has been impressive during the last two decades (Figure 6), although it is unevenly spread around the regions of the world, with significant disparities between developed and developing countries. Many developing countries (excluding Asia and the Pacific region) have actually experienced no growth or even a clear economic decline [33]. Moreover, world trade, along with globalization, is further fueling these disparities, since much of the economic growth in developed countries is taking place at the cost of resource extraction in developing countries, generating virtual resource transferences in a global context [44]. Globalization has allowed for the export of national internal demands (and subsequent degradation from their source areas) to distant geographical areas [33-45], whereby product consumption in one place now mostly non-coincides with resource consumption, and depletion, in the same place. What countries consume today is largely happening at the cost of resource depletion in other countries where production actually takes place [44]. The emergence of new economies will bring about both environmental and geopolitical consequences that will further influence global patterns of resource production and consumption [33,46].

Regarding the patterns of development, we have come a long way since the resource-driven era of industrialization in the 19th century, towards the evolution of many high- and middle- income countries into post-industrialization, where material needs give way to a more service and knowledge-driven economy [46]. These technological revolutions brought about major changes in the way we use resources, and in the actual characteristics of the products; today the use of natural resources and the resulting impacts are strongly influenced by the prevailing type and efficiency of available technologies. The influence of technology goes hand-in-hand with the economic structure of a country and the patterns of production and consumption, since producing services tend to require relatively less natural resources than producing agricultural or industrial goods [34,46]. However, in spite of resource efficiency usually improving as the services in the economy increases, the accompanying growing affluence also drives increased consumption of some resources, an issue that can be well followed in the discussion between relative and absolute decoupling.

Growth and consumption are thus strongly interwoven in our current economic model of society. Growth in GDP, a measure of the economic activity in a region or nation, has been singled out as the key policy and driver of modern economic societies, both in developed and developing countries. The fact that higher incomes lead to increased choices and improved quality of life for those that benefit from them has become conventional wisdom [3]. While over the years attention has been placed on how to make GDP bigger, the question of why we might want it in first place is hardly raised. As Jackson [3] eloquently addresses, GDP expresses the economic value of goods and services exchanged on the market, and if people are spending money on commodities it is because they value them as they improve people's lives. Hence a continually increasing per capita GDP is a reasonably proxy for a rising prosperity [3], and a direct driver for rising consumption.

There is much evidence that some countries are not progressing anymore in terms of an increasing quality of life for increased GDP, and have entered an era of uneconomic growth that accumulates illth faster than it adds to wealth [8]. McKibben emphasizes that the link between increased consumption and happiness has broken down, and that economic growth is now more likely to yield isolation and

disconnection [47]. A recent study by the Worldwatch Institute [48] illustrates the paradox between income and life-satisfaction, showing that above an annual income of about 15,000 dollars per capita, life-satisfaction barely increases, maintaining the perception of quality of life. This helps to explain why countries like Denmark, Sweden, Ireland and New Zealand present higher levels of happiness than the USA, but significantly lower income levels [3]. In a world of finite resources, constrained by strict environmental limits, still characterized by "islands of prosperity" within "oceans of poverty" [3], rising consumption patterns associated to ever-increasing incomes for the already-rich illustrates our current unsustainable trends. Like the Worldwatch Institute [48] study demonstrates, wealth can continue to grow with no further growth in benefits derived from energy and material use, while instead its illth-inducing resource depletion and pollution [8] persists as a growing trend, increasing ecological damage and consequence externalities. As Daly [8] states, once growth becomes uneconomic at the margin it begins to make us poorer, not richer.

This situation is likely to induce change in current consumption patterns. As Young *et al.* [25] concludes, governments, companies, NGO's and other civic movements should strengthen community's environmental ethics, invest on social justice. At a time of unparallel prosperity for some, 54 countries are poorer now than they were a decade ago. Worldwide, the number of people living in chronic poverty and daily insecurity has not changed for over 10 years, with woman and children suffering disproportionately.

It is time to challenge the assumption that continued consumption growth, without greater attention to equity and sustainability, can deliver prosperity for all. Education, environmental ethics and social justice are key in the effort to change the way consumption patterns may evolve to more sustainable lifestyles, but not enough to close the existing 'attitude-behavior gap' that should be addressed through context-specific community-based approaches. As Dobson [49] points out, before anything else, the main success factor for long-lasting and meaningful lifestyle changes is the internalization of environmental values through education. The key message is the idea that is possible to consume less and differently without compromising the individual quality of life.

6. New Paradigms—Future Options for More Sustainable Lifestyles

Conventional discourse on sustainability, as discussed in Section 2, refers to the triple-bottom line of environment, social and economic dimensions, or the three pillars, as the basis of sustainability. This has been a prevailing paradigm for much of the past decades since the Brundtland Report [1]. Much of the criticism of this concept results from the lack of interconnectedness between the three dimensions [2,9,12,13], thus prolonging the divide between the dominant perspectives, unable to stimulate change, on the contrary, encouraging the pursuit of business as usual. Because the three dimensions may interact but do not mix, each remains practically unchanged.

In this paper, we argue the need for a radical shift in the way we think and look at sustainability, in the lines promoted by Gibson [2]. Our proposal is for the pursuit of new paradigms in sustainability, coherent with the complexity and diversity of sustainability that require holistic and adaptive approaches, and which can be more responsive to evolving needs, assuring more sustainable lifestyles. Our vision is a mix-and-match approach, based on innovative and constructive thinking through which new dimensions are generated, radically shifting away from established conventional dimensions, and

instead mixing them to match new needs and future challenges. The idea is based on the mix of the conventional environment, social and economic dimensions, which are re-adjusted, adapted on a case-specific basis, re-formulated through inter-sectoral, inter-spatial and inter-temporal crucial linkages, to match context-specific sustainability objectives, as well as stakeholders perceptions and expectations [14,15]. Mix and matching in sustainability will lead us to think in more innovative ways, to act in a more interwoven and interdependent way across sectors, spatial scales, and thematic or substantive issues [2]. Such mix and match will require creativity, innovation, thinking outside the box, new conceived dimensions, paralleled by new analytical and institutional frameworks, ultimately influencing the society perceptions and expectations.

We found some illustrating examples of attempts to pursue this mix-and-match approach, and we will refer to three different concepts. That includes the concept of Landscape, Lifestyles and Livelihoods (LLL), developed in Australia, subsequently pursued by the United Nations Sustainable Lifestyles approach linked to the Marrakech Task Force. Another example is the Happiness Index, in its various interpretations, albeit highly debatable as to its scope and social meaning. A third example is The Economics of Ecosystems and Biodiversity (TEEB), an initiative of UNEP with other national development cooperation initiatives, grounded on the economic valuation of ecosystem services and their socio-ecological value. Altogether, these three examples represent initiatives that tend to mix and match the conventional triple-bottom line dimensions of sustainability, generating new drivers and new perspectives on sustainability, eventually helping to change expectations and lifestyle perceptions.

The Triple Helix, or LLL, advanced in Australia by Andrew Campbell in 2006 [50], based on the work developed by Cork *et al.* [51], intends to mimic the original triple-bottom line, while changing the underlying substantive dimensions. In this LLL approach, Landscape is about people's thoughts and activities as part of the physical environment, to convey resilience to changes, new ways of exploring how management of regional natural resources can achieve the most enduring combination of landscape, lifestyle and livelihood. Lifestyle is not only the type of jobs and level of employment, but mostly it is about our choice of the type of life we want to follow, such as carbon free or low carbon, low consumption lifestyles. Livelihoods is about people enjoying life, raising healthy, contented and educated children, leaving behind a stock of wealth comprising manmade and environmental assets for the next generation, living in peace and security, breathe fresh air, drink clean water and eat uncontaminated food [52].

LLL is therefore a mix-and-match developed upon strategic key values, rather than dimensions or issues, for a sustainable life [50]:

- Knowledge, health and work capacity;
- Natural assets as the livelihood support basis (e.g., land, water, biodiversity, environmental resources);
- Physical production means and basic infrastructure (transports, shelter, energy and communications);
- Financial resources available for people (savings, credits, pensions);
- Social networks, associations, trust relationships and access to collective institutions;
- Cultural values—identity, the meaning of a good life and means which are culturally viable to respond to basic human needs (*i.e.*, subsistence, protection, affection, participation, free time, freedom).

In parallel, the Task Force on Sustainable Lifestyles was established in 2005 as one of the seven task forces under the Marrakech process on Sustainable Consumption and Production (UNEP

DTIE/UN DESA—Marrakech Task Force, lead country Sweden) [53] This global multi-stakeholder process is managed by UNEP and UNDESA and developed a 10 year framework of programs on Sustainable Consumption and Production. The role of the Task Force is to engage, exemplify, enable and encourage relevant stakeholders in the Marrakech process to change behavior towards sustainable lifestyles, by finding the means and by assembling results and good examples from ongoing work on sustainable consumption. The task force activities and projects are focused on concrete actions to guide and enable wiser consumer choices and lifestyles in the field of communication, education, marketing, advertising and training including social and cultural initiatives and the role of young people.

The Marrakech process on Sustainable Consumption and Production [53] introduces sustainable lifestyles as a means of rethinking our lifestyles, the way we buy and use products and services and the way we organize our everyday life. It means rethinking our society and the way we want to live in a balance with our natural environment. At home, at work, in school, many of our choices on energy use, transports, food, waste and communication count toward building sustainable lifestyles. For governments, it means to create the appropriate framework (infrastructure, regulation, economic incentives, technical innovations, *etc.*) to facilitate citizens and business behavior change. Business has an important role to provide sustainable products and services on the market together with appropriate information to meet our needs. The following drivers for consumption patterns are advanced and explored within the Task Force: Economic, Technological, Social, Cultural and Historical, Political and Psychological [53], again demonstrating mix-and-match of different values in sustainability.

In 1972, the Kingdom of Bhutan adopted the Gross Happiness Index [54], consisting of four pillars: sustainable development, cultural values, natural environment and good governance. From then on, timid but tentative proposals to adopt happiness as an alternative to GDP to measure development prosperity have been put forward. The University of Leicester suggested a happiness map in 2006 [55], which is built upon three key indicators borrowed from the United Nations Human Development Index: life expectancy, access to education, and economic well-being (considered to be, by its proponents, a measure of Happiness, which is certainly debatable). Interestingly, the New Economic Foundation, together with the Friends of the Earth, suggests The Happy Planet Index [56], based upon very similar indicators, but this time incorporating a more ecological indicator: the ecological footprint, life expectancy and life satisfaction. Whatever the value we wish to attribute to the concept of happiness as advanced by these three examples, the important point to make here is that this exemplifies changing trends in the way people value, and wish to measure, their future development. As discussed before, at the end of the day prosperity goes beyond material pleasures, it transcends material concerns [3]. Increasingly the conventional economic model is being questioned [3-5,8,20,46,47] and people are putting more importance on the quality of their lives and in the health and happiness of their relatives and friends, in the strength of relationships and on community trust, through approaches that mix conventional concepts and match intended purposes, breaking the previous established boundaries of the triple-bottom line. This is raising new paradigms and a new look into sustainable lifestyles.

Contributing to the discussion on the need for new paradigms, Jackson [3] states that "the cornucopia of material wealth adds little to happiness and is beginning to threaten the foundations of our well-being". The same author argues that beyond a certain point, pursuit of economic growth does not appear to advance and may even impede human happiness, as the results of the Worldwatch

Institute study [47] suggest. This raises important emerging drivers in consumption patterns, determined by new societal values based on happiness, humanitarian values, equity and justice.

But other mix-and-match perspectives can also be pointed out. Over the last years, a new way of looking at natural resources and ecosystems has emerged, perhaps establishing a new path towards sustainability. Nature is now being increasingly perceived as a source of benefits to society through its ecosystem services, rather than just being considered as a source of wealth for economic growth, largely through the availability of its natural resources. The main novelty in this perspective is that it seeks to value nature through the identification of direct and indirect benefits of ecosystems to society, including material and immaterial ones [30]. This perspective allows looking into development options in an integrated and comprehensive manner, including the wide spectrum of benefits—social, economical, environmental—that can be derived from ecosystems. However, how to value nature is a key challenge this perspective faces in order to succeed in working towards sustainability.

The Economics of Ecosystems and Biodiversity (TEEB) study [57] developed as an attempt to respond to this challenge. It is a major international initiative led by UNEP but engaging also the European Union and individual nations and development cooperation organizations. This study aims to show the economic benefits of biodiversity and the costs of its lost. It intends to provide guidance on ways forward, based on the increasing evidence that the lack of valuation has been an underlying cause for the observed degradation of ecosystems and the loss of biodiversity, since much of nature's value has bypassed markets so far and escaped pricing [57]. This study particularly recognizes that economic instruments, if applied and interpreted appropriately, can be used effectively to foster sustainable development and better conservation of ecosystems and biodiversity, largely enabling sustainable lifestyles through the valuation of resources that underpin communities livelihoods, and also well-being.

Another interesting aspect about TEEB is that it is aimed not only at policy-makers and administrators but also at businesses and citizens, recognizing sustainability as a governance issue that has to be spoken to, and perceived by, different target-groups. This links directly to the need to take into consideration all perspectives of sustainability and inter-connect them, or mix them, looking at the policy-science interface, gathering expertise from various fields such as socioeconomics and policy, socio-ecology, psychology, cultural and biological sciences, *etc.*, generating new understandings, that match specific contexts and enable practical and successful actions towards sustainability.

7. Conclusions

As discussed in the previous sections, current societal dynamics is mostly set by the following drivers of change:

- Growth of population and activities, based on the exploration of natural resources;
- Changes in population patterns, generating changing needs and consequent impacts on the local landscape, lifestyles, economies and social patterns and networks.

When these two drivers are cross-analyzed, the result is the recognition of opportunities for interesting "changes" that may influence future trends:

1. A world centered on the exploitation of natural resources (e.g., forestry, mining) is changing into a world that explores amenities in a region (e.g., climate, landscape, open spaces, isolation), thus requiring the resources-base to be available;
2. The concept of a landscape that supports livelihoods is changing into a concept of landscape that offers lifestyles, thus determining new demands and consequent consumption patterns.

The approach adopted in this paper, and the message that we tried to get across calls on a different look into sustainability that requires new integrated full-bodied dimensions that do not match directly the conventional social, economic, environmental dimensions. A new paradigm based on a mix and match approach, that mixes the conventional triple-bottom line dimensions, and matches sustainability to fit intended futures, assuming context-dependency, is suggested in this paper, following existing literature that support this understanding [2,13]. This requires the adoption of new dimensions, each representing integrated concepts that can be seen as critical success factors for sustainability. That means, for example, to look at landscapes as social constructions, as systems where nature meets culture, where resource management means management of people and activities, engaging values, perceptions, expectations and behaviors. Or lifestyles as social positioning, in which people signal their social position and psychological aspirations linked to the way they use material and resource flows in the society, their consumption patterns expressing their lifestyle, also a means of differentiating themselves from other people.

Consumer behavioral change is central to a more sustainable future, since the consumer's level (demand) is determinant to stimulate the production, and consequently resource exploitation. We tried to explore this in this paper, by suggesting a relationship between the consumption attitude-behavior gap and the current rate of consumption of natural resources, how these change across the world and how geographically unrelated the rate of exploitation of resources and their respective consumption may be. However, other measures, such as governmental use of regulations to control resource management equally contribute to a resource sustainable management (at least in current consumption driven economic models). Despite some efficiency and productivity gains that have enabled the achievement of a relative de-coupling between growth and resources use, volumes of production continue to rise in an economy that is resources dependent. We are still far from an absolute decoupling. On the other hand, there are also huge disparities between developed and developing countries. Even within each country we still face rising levels of relative poverty.

In this paper, we aimed to explore the current literature and emerging actions that point towards the possibility of consuming less, and differently, without losing life-satisfaction. Increasing consciousness towards environmental issues is not always converted into shifts in lifestyles (attitude-behavior gap). Changing the social and cultural contexts that support environmental ethics, as well as working through education, training and communication are key success factors for sustainable lifestyles.

Sustainability has to be more than a lively and intense discourse, it is a new development path that is different from business as usual, and will be as successful as our capacity to define and follow it. Sustainability requires change. We need to change our social construction of the environmental concept, the assumptions that set current wealth distributional patterns, the balance of powers and social inequities. The major challenge of sustainability lies exactly in our capacity to find new pathways based upon:

- socially desirable values, that recognize the multiplicity of perspectives and associated values of different societal groups;
- flexible and strategic decision and development processes, based upon dialogs, that enable constant investigation and adjustment to societal values;
- sufficiently large time scales that enable us to put development into perspective;
- transdisciplinarity in cross-relating traditional and innovative concepts and dimensions, which allow us to overcome lock-ins established by conventional attitudes and values, and which will represent new solutions into plausible pathways.

We close with a citation of Fyodor Dostoevsky: "Don't let us forget that the causes of human actions are usually immeasurably more complex and varied than our subsequent explanations of them" [58]. Attempting to explain sustainability only through conventional analytical and technocratic approaches can be ludicrous. Above all, sustainability represents a different paradigm in a complex system, encompassing multiple visions, expectations and alternative pathways, which cannot be followed through the usual routes. Climate change in itself imposes different and urgent actions and attitudes, calling for low-carbon economies and societies, breaking with business as usual, if the society is to still expect a sustainable future. There is still a long way to sustainability, full of challenges and opportunities for change. Our actions of today are the determinants of more sustainable lifestyles in the years to come.

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