Finite Earth, Infinite Ambitions: Social Futuring and Sustainability as Seen by a social scientist

Tamás Kocsis

Senior Research Fellow, Social Futuring Center, Corvinus University of Budapest, Hungary

Email: tamas.kocsis@uni-corvinus.hu

In a historical sense, humanity has accomplished its mission: it has populated Earth and has used its riches and resources to its own benefit. However, from an environmental perspective, Earth has a limited amount of resources, placing restrictions on these high expectations. Accordingly, humanity clearly needs to identify new ways of living, and make efforts to develop new goals. In light of this situation, it is worth exploring what the connection is between the more or less well-known concept of environmental sustainability and that of social futuring. Is there any overlap between the two concepts, and how can one evolve from the other? Can we identify any local-level (dis)similarities regarding these two in practice? The significant potential inherent in human beings – the unfolding of which is evident on a historical scale – can make interpretation of this issue easier. In this context, it is worth identifying the cornerstones of social futuring so as not to impair human ambition by blaming it for using up the Earth's limited resources and causing natural disasters. The goal is to give humanity new direction and impetus, while retaining the intensity of earlier ambitions.

Keywords: sustainability, social futuring, ecological footprint, happiness, voluntary simplicity, strategy

JEL-codes: Q01, Q55, Q57

1. INTRODUCTION[1]

Is the future an opportunity or a threat? It is probably both. In terms of futuring, the former is envisaged to contrast with future-proofness, which presumes the latter. With regard to the natural environment, threat is the dominant sentiment felt nowadays. What will happen if we use up all or most of the planet's natural resources? What if the climate irreversibly changes? How will human civilization, as we know it today, survive? Our initial premise is a difficult one: we have to cope in a world that is based on a finite material environment. Looking down on planet Earth from outer space, we can see that the above premise is indeed correct.

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Deeper analysis requires us (1) to provide a brief outline of the human ambition that has led to the present state of affairs; (2) to examine the relation between the common concept of environmental sustainability and the recent concept of social futuring; and (3) to demonstrate the potential in human nature which, we hope, may lead to the formation of a futurable structure. We shall attempt this from the viewpoint of a social scientist. The claim (i.e., that the natural environment is finite) is supported by natural sciences. Although the topic of sustainability necessarily requires a global focus at first sight, this study emphasizes “bottom-up" solutions rooted in the depths of human nature. However, since the human individual is also the basic "unit" of higher-level social entities, considerations of sustainability should be interpreted in this spirit at these higher levels as well. Potential “top-down” government policies will only be referred to briefly in relevant places; for further reading, we recommend political analyses conceived under the aegis of social futuring (for example, Ambrus 2017).

2. THE HUMAN AMBITION

> Be fruitful and multiply, and replenish the earth, and subdue it. And have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.
>
> (Genesis 1.27)

The simplest way to demonstrate the dominance of mankind on this planet is by describing the increase in global population over time. There has been spectacular growth from the prehistoric age to the present day. This population trend is interpreted by many groups (mostly environmentalists) as a risk. True, we may regard overpopulation as a threat – although ecological cataclysms (that is, collapses of human populations) have so far only occurred sporadically and at a local level (see e.g. the collapse of civilization on Easter Island; Diamond 2004).

Regarding units of one billion people as absolute population growth, the human race reached the first billion by 1804. We had to wait more than a century for the next billion – until 1927. Then, at an ever-increasing growth rate, by September 2017 the global population was just over seven and a half billion, and the trend continues (Worldometer 2018). However, population growth is slowing. According to recent UN forecasts, global population will reach 9.4-10.2 billion by 2050, and 9.6-13.2 billion by 2100 (with a probability of 95%). Of course, estimates react very sensitively to even the slightest changes in expectations, a fact which is also mentioned in the UN report. For example, a change of only 0.5 fewer children born to each woman of childbearing age compared to the mean estimate would result in global population reaching 8.8 billion by 2050, and dropping back to “only” 7.3 billion by 2100 (UN 2017). In time, the global population will inevitably reach a maximum/saturation point, unless technological change based on *external control* (as discussed later) enables mankind to expand its ecological space considerably. However, this does not seem to be likely, since the size of the latter is already partly unsustainable.

Although population figures represent a spectacular index of the human race’s dominance of planet Earth, it is worth mentioning that this increase has not solely been quantitative. There has been a qualitative increase, too: present-day average living standards – the affluence of the average individual – cannot be compared to that of the past. We may attempt to give a historical estimate of this phenomenon, even though it partly relies on a vague methodological basis (Tóth – Szigeti 2016). However, the magnitude of such estimates would be difficult to dispute.

"Replenishing" and "subduing" the planet – as a human project of historical scale – leaves barely anything to be desired either quantitatively or qualitatively. There have been proposals by significant groups of natural scientists to introduce a term for this new geological era: the *Anthropocene*. The date marking the dawn of this era has not been specified yet (Smith – Zeder 2013), although the start of the Industrial Revolution (between 1750 and 1800) seems likely. This was the era when mankind "learned" to consume fossil fuel resources on a large-scale. Since then, fossil energy has been spent, bringing both advantages and disadvantages, predominantly for peaceful purposes. The related field of study has had its own periodical, *Anthropocene*, since 2013. If the first phase of the human project ended so successfully, what challenge may the future pose to humanity? Does the need for environmental sustainability necessitate the launch of an entirely different historical age with entirely different ambitions? We think it does, and elaborate further on this in Part 3 of this paper.

2.1. ENVIRONMENTAL SUSTAINABILITY VS. SOCIAL FUTURING

The various concepts of environmental sustainability have been discussed in depth by Kerekes and Szlávik (2003). The classic definition of *sustainable development* by Brundtland states that sustainable development is development that satisfies present generations' needs without making it impossible for future generations to satisfy their similar needs (World Commission on Environment and Development 1987).[2] Ecological economists amend this dynamic approach by adding a static limit: the total social-economic sphere (the product of global population and average consumption per capita; scale) must not exceed the carrying capacity of the planet (Georgescu-Roegen 1971; Daly, 1996; Harangozo et al. 2018; strong sustainability). The present study relies on the same arguments regarding environmental sustainability. "Carrying capacity" (instead of which, the term *ecological space* is used later as it is more palpable, in the author's opinion) may be increased via technological development (technological development serving for the expansion of ecological space), yet this expansion will prove partly unsustainable in the long run if it involves the use of non-renewable power sources. According to ecological footprint calculations, this state of affairs is valid globally.

According to Corvinus University of Budapest's Social Futuring Center, *social futuring* is an umbrella term, and the frame it offers may be filled in a plethora of ways. Lasting prevalence, functional operation, creating a future image and strategic acting are essential, while preparation for influencing changes (exploiting opportunities or managing risks) is also an important consideration (Szántó 2018). Social futuring may be applied to entities in the present, but the concept strongly projects towards the future.

[2] Differentiating between needs and wants is of strategic importance when this definition is interpreted. Necessity can be calculated objectively, based on scientific fact (e.g. daily nutritional demands), while needs are predominantly determined by society and, as such, vary from culture to culture. It is for this very reason that the latter should be adjusted for time, place, and social entity, which also allows decision makers strategic leeway.

The concepts of environmental sustainability and social futuring are difficult to tell apart at first sight, and are both clearly future-oriented. It is worth mentioning that, in historical terms, the notion of "sustainable development" is a kind of response to environmental problems, and only relates to these issues, while social futuring employs a wider perspective. In other words, tackling environmental sustainability responsibly with regard to its human and social aspects is a futurable act in itself, while an environmentally sustainable entity is socially futurable, too. The new notion is therefore nothing more than a euphemism for the old one. Yet the situation is more complicated, with the relations between concepts needing deeper analysis. Writing a list of the most basic logical possibilities may be a reasonable first step.

The initial question here is whether the two concepts approach their content similarly, suggesting a coordinate relationship, or whether one of the two is subordinate.

If one concept is embedded in the other, two cases exist: in the first, the notion of social futuring includes, by definition, that the targeted process or structure must be sustainable – including in an environmental sense – indefinitely in time. In other words, social futuring cannot be conceived of without environmental sustainability. From this viewpoint, the use of non-renewable natural resources and overflow needs to be countered. A wristwatch can be made shockproof and waterproof in the same way that a society can be made future-proof. Socially futurable strategies are, by definition, environmentally sustainable. (If something is unsustainable, it is inherently unfuturable.) According to this approach, *social futuring should be researched as a part of environmental sustainability* (Figure 1).

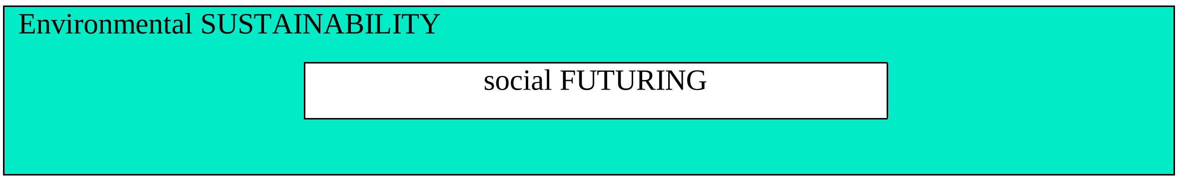


Figure 1. Social futuring as a part of environmental sustainability

Source: author.

The relation is reversed in the other direction of subordination. In this case, the existence of socially futurable processes and structures with no long-term sustainability are allowed. Structures and processes that are environmentally sustainable in the long run are possible parts of social futuring in this scenario, but they are not a necessary condition. In this approach, environmentally sustainable things are, by definition, also socially futurable. (If a thing is unfuturable, it is inherently unsustainable.) In this case, the issue of *environmental sustainability has to be examined as a part of social futuring*.[3]

[3] In the author's opinion, this latter approach involves a less beneficial relationship, so we do not recommend pursuing it. Taking this approach would be similar to assuming that some socially advantageous structures are also environmentally sustainable. This assumption however may prove false.

Figure 2. Environmental sustainability as a part of social futuring

Source: author.

Finally, the set of theoretical possibilities also includes the case that the two notions are independent and *not* embedded in each other. In such a situation, environmentally sustainable, but socially non-futurable processes and structures can exist (see e.g. living conditions in sub-Saharan Africa), and vice versa (for instance, in wartime the short-term prevalence of a social entity may be achieved by temporarily inflicting considerable damage to the environment) (Table 1). In this case, the subject of analysis may be the present. Then, the initial situation must be defined from perspectives of both sustainability and futuring (defined as the cell the entity occupies in Table 1), followed by the designation of the most desirable target (the cell that we wish to arrive at and, more importantly, a description of how). Also, the optimal situation here would be an entity that is environmentally sustainable *and* socially futurable at the same time (lower-right-hand cell, Table 1).

Table 1. Environmental sustainability and social futuring in a coordinated relationship (shaded: desirable combination)

		Social FUTURING	
		NO	YES
Environmental SUSTAINABILITY	NO		
	YES		

Source: author

This paper presumes that there is a coordinated relationship between sustainability and futuring. Although the concept of social futuring contains, by definition, the condition of an entity's long-term prevalence, multiple examples will be cited below of situations which are environmentally sustainable, but – as far as social futuring is concerned – do not meet the standards, or are downright undesirable (lower-left-hand cell, Table 1). (Cases in the uppermost row of Table 1 receive less attention here for being environmentally unsustainable.) It is important to note, however, that *long-term* social futuring cannot be conceived of without environmental sustainability.

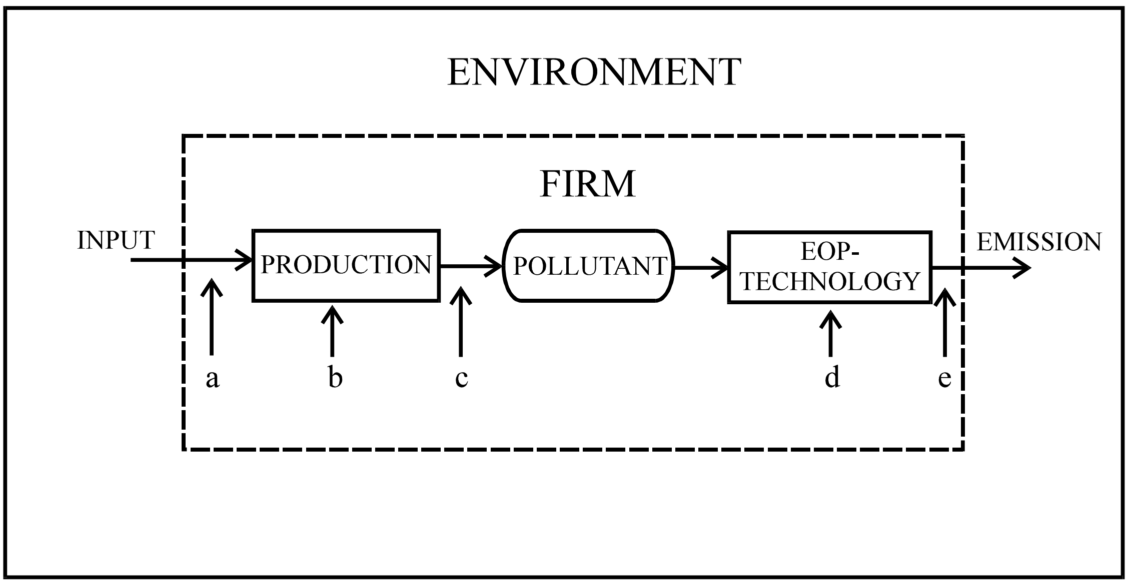
2.2. COUNTERING POLLUTION VS. SOCIAL FUTURING

(Corporate) methods of combating environmental impact as a *problem* and the main opportunities for realizing social futuring have many things in common. To make a comparison, it is advisable to take a *problem-oriented* approach to social futuring. The question that needs to be answered here is: what are the causes of flawed social futuring? A change is environmentally undesirable if the emission levels of a substance exceed the environment's assimilation capacity, resulting in pollution.[4]

If we classify corporate methods for influencing emissions (as has been done by many researchers, including Kerekes and Szlávik 2003), a structure similar to the one drawn up in Figure 3 will emerge. We may, however, regard any decision-making entity as a "corporation." Likewise, the dotted line separating the corporation from the environment also exists if the entities are of a different type (ranging from organizations, institutions, towns and regions to countries, country groups, societies and nations – Szántó 2018). When decisions are made, external conditions that cannot be influenced by that decision should also be taken into consideration.

"Production" is a process of altering something that results in an output useful to humans (the very reason for this action).[5] The following figure, however, does not focus on the useful outputs of production, but on harmful side effects such as pollution (a negative external effect[6]), which at the end of the process appears in the environment as emissions (the amount of pollutants emitted in a defined unit of time).

Figure 3. Firm-based methods of influencing emissions



[4] Pollution means that an inflow of materials and energy into the environment occurs faster than the pace at which the environment can process and assimilate them (Kerekes et al. 2018).
[5] Let us for now disregard the well-known critique of consumer society that claims that many products and services are completely useless. If indeed some of these consumables really prove to be unnecessary, it might make sense to do without them. This idea is built on later (doing without = increasing internal control).
[6] An external effect – or "externality" – influences the welfare of a third person (neither producer nor consumer); it is unintentional and uncompensated (Kerekes et al. 2018).

Notes: a: use of cleaner inputs, resulting in a lower pollutant/product unit ratio (intensive environmental protection); *b:* restriction of production; *c:* employment of a new technology, resulting in a lower pollutant/product unit ratio (e.g. use of end-of-pipe technology, intensive environmental protection); *d:* limitation on pollutants created during the manufacturing progress (extensive environmental protection); *e*: dilution of pollutants before emission (passive environmental protection)

Source: Kocsis (2002c)

Generally, the corporation continues its main activity of producing useful products/services without taking care of by-products and impacts – for example, contamination. When activities of this type are insignificant in terms of scale compared to the global system, there is no problem; the waste assimilation ability of nature can neutralize pollutants, and no perceivable pollution occurs. However, nature's assimilation capacity, which is a renewable resource itself, can be overloaded, and the expansion of production may result in the appearance of emissions. Enforcement can take many forms, from new laws (bans, fines, taxes, etc; Kocsis 2002a; Kerekes et al. 2018: Chapter 5.13) to consumer feedback, but may have the aim of promoting mere survival (if the contaminant is highly toxic); nevertheless, this is the very change that every corporation – or any other entity, for that matter – has to adapt to. If it fails in this, it is not socially futurable.

Corporations, just like other socially futurable entities, have various options for intervention (see also Szántó 2018). Active intervention results in a real decrease in the amount of the potential problem source (i.e., contaminants). This may involve problem prevention (intensive and active intervention) and the management of problems that are still within the corporation's scope (extensive and active intervention).

In Figure 3, the intervention possibilities “a” (use of cleaner inputs; for example, burning coal with a lower sulphur content, if existing technologies allow this) and “c” (use of newer production technology; for example, installing a power plant appliance that operates on natural gas instead of coal) are similar in effect; they prevent the problem by avoiding the creation of the pollutant (for example, sulphur dioxide) during the process (the examples demonstrate active and intensive variants of pollution prevention). Nonetheless, the production of a pollutant is not necessarily equivalent to its emission while it is still within the boundaries of the corporation; the entity may choose not to emit the contaminant into the environment. For instance, the filters in chimneys and the catalysts in cars play such a role (intervention option “d”) (active and extensive variants). Last in line is intervention possibility “e,” which despite not reducing emissions by itself, makes the effects more tolerable for those potentially exposed; for example, the erection of a taller chimney (passive variant). By harnessing the waste assimilation ability of the natural environment more effectively, pollutants will be emitted in diluted concentrations and consequently will inflict less damage to those exposed. The classic example of this method is taller chimneys for factories, but at a household level introducing flues in older, smokey kitchens would be a similar solution.

Both solutions are technical, which means that they involve some sort of "external control" over the environment with the goal of creating a result that best suits us humans.

All things considered, it is not too difficult to spot the similarities between the main options available to socially futurable entities. The demand for managing emission levels is one target in the broader objective of diverting *unfuturability* and reacting to unfavourable changes. Emissions, no matter how insignificant in quantity and scale they may be initially, became intolerable and threatening over time. They represent, beyond any doubt, *unfavourable change*.

Bearing this in mind, let us first try to create a situation and imagine structural changes on a larger scale – in a *proactive* manner – that may subsequently lead to a solution to such problems. This compares to the development and application of a cleaner and greener production technology, or as we shall see later, unless technological development results in an unsustainable enlargement of ecological space, it may generally correspond to this solution (see also Figure 3; intervention points "a" and "c£ – technological change causing rearrangement within ecological space).

If this option is not possible, or if the range of possibilities has been depleted, the entity may, within its scope, still try to diminish the disadvantageous impact of a problem – i.e. the broader causes of unfuturability – in an *active* manner. Pollutants that are "unavoidably" emitted may also be taken advantage of. If collected, they will not necessarily burden the environment, but can become useful input materials for activities (products) instead (Figure 3, intervention point "d").[7]

Finally, if we run out of the options described above (both active and passive), we may still adapt to changes. For example, pests can not only be controlled (let alone exterminated) with the extensive use of chemicals, but also by exploiting the *existing* mechanisms of nature purposefully. Organic farming involves many good examples of this approach (intervention point "e", Figure 3).

It can be argued that all the methods mentioned so far (no matter whether regarded as methods for environmental protection or futuring) are similar inasmuch as they all rely on actively influencing the environment. What they differ in are their mechanisms and the results of their application. There is still one possibility, and perhaps the simplest, that has not been mentioned yet: restricting production/activity (Figure 3, intervention possibility "b"). This option disregards the scale of human activity and focuses on the basic question of *whether it is worth doing a particular activity to the extent it has been done before*. If the answer is negative, the *status quo* should be changed, resulting in humankind doing without a certain thing. This is a classic example of "internal control,"[8] the concept of which will be introduced later. Can we

[7] Not forgetting about thermodynamics – the natural law that tells us that 100% recycling is impossible!
[8] It is important to note that the distinction between "internal" and "external" does not refer to spaces "within" and "outside" the entity. Instead, internal/external indicates whether individuals (decision makers) reach their goals either by manipulating their environment (external control) or by reconsidering their ambitions (internal control).

really make do with less? It is important to note that this option requires no investment and no technological development whatsoever. The opposite process, production that brings about environmental change, has been the most general phenomenon in human history, and hitherto the main goal of mankind, the very essence of human ambition. Altering this process, let alone reversing it, is by no means a banal task for companies, social entities, and people in general. The importance of this task is generated by the need for environmental sustainability, without which no social entity can survive in the long run (Table 1, lower-right-hand cell). It is therefore a key element in the creation of a strategy.

3. *HOMO SAPIENS*: HUMAN POTENTIAL

Julian Simon, author of *The Ultimate Resource (1981),* is one of the founding fathers of today's climate scepticism and the ultimate bogeyman of green movements. He is still adamant that there is no reason to be afraid of using up non-renewable natural resources, as the quantity of these materials will increase in time, while their market price will decrease. He made a bet with one of the most well-known neomalthusians,[9] Paul Ehrlich, about the price movement of five natural resources of Ehrlich's choice over a ten-year period. Simon won the bet, and we can still observe the same tendency – prices for natural resources "about to be depleted" are generally going down, as if they were becoming more available rather than disappearing.

Since it is impossible to expect "finite" resources to yield "infinite" quantities, we shall not go deeper in explaining Simon's respective thesis (for further reading, see also Herman Daly's criticism of Simon's book; Daly 1982). However, how is it possible that the facts – that is, trends in raw material prices – seem to justify Simon's hypothesis? The ultimate resource he refers to is humans themselves – their inventiveness and creativity which has enabled spectacular technological development throughout history. In this sense, humans as a resource – which, in this case, does not refer to their exploitation – can be regarded as infinite. We may also consider humans to be endless sources of opportunities, on which an environmentally sustainable *and* socially futurable strategy can be based.

3.1. THESES, CONCEPTS, AND KEY POINTS OF THE PAPER

Figure 4 shows the main concepts used in this paper. On the right-hand side of the figure, the impact of humanity on our planet is indicated; the determination of its value in numbers is strongly dominated by the natural sciences. Further on the left of the figure, human factors gain in importance. Accordingly, the role of social science increases. On the far left, the measurement of subjective well-being is linked directly to the entity (of course, well-being is not entirely independent from natural and environmental contexts). This duality merges in the *celestial footprint* – the concept of which is introduced later – which can be expressed as subjective well-being (happiness) per ecological footprint (global hectare: gHa). We have

[9] In a book first published in 1798, Malthus concluded that global population growth progressed geometrically, while food production could only increase in an arithmetical way, and since the gap between the two would widen over time, future poverty would be all the graver. Technological development has modified this forecast – so far. It is for this very reason that people who doubt the possibility for continuous technological development or emphasise the technological inevitability of environmental limits are called "neomalthusians."

included suggestions in the figure for proposed measurements and relevant formulae for illuminating these relations. (On the right- and left-hand side of Figure 5, by multiplying the two lower apexes of the triangles we get the result shown in the upper apex.)

Based on the above, our main theses are as follows:

First thesis: in the early twenty-first century, the ecological space occupied by humans via exertion of external control was *too big*, and there was "overshoot" *(i.e., the development of technologies which expand the space consumed by non-renewable energy sources)* (the dashed oval shape on the right-hand side of Figure 5 symbolizes overshoot).

Second thesis: population (which can be influenced by population control) is external control multiplied by internal control. Basically, an increase in internal control is needed (also because there are hardly any other options), by which ecological space may be "freed up" (if the effect is not moderated by population growth). (Rearranging technological development *only leads to restructuring within the ecological space. By itself, it cannot decrease the ecological space occupied by humans, and thus it might be wrong to place too much trust in this factor*) (the relationships of the right-hand triangle in Figure 4).

Third thesis: when creating strategies, subjective well-being (happiness) must be taken into consideration.[10] The product of happiness and internal control is the celestial footprint. It would take human's considerable potential to exploit this (other species do not possess a celestial footprint). The reasoning is that if an increase in internal control is forced, and leads to unhappiness, the environmental strategy is not futurable socially, since it does not lead to a life worth living (Csák 2018) (see the relationships of the left-hand triangle in Figure 4).

[10] Although some other authors make a difference between "well-being" and "happiness," the two terms are used as synonyms in this study (albeit it is sometimes argued that happiness only lasts for moments while well-being is a more stable, long-term phenomenon).

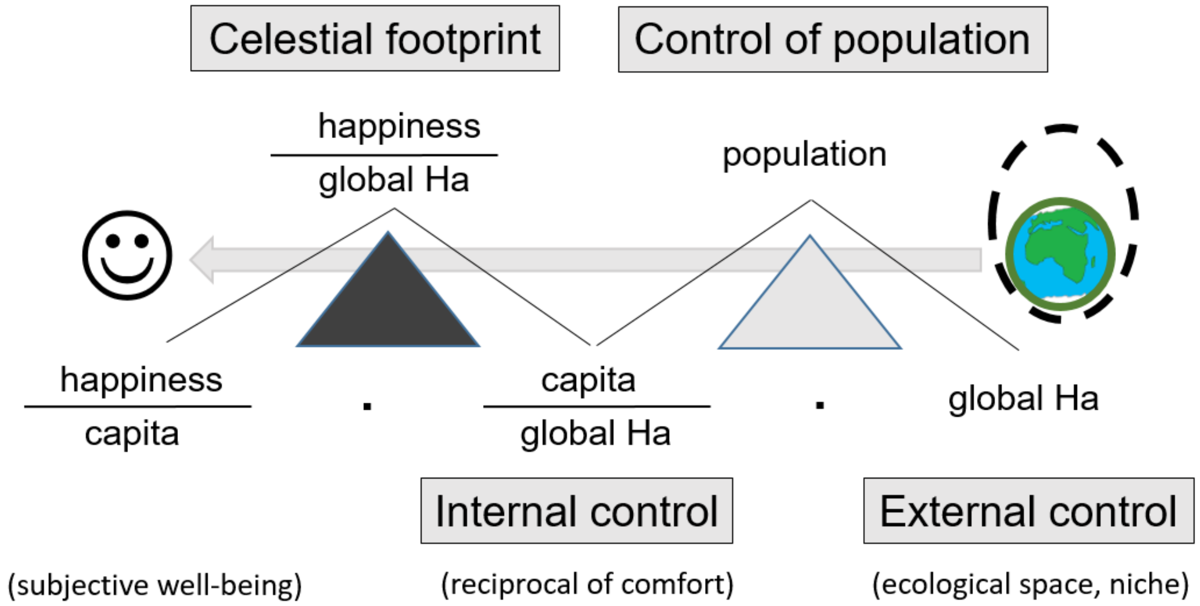


Figure 4. The main concepts and relations depicted in the paper (moving from right to left, the role of social science increases and the role of natural science decreases)

Source: author

3.2. FILLING ECOLOGICAL SPACE AND INTERNAL CONTROL

The list of features that differentiate man from animals is rather long. However, in social futuring the ability of humans to *control* the human *population* is of utmost importance. Consequently, as far as ecological space (niche) is concerned, (i.e. those unused resources that can be exploited to sustain life)[11] humans are not only able to increase population to the limits of environmental carrying capacity, but they can also control population to increase affluence and consumption per capita. The sheer fact that this ability exists does give us some hope in this finite world of resources. A "good life" can really be lived within ecological limits. Humans have the potential to achieve this goal. Filling in an ecological space completely is not genetically predetermined for the human race, as opposed to other species.

The challenge lies in the fact that the world has never witnessed any global, voluntary forms of population control, which successfully combated environmental impact. The idea is just as unprecedented as that of technological development shrinking the global ecological space.[12] It might well have been unnecessary – as it seems, "cowboy economy", as described by Kenneth Boulding (1966), was able to carry on with continuous expansion until there were vast, unused pieces of land. Back then, this was a viable model. What is more, it suited human ambitions

[11] More precisely: ecological niche refers to the role that individuals of a certain species play in the community, and the environmental factors they need, or that they are able to endure. Hutchinson (1957) gave a modern definition of ecological niche, stating that the ecological niche is an n-dimensional abstract space, the axes of which represent limiting sources and habitat features relevant to the living conditions of the species examined. Each living organism in the system fills its own niche (Bihari et al., 2008).

[12] By its nature, sustainability has to be understood globally. At the same time, it is essential to be able to apply it to entities smaller in scale than global, with centres and peripheries. An example of such an analysis is presented by Kocsis (2014) on a national level through an examination of ecological footprint data.

perfectly well. Today, however, ecological footprint calculations have shown that a single planet is inadequate for serving the population in an environmentally sustainable way (i.e., supplying material comfort for the current population via renewable energy). We are in dire need of a new strategy. Social futuring, both locally and globally, requires that this doubtlessly existing control be applied in the fields of population and/or consumption, preventing mankind from filling in *temporarily* available niches in ecological space with people and/or consumption, as the existence of these niches depends on non-renewable natural resources, especially fossil fuel. In this case, we could finally see an actual decrease in environmental impact. "Carrying capacity" and "scale" are terms similar to "ecological space," used most frequently in this study.

To illustrate the issue of environmental sustainability, it is best to start out from the widely used *IPAT* formula, in which environmental impact (I) is considered to be a product of population (P), affluence (A) and technology (T).

$$I = P * A * T \qquad (1)$$

Note that technology (T) is here only a factor that serves to connect affluence and environmental impact. If affluence (A) is measured in monetary units, it should be converted to environmental impact (I), which can be, for instance, measured in global hectares (gHa); the "shoe size" of the ecological footprint.[13] In order not to complicate matters, it is better to focus on environmental impact only, and measure affluence in "environmental impact per capita" terms instead of money. In this case, the formula is

$$I = P * A \qquad (2)$$

Researchers often started out from this assumption (see also Ehrlich – Holdren 1971). The formula makes a very simple reference to the possibility that ecological space can be filled by population and/or consumption, with humans having free choice. Among animals, consumption is determined by genes, while population is determined by ecological space.[14] In this formula, "technological development" can be grasped by the size of the ecological space (I).

For better understanding, let us first consider the correlation between the animal kingdom and humans; the number of individuals living on the planet is correlated to the ecological sphere (carrying capacity). The size of the latter, in this case, also depends on the level of technology. If ecological space were depicted as a pie, the number of humans at a minimum standard of living would be the size of the slices of the pie that could provide just enough food for their physical sustenance. Unattractive as this situation may be, this state is theoretically the maximum of the internal control of consumption (physical minimum living standard).

[13] Ecological footprint is calculated using the average productivity of all biologically productive areas on the planet, which enables comparison. This is the concept of the global hectare (gHa).

[14] Daniel Quinn's popular sustainability-related novel Ishmael demonstrates this issue using the example of a cage containing rats. Although simplified by assumptions about linearity, hardly anyone has ever disputed the validity of the example. If the rats are given twice as much food, in time there will be twice as many rats (and vice versa). The amount of food available to rats can be identified with the ecological space or niche that is available to humans.

However, people are able to control the population, and thus increase the size of slices of the pie well beyond the physical minimum per capita. This decreases the internal control of consumption.[15] In the long run, the size of the ecological space depends on the level of technology. The formula will be more precise if the relationships are reflected differently (Figure 4, triangle on the right), thus:

$$P = I * (1/A) \tag{3}$$

Technology and technological development are of course still very important factors, even if they do not appear in this formula; that is, not explicitly, since the impact we have – or the impact we can have – on the environment in a certain period of time is significantly dependent on technology, which ranges from poking the ground with a stick to satellite-controlled precision fertilizing.

Historically, technological development served environmental sustainability in a way that it formed and expanded ecological space to suit human needs. As a rule, it was followed by the process of filling in space with population (*P*) and/or consumption (*A*). This rule is just as strong as natural laws; the existence of the Jevons paradox (York 2006) also leads to this conclusion. In this case, total impact (*I*) increases; however, this higher level is not necessarily unsustainable. We only confront an issue with sustainability if the increase in ecological space is only temporary (even if this interim period is several centuries long); in the case of ecological overshoot, the "increase" in space is bogus. The issue stems from the fact that a virtual niche is filled with actual population and/or affluence. A false increase in ecological space happens when non-renewable energy sources are consumed to fuel technological development. The ecological space thus created is ephemeral and unsustainable.

On the one hand, we may say that the global population (*P*) of 7.5 billion (9-10 billion by 2050) is unsustainable at the current average level of material comfort (*A*), but as the current level of population and affluence obviously exists, the necessary ecological sphere must be available here and now. The long-term availability of this niche is dubious, however. Environmental challenges are pressing, and the sustainability of the system has to be taken into consideration. Compared to other ages, this is the very novelty of the Anthropocene.

Social futuring explores the potential ways in which humanity, or smaller subsets and entities thereof will be able to face the inevitable decrease in ecological space and cope with ensuing corrections. A purely logical deduction might be that it does not matter; if the occurrence of this phenomenon is so apparent and predictable, humans can also affect it. We can, for instance, slow it down by some sort of wise foresight (proactive intervention), benefit from it (active intervention), or face a slow correction/swift cataclysm, in which case the minimization of

[15] It is important to note here that we do not seek to condemn the present decrease in internal control or promote minimum living standards. However, the current situation we are witnessing and experiencing involves such a decrease in internal control and, coupled with an increase in affluence, is such that enhanced control could well be defined as a strategic target (as is asserted later in this paper).

losses and the management of risks will become a necessity (passive adaptation). It is certain that a social entity that prepares for a reduced ecological space – as described above – will be in a more advantageous situation, especially if it makes adequate plans for scenarios on all of the three "strategic lines."

Homo sapiens has a highly multifunctional, important and unique tool: *internal* control (for population, we use the term population control, not to be confused with the internal control introduced here). Numerous thinkers have described the ability of internal control in various ways, for example as frugality (Nash 2000), and it is among the most prized virtues in religion and ethics.

Giving this human ability a more or less neutral or technical label seems rational inasmuch as it may then be compared more easily with the *external* control of the environment. External control results in an expansion of ecological space – this is exactly what has been happening in the past millennium of human history. Even primitive sticks count as part of the arsenal of external control over nature – a vast, monocultural field of crops does even more so, of course, if we consider how much energy and how much developed technology it takes to sustain this. Because of environmental unsustainability, ecological space needs to be limited somewhat, the proactive influencing of which could take the form of some sort of technological maintenance task (the risks of "planetary engineering," of course, need constant attention). In the active and passive fields of social futuring, however, social sciences will most probably play a more marked role if the application of internal control, interpreted as a unique feature of human nature, is given more focus.

To present the scientific – and opinion forming – potential in interpreting and comparing the two forms of control, we shall present global population as a compound of two forces (as already supported by the theoretical evidence, see also Formula 3). Even in the social sciences it is of key importance to make a phenomenon measurable and numerically determinable (it would not be appropriate, though, to create standards). In any case, if measurements can be made, assessment becomes possible.

External control (i.e., the artificial human ecological space) can easily be assessed by calculating ecological footprint (Wackernagel – Rees 1998),[16] but other indices of environmental impact such as total carbon emissions could also be used. The Global Footprint Network, the organization which developed the methodology for calculating the ecological footprint, published their latest data in 2017, according to which the global footprint of the human population was 20.6 billion global hectares (gHa) in 2013. In comparison, the available biocapacity of renewable energy sources was only 12.2 billion gHas that year, which points to an overshoot of 69%. We can thus say that the difference in the numbers shows the size of mankind's "virtual ecological space," which is not environmentally sustainable, but which is

[16] In spite of its many flaws and shortcomings (see also e.g. van den Bergh – Verbruggen 1999), the ecological footprint is currently the most concise index of environmental impact.

regardless filled up with actual people and affluence. This is what recent ecological footprint data tell us about external control, shown on the horizontal axis of Figure 5.

Expressing internal control in numbers is a much larger challenge, as we cannot really capture the "average self-control" of humans in figures. However, if we start out from the number of people that a unit of ecological space (gHa) can nurture (person/gHa), we can get an approximation of internal control. On the one hand, it seems obvious that the greater the number of people who would like to exist in the same ecological space, the greater the self-control that is required in terms of material wealth and comfort. Moreover, measuring internal control in this way is advantageous in that it corresponds to the process of capturing external control, the product of the two resulting in (global) population

$$\text{person} = \text{gHa} * (\text{person} / \text{gHa}) \qquad (4)$$

Figure 5 shows this relation, with internal control on the vertical axis. Population appears on the surface that spans the two axes with values for the two forms of control. The population isographs of one, three, six and nine billion are marked. An appropriate question about social futuring is, for example: knowing that ecological space will inevitably shrink sooner or later, how can we make the best of this?

- We "voluntarily" return (at least) to within the actual ecological space, marked as the thick white vertical line (Figure 5) (which still indicates 100% human use, not allowing any space for species labelled "useless" by humans, although returning to this level would still be considered a success).
- Depleted non-renewable energy sources (including emission assimilation capacity, which is an overloaded renewable source) will force us to back out, resulting in the need for crisis management and a forced return to an environmentally sustainable level.[17]

[17] In spite of envisaging catastrophe, this is still an optimistic scenario which does not envisage a collapse in the ecosystem.

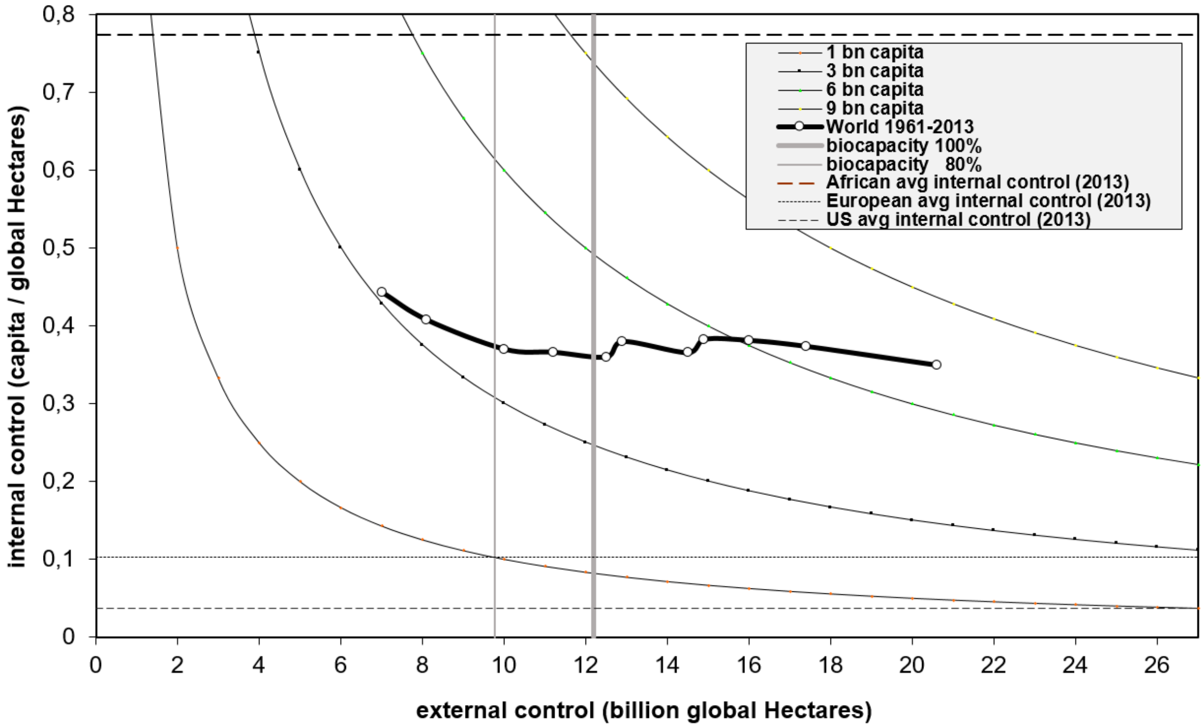


Figure 5. Human population as determined by a combination of internal and external control (1961: left-hand side of the bold line, 2013: right-hand side of the bold line)

Source: author, based on data from the 2017 database of the Global Footprint Network.

The question inevitably arises: is there a way, through technological development, to enlarge the ecological space to an extent that it is still environmentally sustainable (i.e., does not involve the use of *non*-renewable energy sources)? We cannot rule out this possibility (since it could well be the predominantly technical-scientific *proactive* aspiration of any socially futurable entity). However, the first and second law of thermodynamics suggest that the creation of a perpetual machine is impossible. Some opportunities for such forms of development surely exist – in the middle ages, switching to two-field and later to three-field farming represents an example of taking advantage of a narrow loophole. The Holocene, the age preceding the Anthropocene, was not entirely free of technological development. However, technology did not rely at all on finite fossil fuel sources. A good example of a present challenge is fertilizer production. Arguably the most energy-intensive industrial process, fertilizer production should be redesigned to work *completely* on a renewable basis. However, the advantages of the complete replacement of fossil energy consumption are questionable. In general, it is expected that available ecological space will sooner or later decrease – an entity that is socially futurable has to take this likely possibility into consideration.

Having introduced the concepts of internal and external control, we have created a clear framework for analysis. To test this, let us look at Kocsis’s example of famine (2010). The age-old phenomenon of global famine, which affected about 800 million people in 2015 according to the FAO, can be tackled in various ways. Assuming even distribution, we can argue that by dropping one or two meals that contain animal products per person per week, the “developed” world could contribute to the solution[18] (requiring an increase of internal control at a community level). On the other hand, for some time industrial agriculture could be further developed to become even more productive; e.g., by introducing more GMOs, thus increasing external control (see Borlaug 2002). Of course, we could also illustrate the situation using examples from other fields. The need for mobility may be satisfied by using public transport instead of cars. Riding a bicycle or walking instead of driving necessitates increased internal control, as the comfort levels of these activities are lower. We may also try to enhance oil production and develop industrialized farming to grow genetically modified biofuel crops, shaping the biosphere ever more intensively to meet human needs, thus increasing human pressure on nature even further (i.e. increased external control).

Figure 5 clearly shows that in the period from 1961 to 2013 a significant increase in external control occurred (the tendency at the millennial-scale level is anyone's guess), whereas the affluence of mankind also increased on average with a simultaneous decrease in internal control levels. The result of these two forces is significant global population growth, as mentioned earlier in this study. Ecological space suitable for human use, created through exerting external control, was filled with population (where the trend line intersects the population isographs) *and* consumption/affluence, indicating a decrease in internal control. In other words, mankind has always been able to increase its material comfort levels (and decrease its internal control) in spite of continuous population growth. This is not only true for the past five decades, but for the past ten millennia (the three horizontal lines in Figure 5 represent the average comfort levels of Europe, the US and Africa.)

As far as the unsustainable, virtual component of ecological space is concerned, "stepping back" to levels of environmental sustainability may also be interpreted as a combination of internal and external control. Since the size of ecological space suitable for humans may be identified with external control, the figure clearly shows the various strategic possibilities for manoeuvring. In the case of shrinking ecological space, humanity will need to decrease population and/or increase internal control. These processes are unprecedented both globally and historically.

3.3. SOCIALLY FUTURABLE AND ENVIRONMENTALLY SUSTAINABLE STRATEGIES

The main possibilities for decreasing virtual ecological space and excessive external control may be classified into two categories: the "brave new green world," and "towards harmony" (Figure 6). (Further increasing external control is likely to end in disaster. Discussing its two variants – i.e. overpopulation and "over-comfort" – is beyond the scope of this study, both approaches also being environmentally unsustainable and thus unsuitable for use in building socially futurable entities).

[18] In terms of energy it is much more efficient to consume plants directly than indirectly – feeding produce to livestock first and eating the animals later to cover daily nutritional needs results in significant energy loss since animals use most of their energy intake for maintaining their basic functions (breathing, moving, etc.).

The two basic sustainable scenarios are discussed here based on research by Kocsis (2010). Compared to the world as it is now, approaching the bottom-left part of Figure 6 could be seen as an effort to create a brave new green world. This strategy, by limiting external control over nature (by decreasing the virtual part of ecological space) would doubtlessly contribute to the creation of a more environmentally sustainable world; however, it would also promote a further decrease in the internal level of control (by further increasing affluence). These two objectives can be realized simultaneously by radically decreasing population (strong population control). This strategy would involve a comfortable, Western-style “environmental protection” that does not require any self-control in consumption/affluence, but requires limitations on “breeding” in the “third world” instead (see Connelly 2008). This is a dangerous road and the risks of such an approach are made apparent by the present existence of forced forms of birth control that can be identified.[19] This is a typical example of the case when a strategy is environmentally sustainable but not socially futurable. According to our normative standards, such curbing of personal liberty is unacceptable (Csák 2018). For this reason, we suggest a strategy which can be characterized as the most harmonious one (Figure 6, top left).

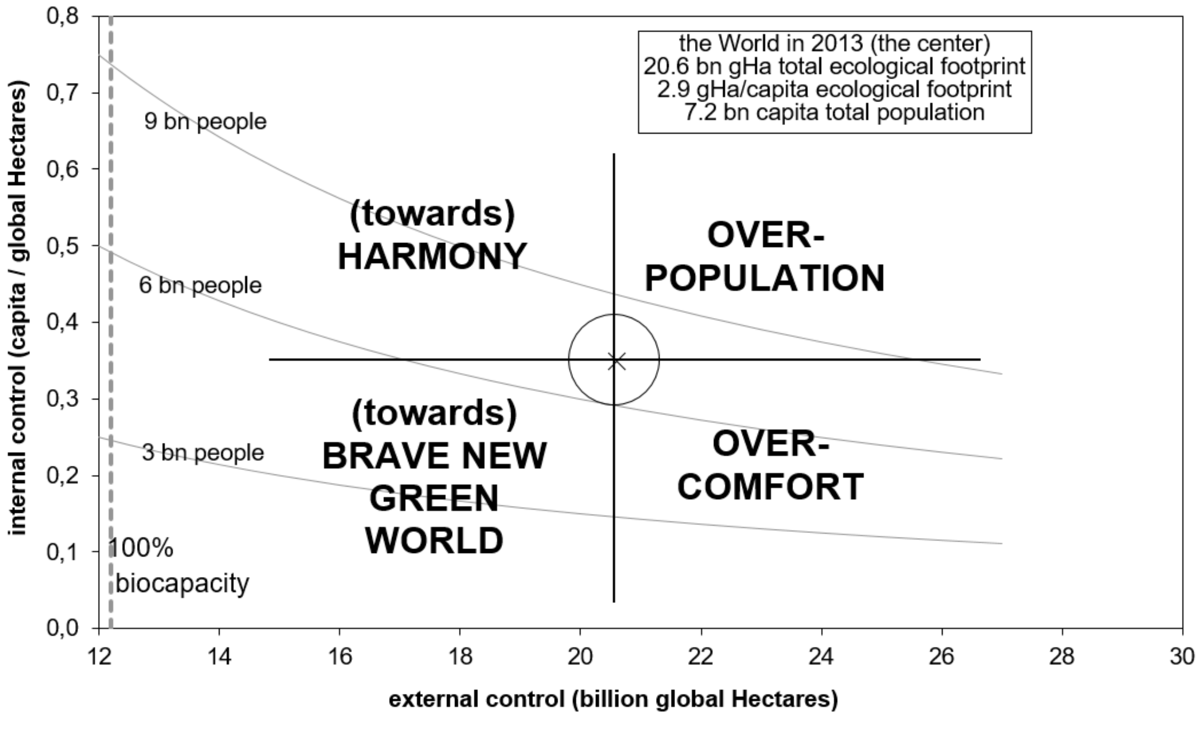


Figure 6. Scenarios of catastrophe and environmental sustainability in the space designated by internal and external control

Source: Kocsis (2010).

[19] Aldous Huxley gave an impressive description of such a world in his novel Brave New World (1932). The system depicted is characterised by total population control which is not only quantitative but also qualitative. In the Brave New World, various technologies, drugs and chemicals systematically provide maximal comfort to people who do not have to bother about internal control at all. If continuously decreasing internal control is considered a benchmark of the historical development of mankind, we would have no reason to criticise this world. And still, if there were one single human left who was able to face the world without artificial and manipulative influences, they would flee, roaring, to a freer and more human world (in the book, a reservation inhabited by savages).

In comparison to the average of today, this would require more internal control from the majority of humans – in a material sense, a less comfortable life, which can yet be seen as one freer and more worth living (Csák, 2018), in contrast to the one that seems to be unfolding worldwide in the consumer societies of the countries we call developed (mainly characterized by material wealth-driven ambition). Subsequently, external control over the environment should also be relaxed through the less extensive exploitation of nature. This might really make the system more sustainable environmentally. In this system, changes in external control and internal control will decide whether the global population will grow, decrease or stagnate (see Figure 6). In this approach, the absolute size of population is not of primary importance, so there is no need to control it in "enlightened" ways that so often conflict with human dignity (Greenhalgh 2003),[20] not even for the sake of environmental sustainability or future generations. It is exactly the concern about the survival of future generations that makes the creation of socially futurable structures and entities urgent and essential.

It is therefore important to realize the significance of the extent and result of external control (over natural environment) and internal control (over the material affluence we have). Again, we are not suggesting that the size of the population is an insignificant factor, but we do claim that the population is a combination of various types of control (so it is more likely to be an effect than a cause in a complex chain of causes and effects, and can thus be modified technically via population control), especially if the thesis about filling the ecological space (niche) is also taken into consideration. So, if the causes of environmental sustainability and human dignity are to be tackled simultaneously, meaning that environmentally sustainable alternatives should also be made attractive and socially futurable, it will be necessary to pay more attention to the type and extent of control that is exerted than to the more conspicuous figures about total population size.

3.4. HAPPINESS (SUBJECTIVE WELL-BEING) VS. INTERNAL CONTROL (PERSON/ECOLOGICAL FOOTPRINT)

There are two important things to notice regarding the desire to head "towards harmony." First, in the course of history, Homo sapiens have already had the higher levels of internal control required by this strategy, and so it would be false to state that enhancing internal control is impossible. However, a high level of internal control was anything but *voluntary* at earlier times (since today's level of material comfort was unimaginable, there was nothing to give up) and it was (and still is) always determined by the actual level of technology.

[20] Of course, on account of the issue of unwanted children (in terms of population control), there are solutions similar in nature to those of internal and external control. Also, in this case, securing a favourable output (i.e. that such babies remain unborn) is at stake – controlling the factors that raise the probability of childbirth. Various chemical, mechanical and surgical methods of birth-control are similar to forms of external control, while "natural" methods of contraception – such as purposefully exploiting the menstrual cycle or men's bodily functions – are similar to internal control. The latter can and should be learnt about; their use conforms to advances in scientific understanding (i.e. they need not be considered obsolete, "prehistoric" methods).

In connection with the "strategy towards harmony," it might be argued that this would reverse history; this argument is often brought up when more radical environmental strategies are unveiled. Indeed, external control has increased continuously throughout history owing to successful technological innovation. As a result, the population has grown and internal control has decreased. In layman's terms, more and more people are living better and better lives. The first stage of the "human project" has thus been successfully accomplished for many. A socially futurable and environmentally sustainable strategy would require just the opposite: lower external control combined with higher internal control (the result of which combination is population growth; see Figure 6).

However, our futurable environmental strategy cannot be regarded as an attempt to reverse history. A global environmental catastrophe would throw mankind into a world of crisis management and shortage, as has already been described by various authors (many of whom also predicted the date of such a cataclysm, and have been proved wrong). A responsible thinker has to find ways to avoid such a catastrophic alternative – this is also the objective of social futuring. Now, for the first time in history, the challenge is not how to fill available ecological space using new technologies, with population and/or affluence, and not how to enlarge this space, even though it is possible. "We could do it, but we won't" could be the slogan of a new age; that is, a strategy of deliberately *not* using technology that is available to exert immense external control. The fact that humans have not used its nuclear arsenal that is capable of wiping out all life on Earth gives us a hint that we might possess this ability. This example is not perfect though, since production seems to typically involve constructive rather than destructive technologies, and "not using" here rather refers to the less intensive use of such technologies than would otherwise be possible. Who would have thought, for instance, that the Indian Green Revolution (that is, the extensive fertiliser use in agriculture that saved millions from starvation), would later have a devastating effect? The Green Revolution successfully enlarged the ecological space in India and reduced hunger; however, the population started growing shortly afterwards. Such efforts at such scales are both environmentally unsustainable and socially unfuturable.

We can illustrate the size of the challenge through the relationship that summarizes actual values of ecological footprint per capita (the multiplicative inverse of internal control shown on Figure 4) and subjective well-being (happiness)[21] (Figure 7).[22] Higher scores denote countries with lower internal control (higher material comfort). On the right we find countries with higher levels of contentment and happiness. One conspicuous tendency is apparent here – greater comfort generally leads to greater happiness, and vice versa. This is hardly surprising. However, it is the lower-right corner of the figure that represents an ideal state. There, a relatively high level of internal control is coupled with greater levels of happiness. This is true of some Central American and South American nations, such as Costa Rica and Brazil

[21] Subjective well-being is often measured by assessing answers to the following question: "All things considered, how satisfied are you with your life as it is now? Zero stands for 'really unsatisfied', and 10 for 'really satisfied'. Where would you place yourself on this scale?"

[22] If, instead of subjective well-being, an objective welfare index is brought into the analysis, for instance the Human Development Index (HDI) developed by the UN, it will also become apparent that mankind has so far avoided combining well-being (or welfare) with environmental sustainability, although there are significant differences between entities – i.e. countries. (No such figures are shown here. See e.g. Global Footprint Network s. a.).

(Hungary is located in the middle on Figure 8, close to China, with near-average levels of happiness and internal control).

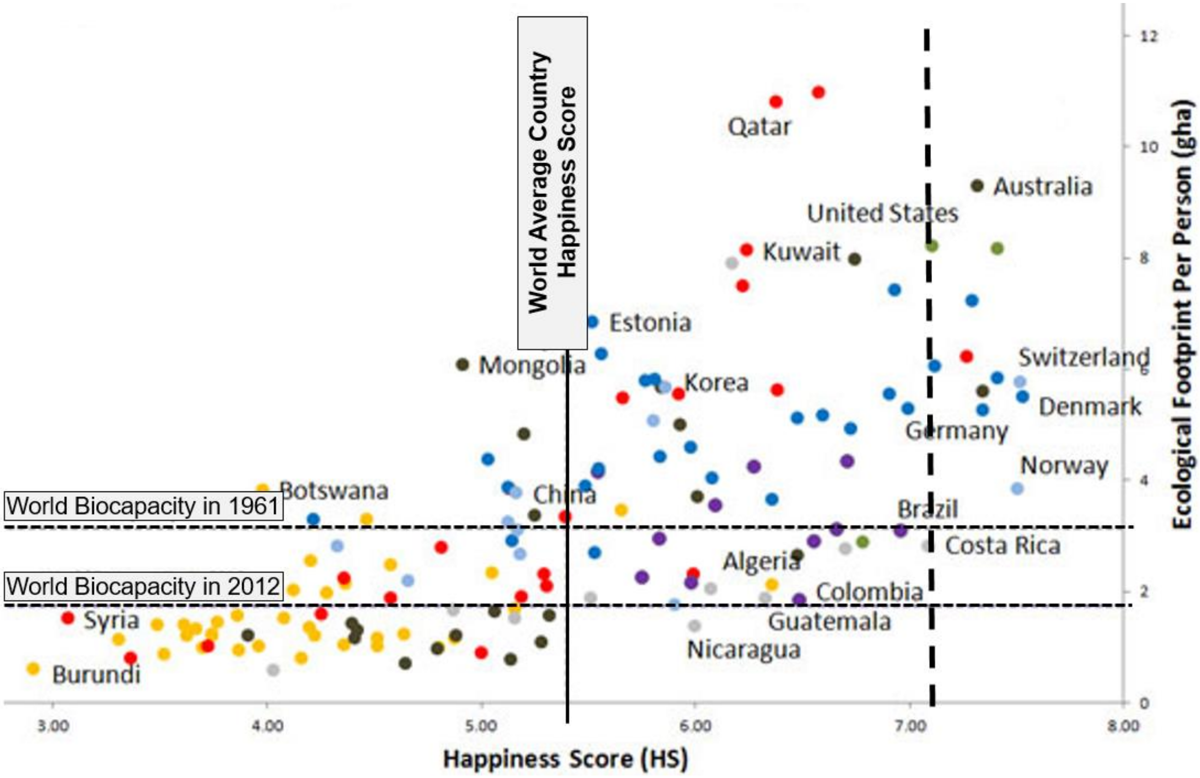


Figure 7. Relation between internal control (ecological footprint per capita) and happiness (subjective well-being) in 2012 (bold dashed line is added by the author)

Source: Global Footprint Network (2016)

Another tool that is widely used for analysis, the Happy Planet Index, reflects this issue rather well. This index adjusts happiness for ecological footprint per capita (internal control), taking the quotient of the two, and also takes life expectancy at birth into consideration (more recently, it has also incorporated income inequality). Based on this index, the countries of the world can be ranked (Jeffrey et al. 2016). Countries from Latin America head this list, too. These countries, maintaining a relatively high level of internal control, have notably high levels of happiness as well. The end of the list is dominated by countries from Sub-Saharan Africa. Environmentally sustainable they may be, but very few people there feel that their lives are worth living (see also Csák 2018) thus they lag behind in terms of social futuring. The sentiment of the population underpins the fact that their region is the most unhappy place in the world. These countries can be found in the lower-left corner of Figure 8.

Although the Happy Planet Index introduces important factors into the analysis by integrating life expectancy and income inequality, we still find it meaningful to create a less complicated index that is “as plain as one’s nose.” This is the quotient of ecological footprint per capita and subjective well-being. Since internal control is the reciprocal of the former, the formula can be rearranged: the above-mentioned quotient is the product of internal control and subjective well-being (Figure 4, relationships pertaining to the left-hand triangle). This product could technically be called “happiness efficiency,” but calling it the “celestial footprint” (Kocsis

2013: 5–6) is more advantageous given that this concept might be communicated more easily. Celestial footprint therefore complements terrestrial/material footprint in terms of human well-being (feeling as a whole), and combines natural scientific relevance with the fields of social science that deal with human happiness.

From the perspective of social futuring, an important direction for research would be to examine the causes of the diverse "performance" of social entities in terms of internal and external control that result in a different celestial footprint (happiness efficiency); it would also be useful to find ways for "underperformers" to adopt potential good examples. It is, for instance, interesting that – according to the figures – Australia and Norway have completely different internal control levels and virtually the same results on the happiness scale, whereas the internal control figures for China, Hungary and Brazil are similar but the happiness results are very different (i.e. the size and consistency of our celestial footprints vary to a considerable extent). Research on this in relation to social entities that are smaller than countries and nations is desirable and important for the future.

3.5. EXAMPLE OF GOOD PRACTICE: VOLUNTARY SIMPLICITY

Voluntary population control as a means of decreasing internal control is unique to humans. There are no other species in the animal kingdom that deliberately choose not to fill the available ecological space with offspring for the sake of more affluence and welfare. Humans are indeed capable of this, which is the very reason that it is not global population itself that defines the available ecological space, but the product of global population and average affluence (consumption) per capita ($I = P * A$). In terms of affluence, there is of course a difference between people. It is for this reason that average affluence is used in the formula. There is also a peculiar trade-off between population and affluence, which involves definitions that vary from one individual, community, country – i.e. social entity – to another. Naturally, this choice is just *one* source of the infamous inequalities in income and wealth; it would therefore be advisable to examine the idea of equality-righteousness more frequently using this perspective.

Study of the issue at a national level, about which economic and sustainability figures are found in abundance, is beyond doubt convenient; however, many good examples can be found at local levels, too. We do not necessarily need to go as far as Latin America, or the United States of America for that matter (see also Takács and Sánta 2017 for Hungarian cases), although the emergence and moderate spread of the *voluntary simplicity* movement is quite a remarkable phenomenon considering that the US is one of the richest and most developed countries in the world, setting examples in many ways (not including environmental sustainability). The philosophy and practice of this movement highlights the possibility of exploiting human potential and practicing internal control with regard to consumption. This does not mean "giving up," but rather "opening up" to a broader and freer human completeness, which is also the basis of social futuring (Csák 2018).

Let us then examine this lifestyle, characterized by high levels of subjective well-being (happiness) and a resistance to material growth and consumerism, from a number of perspectives. The voluntary simplicity movement stands on sound theoretical and practical foundations (Gregg 1936; Elgin – Mitchell 1977; Elgin 1993). Moreover, it has not declined in popularity (Schreurs 2010; Gambrel – Cafaro 2010; Jackson 2008, Gandolfi – Cherrier 2008; Shi 2007; de Graaf et al. 2005; Etzioni 2004; De Geus 2003). As we cannot possibly undertake to unfold all the details of this sophisticated concept here, only the most typical features of a voluntary simplifier will be described.

The theory and practice of voluntary simplicity may be seen as institutionalized resistance to a consumer society. Voluntary simplicity is essentially a lifestyle which is outwardly simple but inwardly rich (Elgin 1993). The movement is rooted, for example, in the legendary frugality and independence of puritans, in Henry David Thoreau's close-to-nature vision at Lake Walden (1854), in Ralph Waldo Emerson's practical and spiritual dedication to a simple life, and in the social philosophy of spiritual leaders like Jesus and Gandhi. According to advocates of voluntary simplicity, the present social and environmental crisis is a further argument for dedicating ourselves to leading a socially and environmentally more responsible life (for details about voluntary simplicity and its criticisms, see Kocsis 2002b: Chapters 3 and 4). A classic book by Elgin and Mitchell, published in 1977, differentiated the five basic values of voluntary simplicity, including: material simplicity; human scale; autonomy; ecological awareness; and personal growth.

But who are the voluntary simplifiers exactly? Valuable information can be found about this from the questionnaires of researchers who study the movement. Shama and Wisenblit's (1984) dogmatic statements that identify followers of voluntary simplicity have seen much use in research, even in recent times. They include: (1) I believe in voluntary simplicity, which means that I only buy and consume in quantities I need; (2) I believe in the "small is beautiful" principle (see also Schumacher 1980), for example, I prefer a small car to a larger one; (3) The function of a product is more important than its looks; (4) I prefer personal growth to economic growth; (5) I aim to have greater control over my life, for example, I abstain from instalment buying; (6) I believe I am ecologically aware (Shama – Wisenblit 1984: 233). Of course, the values and beliefs inherent in agreeing with these statements are closely connected to a lifestyle that is less material intensive and, at the same time, requires more internal control.

Questionnaires that survey voluntary simplicity in practice usually enquire about respondents' everyday activities. In the 1970s, this activity started out in California; no wonder, as that region was – and still is – one of the most well developed in the world from a material perspective. The movement has since become much more widespread globally. Dorothy Leonard-Barton's questionnaire, originally used in California in 1981, is nowadays a household survey that is popular among researchers who study lifestyles and environmental sustainability in connection with voluntary simplicity (Alexander – Ussher 2012; Schreurs et al. 2012; Merrick 2012; Chhetri et al. 2009; Hamilton – Denniss 2005; Huneke 2005; Grigsby 2004; Craig –Hill 2002; Pierce 2000).

According to the general findings of the survey, a typical voluntary simplifier makes presents instead of buys them; rides a bicycle for recreation and transport; recycles glass bottles or collects them selectively; self-educates to become more independent (e.g. painting their own house); chooses to do without meat; buys clothes in second-hand shops; buys furniture second-hand, even the bigger pieces (above approximately 20 USD); builds furniture and makes clothes for the family; barters to avoid the use of cash; and grows vegetables in the summer for consumption (Leonard-Barton 1981: 250–251). Considering all the above as *voluntary* (involuntariness would refer to a state of material poverty), it seems reasonable to assume that voluntary simplifiers may be able to decrease the material consumption of the economy (as well as environmental impact).

It is important to note that creating adequate *structures* may be essential to promoting such activities. For example, good quality, safe bicycle lanes should exist along with selective waste containers in neighborhoods, and barter deals and local currencies should be legal and neither frowned upon by authorities nor persecuted as forms of tax evasion. These suggestions also hint at the importance of sober top-down policies for promoting internal control and "officializing" it.

Voluntary simplicity may only become attractive if people have fully and *securely* satisfied their basic *physical and physiological* needs – this presumption also fits Maslow's thesis about basic human needs (1954).

> Voluntary simplicity is thus a choice a successful corporate lawyer, not a homeless person, faces; Singapore, not Rwanda. Indeed, to urge the poor or near poor to draw satisfaction from consuming less is to ignore the profound connection between the hierarchy of human needs and consumption. It becomes an obsession that can be overcome only after basic creature comfort needs are well and securely sated. (Etzioni 2004: 415)

Thus, it is consumerism, rather than consumption itself, that voluntary simplicity aims to limit (Etzioni 2004: 416).

This observation also points to the fact that not every social entity can afford to engage in voluntary simplicity. For this reason, it cannot be regarded as a universal strategy to be followed by everyone. In reality, a sustainable position should be found along the continuum that also figures necessity, comfort and excess. Voluntary simplicity can be interpreted as an artistic endeavour that is indeed socially futurable, since it offers the possibility of a life worth living.

4. CONCLUSIONS

The first stage of the human project has doubtlessly ended; the earth has been "replenished" and "formed in our image." One cannot possibly find a single spot on the planet that is completely exempt from human (anthropogenic) influence. To a significant extent, the systems of the biosphere have been engineered in a way that they yield maximum social-economic profits to mankind. We live in the geological era of the Anthropocene by the virtue of technological development brought about by humans. This is an impressive success, and humans are worthy of the highest praise: at school, they would get an A+ for their efforts.

Now, the second phase of the human project must be launched – the sooner the better – and this will be just as challenging as the first phase. This is because the system has been "overdeveloped"; plans have developed „beyond expectations" and so corrections are necessary. Technological development, through which the ecological space available to humans has been successfully enlarged, has relied heavily on non-renewable natural resources and energy sources, especially fossil fuel, during the Anthropocene era, which started in – or is rooted in – the Industrial Revolution. Our technology now enables us to exert immense external control over our environment. Nonetheless, this attitude is by no means sustainable in the long run. Will "homo" be "sapiens" enough to realize this and dedicate resources and creativity to solving this problem in the second part of this historical age?

Achieving environmental sustainability – which must not be perceived as a static, non-changing state – has become a task, an objective, which we, human *persons*, must realize partly by creating structures that move individual behaviour in the desired direction. The latter suggests the political relevance of this topic, which is not discussed in this study. However, we may well hope that social futuring will be realized at the level of various entities some time in the future, and as a result, mankind will eventually prevail.

Actively shrinking ecological space, which has already been enlarged beyond the limits, will not be easy, since humans have already "moved in"; population and affluence already fill in the space seamlessly. This has happened exactly in line with the natural law that states that each species will eventually fill in the available niche with population. Technological development was never designed to shrink our ecological space. On the contrary, it has enabled us to increase that space by making it possible to rearrange and restructure impacts (e.g. favoring the environmental hazards of a nuclear power plant instead of those of a fossil plant, using catalysts to turn air pollution into hazardous waste, or taller chimneys to emit the same amount of pollutants while employing more of the waste-assimilation "services" of nature). Technological changes that result in rearrangements within the ecological sphere may win us time, but the issue of overshoot still remains. A non-technological solution, however, is within arm's reach, as it lies in human nature itself. The existence of creativity and human potential – which has been responsible for the incredible development and the alteration of the environment – supports our optimistic premise that we shall become more capable of voluntarily controlling ourselves.

This existing and functioning internal control tells us to do without *some* of the material wealth created by external control, because it is environmentally unsustainable in the long run. The times in which mankind was forced to maintain greater internal control are not unfamiliar – just think of summers you had to survive without air conditioning! It is easy to get used to comfort – deciding to do without it is much more difficult. In any case, the attempt is far from trying to turn back the clock on history. Abstaining from some comforts is hardly a "back to the trees" strategy; a label often used for deep ecology. However, if we continue to consider this form of control a source of inevitable unhappiness, we may continue to seek the material blessings of the "final epoch." A future correction will happen in any case, all by itself, and, as a result, mankind will return to a level that really is environmentally sustainable – yet this will involve much graver human and ecological sacrifice.

As responsible thinkers, we need to figure out new, socially futurable and environmentally sustainable strategies for avoiding this disaster. There are numerous examples of individuals and movements that can be considered as practicing proactive and functioning internal control. The US-based voluntary simplicity movement has been described in this study. We have seen that an increase in internal control (doing without some of the available material comfort) may result in an increase in happiness (subjective well-being). In many cases, this attitude even seems to be the right one for achieving happiness as a sole target (disregarding concerns for environmental sustainability). This approach can lead to the creation of an agreeable strategy rooted organically in human nature. Less is more. The phenomenon can be interpreted and communicated quite easily using the earlier-coined concept of celestial footprint: humans are in possession of a resource that is not limited in any material sense, whose potential may equal that of human creativity, and which enables technological development. Increasing the celestial footprint (internal control coupled with increased happiness) is a real art that extends beyond the level of individuals. The creation and implementation of a suitable political strategy must occur just as it has with external control over our natural environment. This is the most important socially futurable and environmentally sustainable task in the second stage of the human project.

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