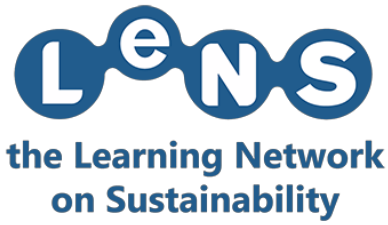

Strategies for Eco-Social Transformation: Comparing Efficiency, Sufficiency and Consistency

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ABSTRACT

Redirecting human progress needs more than superior ethics and good will. Effective forms of management and governance are required (Metzner-Szigeth 2011). Realizing sustainable development takes place under conditions of targeting-conflicts about priorities, utilization competences about resources as well as divergent interests and contrasting visions. Facing great challenges of humankind therefore means tailoring well-designed interventions: in communicative culture as well as in material culture, in the organizational sphere as well as in the technological sphere. But how to do so? Three well-known strategies are "efficiency", "sufficiency" and "consistency". They are driven by contrasting rationalities, respond to different groundings and favour distinct instruments. They are supported by different arguments and seem to exclude each other. As strategies, they are competing for attention for being accepted and converted into practice. But how to combine them with productive principles of design such as to enable far reaching transformations in material culture and social life?

Key Words: sustainability, efficiency, sufficiency, consistency

1. INTRODUCTION

The Learning Network on Sustainability (LeNS) places mediation, exchange and elaboration of knowledge and skills at the center of its efforts. Hence, this is about a special type of "professional competences", namely those that are suitable for promoting processes of sustainable development (SD). They cannot be understood as "theoretical" or "practical" anymore according to the classic dichotomy that divides scientific knowledge and abilities as if they were essentially "pure" or "applied". Instead, the best way to conceive their combined, dynamic and novel character is to address them as "transformative" competences (Hirsch Hadorn et al. 2010; Wiek & Lang 2016).
Unfolding some comparative overview about SD strategies is for sure especially useful with concern to problem-based and solution-oriented teaching-learning projects (Lehmann et al. 2008; Cörvers et al. 2016). But strengthening a good command of methodological issues is not less valuable with regard to similarly organized professional R&D projects that are essentially inter- and trans-disciplinary (Laws & Loeber 2011, Ceschin & Gaziulusoy 2016).

LeNS (2019) declared vision is "to foster a new generation of designers (and design educators and researchers) capable of effectively facing, the challenge to envision, design and contribute to the transition towards the sustainable world for all". A "sustainable world for all" – that sounds nice, convincing and self-evident. Nevertheless, the proposition needs clarification. Gaining a good comprehension about what is indicated by 1.) the adjective "sustainable", 2.) the noun "world" and 3.) the attribute "for all" is anything but trivial.
1.) The conceptual composition of "sustainable" and "development" turned out to be just as promising as of far-reaching consequences. That happened instead, or actually because of the fact that it was created out of two opposing components. Thus it exhibits the characteristics of an oxymoron (from Greek "oxys" = sharp-witted, sophisticated and "moros" = stupid, moron). This rhetorical figure presents a phrase made up of two contradictory terms, such as in the "peaceful warrior". At least at this point the question arises: How could it be that something might become preserved (= sustained) and simultaneously renewed (= developed)? Well, the related problem of validity refers, on the one hand, to the origin of SD. The concept is known to be negotiated and invented within a series of international political conferences and therefore represents a kind of "compromise formula" (cf. i.a. Michelsen et al. 2016). On the other hand, it also points to the substantial difficulty of forming a concept which must also be "future-capable" in itself. Drafting a meaningful concept that is robust and resistant as well as adaptive and extendable implies to keep its contents interpretable in the sense of a "regulative idea" (Stables 2013).
2.) The second clarification concerns the issue whether "world" is a synonym for "planet". Is it constructed as if it were some single place, like in the term "global village"? Or does it count as a manifold and contradictive unit as indicated in the composite notion (cf. Robinson 2008) of "glocalization"? This point is especially relevant for global cooperation networks and world-wide distributed conferences like LeNS (2019). The way "global challenges" are represented on site, in Mexico City - Curitiba - Cape Town - Bangalore - Beijing - Milan - or elsewhere, is just as different as the conditions that shape the reality of the people who live in these places. These include political and social, economic and ecological, cultural and geographical conditions, which form specific constellations.
3.) A third clarification concerns the expression "for all". Sustainable well-being for all will become possible only (acc. to Costanza et al. 2012, p.vi) if three preconditions are fulfilled: a.) that we acknowledge the fact that we live "within planetary boundaries – within the finite capacity of our planet to provide the resources needed for this and future generations"; b.) that we agree "that these resources should be fairly distributed within this generation, between generations, and between humans and other species"; and c.) that we use "these finite resources as efficiently as possible to produce sustainable human well-being, recognizing its dependence on the well-being of the rest of nature".

Anyway, in order to really become effective, it does not need actions alone, but adequate and coherent thinking-approaches and courses of action. All we need to do is search and find them, work and test them. That is an open search, trial and learning process. This conclusion corresponds to an approach that culminates in the idea of transformation design (Jonas 2016, Yee et al. 2017). It is about the idea of "drafting" change and of "designing" everything that is important to it, instead of "planning" change "top-down" from a drawing board in order to "implement" it afterwards, as it were in the past, in the times of unbroken prevailing technocratic thinking. Meanwhile we have entered a transitional phase towards "co-creative" practices (Orr 2004). These include and integrate experts and laymen, producers and consumers, planners and citizens much stronger into inter-active and inter-connected processes of designing and negotiating results and products.
Realizing sustainable development in practice takes place under highly diverse conditions of targeting-conflicts about priorities, utilization competences about resources as well as divergent interests and contrasting visions of how "our common future" (WECD 1991) should look like (Metzner-Szigeth 2014; Michelsen et al. 2016). Facing the "great challenges" of humankind (Royal Geographical Society 2015) therefore means tailoring well-designed interventions into the ongoing dynamics of existing patterns: in communicative culture as well as in material culture, in the organizational sphere as well as in the technological sphere. But how to do so?

2. PROFILE DEFINITIONS

There are three crucial strategies for SD in general and certain professional practices like design, engineering or management. They are well known in sustainability science, science-technology-studies and systemic design. Their labels are EFFICIENCY, SUFFICIENCY and CONSISTENCY (cf. i.a. Huber 2000). [An additional strategy, resilience, is not included here - and this for pragmatic reasons only.] They can be characterized as follows:

EFFICIENCY focuses on environmental resources, i.e. on the productive and consumptive use of material and energetic resources (exhaustible and renewable raw-materials, geophysical processes, eco-systemic functions). Its aim is to improve the ratio between the input of material and energetic resources and the output of goods and services. The medium to do so is primarily technology. Its intention is not simply to increase, but to multiply the general resource productivity. This intention finds its expression in formulas like "factor four: doubling wealth - halving resource use" (cf. von Weizsäcker, Lovins & Lovins 1998). Optimizing existing systems is not sufficient then. Instead, disruptive innovations are striven for, culminating in a "revolution of efficiency" (ibid.). The aspired result is an equivalent reduction of the consumption of environmental resources and a release of environmental and climatic burdens. This seems possible, but only under the (ceteribus paribus) condition that the overall amount of goods and services remains constant. Its formula of success and promising perspective is therefore (on side of the input) to reduce the exploitation of environmental resources and (on side of the output) the burdens for environmental media (like water, earth and air). The central parameter for this approach is energy and material or CO2-intensity per product or service-unit (cf. Baccini & Brunner 2012, pp.162ff.). Conventional economic strategies, in contrast, try first and foremost to increase labour and capital productivity, and not resource productivity. Efficiency, as a SD strategy, is interested in achieving an optimal allocation of material and energetic resources in order to reduce negative environmental impacts. Nevertheless, its consequences may result in reducing costs (especially with price-intensive resources) as an appreciated side-effect, as well. But that bonus counts and is the basis for the affinity of efficiency to industry and commerce, especially in so far companies are interested in following the road to sustainability.

SUFFICIENCY focuses on human needs. Its aim is to limit and to directly decrease the (individual and collective) demand for products and services. This is followed indirectly then by limitation or reduction in the consumption of material and energetic resources (Fischer & Grießhammer 2013). The medium to realize that is culture where a shift to post-materialist values, more conscious consumption patterns and sustainable life-styles is aspired, up to thoroughly novel ways of life. The mechanism for reaching these intentions is by influencing consumer choices, individual behaviour and habits. Good reasoning to do so lay at hand especially with concern to energy and material intensive products or such that are rather dangerous for the environment or decidedly harmful to the climate. Originating from the Latin "sufficere" (= to be enough) sufficiency is by its ethymology prone to be associated with terms like adequacy or suitability. From this context the question arises "How much do we really need for a good life?" that is typical here. And this asks for making a distinction related to "What is superfluous, luxury or only wasting?". Self-Limitation of one's own needs or desires, and ideals such as frugality and living in self-sufficient communities, represent characteristic key elements. They often occur together with ideas of social fairness, egalitarian values and environmental justice (foremost in its distributive sense). These topics and positions coincide with worldviews that make sufficiency particularly attractive for NGOs and members of environmentalist movements. The ambition of sufficiency is nothing less than stopping or even turning around the mega-trend of ever more commodities and the expansion of the "affluent society". In other words, sufficiency puts a hold on a certain standard of material welfare or even lowers it to some degree as expressed in the ideology of post-growth.

CONSISTENCY focuses on procedural and substantial qualities. Its goal is less a reactive reduction of quantities, but rather a foresightful and encompassing design of life-cycles. That includes entirely novel products and manufacturing procedures as well as their utilization in processes of consumption and re-cycling. This should allow an almost permanent and as complete as possible re-use of components and resources in interconnected chains, networks and closed loops. Moreover, it should guarantee an ideally 100% bio-compatibility of artefacts, compound-materials and substances if there is need to revert them from the technical cycle back into nature's cycle. Embedded in the metabolism of nature and powered by renewable energy sources only (like wind, solar, geothermy, biomass) this concept strives to organize anthropogene and geogene flows of materials either so they do not disturb one another or in ways that allow their interdependent reinforcement in a symbiotical sense. The principles of the cradle-to-cradle design (C2C) are prominent within this field and fulfil the criteria of consistency in an ideally-typical way. C2C was originally elaborated by biochemist Braungart and architect McDonough. Both were inspired by the approach of "remaking the way we make things" instead of simply remaking things without any further plan (Braungart & McDonough 2009). Many examples of how to implement this principles were elaborated by them, as originators, as well as by many followers (cf. i.a. C2C e.V. 2018). Consistency, ethymologically connotes with coherence, constancy and unity. A familiar association is made with the natural principles of life. These teach us how to successfully practice organic farming or permanent horticulture. Biochemical pathways of complex systems like that of photosynthesis represent models here, in so far as they show how to realize the idea of preventing "waste"

within complex networks where metabolic products generally become the feeding substrates for operations and reactions that follow. The medium in which the consistency approach in general and the principles of the C2C design in particular are thought to be realizable is ecology or, more precisely, "industrial ecology" (for a definition cf. Lifset & Graedel 2002, p.4).

3. COMPARATIVE DISCUSSION

The three transformational strategies are driven by contrasting rationalities, respond to different groundings and favour distinct instruments. Nevertheless, we can understand efficiency, sufficiency and consistency as strategies that highlight their diversity up to the point where they seem to exclude any combination of them because they are competing for attention on the public agenda to be accepted and have the chance to become converted into practice. The following points of critique and their counter-arguments correspond to that background (cf. i.a. Mathis 2018):
Achieving intentions of EFFICIENCY is constantly at risk in so far rebound effects might cancel them out. Realized gains than become compensated (or even overcompensated) by an additional consumption of goods and services that have become cheaper, better or more acceptable. Moreover, sectoral reductions in the use of environmental resources may not result in a general reduction simply because of the ongoing growth in the overall production and consumption of goods and services. ◇ Efficiency's confidence in technology is associated with a bias towards ignoring the importance of culture and its mainstream orientation on materialist values and economic growth. ◇ In its essence the strategy may easily become misunderstood (not only by its opponents but as well by its protagonists) as if it were interested in cost-efficiency only. That burdens its acceptance and could inhibit the realization of possible efficiency driven reductions of needed material and energetic resources.
SUFFICIENCY, as an approach that requires a lot of individual commitment, needs to stimulate some re-definition of own needs and wishes. But individual preferences and consumer choices are determined by a potpourri of highly diverse world views, predominant attitudes and personal motives - especially under circumstances of an open society. Together, they form an inert complex that is difficult to alter in adequate measures and tempo. ◇ The representatives of this strategy mostly emphasize the voluntary basis of the reduction. Nevertheless, diminishing the demand of certain consumer goods (that count as especially harmful for climate or environment) or of the cumulated amount of material consumption in general could be as well forced by prices and taxes, that is, by the market, or by norms and laws, by the state, or discriminated by negative sanctions of fellow people, that is by the media and by influencing the public opinion. ◇ Sufficiency does not refer to the manner of production and to the quality of the produced. Therefore, negative environmental consequences of modes and properties are neglected, because the quantitative reduction of consumer goods is given entire priority.
Realizing CONSISTENCY is hardly possible because of missing options, in so far as required technological basic innovations are not at hand. They would need to be invented first and to be elaborated during time-consuming follow-up processes before that consistency strategy can release significant impacts. ◇ Consistency neglects the consequences of too great quantities and oversized material flows because of its prevailing concentration on qualities, like harmlessness (for humans, other beings and the natural environment) and integral compatibility (with metabolic pathways of ecological systems) as well as re-usability and re-cycling-ability of components and ingredients with respect to the cycles of their utilization in productive and consumptive processes. ◇ A precondition of its success is the need of a complete redesign of the whole economic system towards products, services and techniques, operations and procedures that are consistent with nature. This implies a great demand for information and knowledge sharing because of the need to integrate loops of in- and outputs according to appropriate qualities of resources, re-used products, by-products in networked systems of production and consumption.

(Table 1. Synopsis of some characteristics of the efficiency, sufficiency and consistency strategies / Source: by the author)

STRATEGY	DIMENSION	FOCUS	GOAL	EXAMPLES	DESIGN	PROBLEM
Efficiency	Technology	Resources	Reduce energy and material intensities per good/service	Drip irrigation LEDs	Passive buildings	Rebound effects
Sufficiency	Culture	Needs	Limit consumption of goods/services	Car sharing No meat	Self-sufficient communities	Inertia of habits
Consistency	Ecology	Qualities	Close cycles of material flows / Energy streams out of renewable sources	Compostable plastics / Solar and hydrogen power	Cradle to cradle	Missing options

My preliminary balance of their "pros" and "cons" is based on the profiles of the three strategies, the summary of points of criticisms, and above all on a comparative reflection of some of their essential traits (as indicated in table 1).

I order to become really effective the efficiency strategy requires great technological investments and huge efforts. Nevertheless, under given conditions and taking into account its potential for reducing costs it is a very feasible approach. The sufficiency strategy requires fundamental social and cultural change. Nevertheless, it has the advantage of possibly carrying out onward leading actions even as an individual consumer or citizen. The consistency strategy requires a far-reaching reconfiguration of the human metabolism with nature. This cannot be done without lasting collective efforts. Nevertheless, this approach is attractive because it offers a model for the "circular economy".

In his resume about SD strategies Huber (2000, pp.282-283) comes to three conclusions: At 1st he refers to Schumpeter's analysis of processes of "creative destruction" as a standard form of socio-economic change. Against this background it becomes clear that eco-social transformations as well cannot to be realized without conflicts. Here, the precise diagnosis of Huber reads: "Complex innovations of the 'basic' or 'system' type come with both pleasant and unpleasant implications. They represent major structural change, and this means processes of 'creative destruction' (..). There are winners and losers, and, therefore, social and political conflicts. New generation knowledge, knowhow and skills imply a devaluation of older generation knowledge, know-how and skills. New capital stocks have to be built up, as old ones will have to diminish and dissolve. New sites and regions may see chances, while old ones face the dwindling of theirs" (ibid.). The 2nd point concerns the scope of all three transformative strategies, regardless of the fact that Huber addresses consistency in particular: "Thus, a programme of ecological consistency of the industrial metabolism is not only a call for the innovative productive capacities of industry and the means-mobilizing capacities of finance, or for the inventiveness of research, construction and design, but is concurrently as much a call for social support and political leadership" (ibid.). The 3rd point goes beyond the obvious idea of combining the advantages of the strategies. Instead he unfolds a successive logic: "The strategies of sufficiency, efficiency and consistency can be combined, although the degrees of combinatorial freedom are less arbitrary than one might think. The best overall strategy will be the one that places priority on long-term consistency and utilizes mid-term efficiency as much as possible, while fully acknowledging that certain limitations, thus sufficiency, must finally be respected" (ibid.).

4. RESEARCH DESIGN

Besides focusing on the advantages of a balanced approach in theoretical reasoning there is considerable demand to initiate and realize further empirical research. Indeed, there is urgent need to perform inquiries about concrete applications of these strategies, about best practices and what could be learned from failures. Moreover, unintended consequences should be taken into account, probable rebound effects and, finally, possibilities to deploy them in smart combinations together with accompanying measures. But how to elaborate a comparative research design that is able to effectively address all these issues?

Efficiency, sufficiency and consistency can be analysed, separately or comparatively. Both can be done theoretically, for example in the context of the debate about the limits of economic growth and the need to reintegrate the industrial metabolism of humankind quantitatively and qualitatively into the global metabolism of nature, thereby respecting planetary, regional and local carrying capacities as well. (In this case, the work would be directed by ecological economics as predominant discipline.) Both can be done empirically as well, for instance within the framework of discourse analysis. How these three strategies are constructed within public and professional debates would be one of the guiding questions then. Another key question would be how they stimulate alterations in ways of addressing, framing and prioritizing problems and, thereby, preformating how to approach solutions. (In this case, the work would be directed by environmental sociology as predominant discipline). A third way to work on them, either separate or in comparison, is inspired by the idea of praxeology. This alternative option is above all interested in evaluating their transformative potentials related to practice. The research question pushed into the center then would read: What are the conditions under which it becomes possible to unfold and to realize these strategies enhancing their probability to become successfully implemented within projects. (In this case the work would be directed by sustainability science, in the sense of transformative science, as predominant discipline).

The two types of approximation which would be allowed and promoted under the umbrella of this combined transformative and praxeologic research design are: First, not only to observe, but to participate in these projects. This would be as accompanying action research that needs either to maintain some distance to the (observed) practice and, simultaneously, to ensure not only free access to information but its own (practical) involvement. Second, to holistically tackle professional practice together with its conditions and its consequences.. In this form professional practice can be investigated not exclusively as paid labour in entrepreneurial and institutionalized frameworks, but moreover with regard to all kinds of organized work in more open collaborative networks.

No matter whether it concerns efficiency, sufficiency and consistency, or strategies labelled otherwise: they all represent conceptual concepts or, in more simple terms, linguistic tools we can use to reflect on practices and projects. Hence, it is about the conditions of possibility to create successful societal practice with their help, namely advised

and supported by them. But what does "successful" mean? Our criterion for this is whether and to what extent they contribute to the implementation of "transformative" steps. What "transformative" steps are, can in turn only be identified by reference to the "regulative idea" of SD. To meet the need for greater practicability and clear operationalization the answer to this question may, however, simply be tied to the essential provisions of the 17 SDGs and 169 targets in the UN 2030 Agenda (United Nations 2015).

5. OUTLOOK

We want to intensify our comparative research about these three transformational strategies. Our leading question is how they can be utilized to stimulate design projects either as teaching-learning projects or in form of professional R&D projects. For that, we wish to find suitable international partners.

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