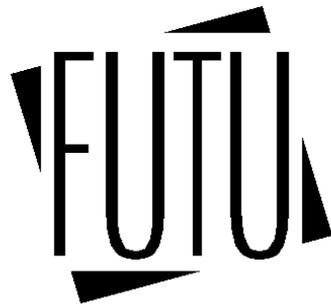


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**SUSTAINABLE TECHNOLOGY
- SUSTAINABILITY OF WHAT?**

The purpose of the research programme Citizenship and ecomodernization in the information society – the futures approach – is to study the social and ecological dimensions of emerging information society. Particularly we aim at assessing social impacts of new informational structures that are impinged on citizens. We also focus on analyzing the ways application of information technology influences on targets and realization of sustainable development. The study programme comprises of ten individual research project organized around above sketched themes.

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SUSTAINABLE TECHNOLOGY -SUSTAINABILITY OF WHAT? ¹

Why is it that we have started to question the sustainability of consumption, invention and innovation, economy, nation-states, whole systems and even the globe, in short of almost everything? What are the new paradigms, what new approaches have been proposed? And: Is it "only" the question to develop new technologies?

1. Ecological problems have become omnipresent and/or international

I want to file a proof that *ecological problems have become omnipresent and/or international*: On March 12, 1997 I found elaborations on the following topics in newspapers like LeMonde, Frankfurter Allgemeine Zeitung or Financial Times:

- Possible answers to the question, why Germany experiences a new wave of protest against nuclear energy;
- Analyses, why Germany's chancellor Kohl appealed for the first time pro ecology, i.e. to tourists, to behave more ecologically;
- Globalisation. It destroys the environment even further, but, and at the same moment, stimulates environmental policy in almost all nations;
- The likelihood, that the attempt to exploit the oilfields of the Tschad will follow similar patterns as in Nigeria (the genocide of the Ogoni-people);
- Can we delineate conditions which would allow micro-genetic manipulations with human genes?

I mention these writings in order to proof that environmental information are all around us but that we have stopped to realise how urgent it has become to find solutions.

¹ Lectures: 13 March 1997, Turku School of Economics and Business Administration, Finland Futures Research Centre; 14 March 1997, Finnish Ministry of the Environment, Helsinki.

2. Consumption, pollution and the end of “natural nature”

The same day I was struck by the following observation: I felt pestilated by the same type of noise (road-traffic noise) in Casablanca, Morocco, then, a week later, in my hometown, Wiesbaden, and later on, in Turku, Finland. And yet, the noise had different affects on me, which I found extremely hard to describe, and people are having different reactions to environmental pollution. The outer differences were striking, 5 million inhabitants in Casablanca, 250 thousand in Wiesbaden, so to speak in the middle of a lot of freeways and air traffic, and 150 thousand in Turku.

Noise pollution seemingly has many *individual* consequences (though I did not discuss the dangers of “nervous societies”), but if one thinks of the raw material facilitating all traffic, crude oil, and the winds which circulate the exhaust emissions world-wide, its *international* dimension becomes immediately visible, not talking of the enormous material flow in order to produce the cars and to get rid of them again, the streets, the law and assurance industries, etc...

Let us switch to another type of international pollution, our food, and to the industry which produces it. This industry also utilises energy (of all sorts and international origins), at least for its distribution, but also quite a number of chemical products, and a lot of packing material, etc. It brings us to a very long list of considerations of which I only want to site a few:

Meat production with all actions it necessitates is one of the most inhuman human actions. Why? Because we could easily feed much more people on our planet much better, wouldn't we feed ourselves with meat of animals which consume the food instead of the people themselves. And animals require, in addition, medical-pharmaceutical treatment, produce atmosphere (ozone)-destroying methane (cows), etc.

Or think, as a third example, on one of the most obnoxious consequences of the medical art: if people receiving radiation treatment have no chance to have their excrements separated from the regular sanitary system, they will have to add them to those of everybody else with the consequence, that the whole life-cycle gradually gets contaminated.

With these few examples I wanted to illustrate my first thesis:

Everyone, willy-nilly, is a consumer and therefore a/n (international) polluter; there is no more “natural“ life on our planet.

3. More information and more computer science and technology alone will not help. Personal and social change is required much more

It is nothing new that life should be a cycle. But it has never been one so far, because, first, people did not know about it (with the exception of farmers, etc.), and, second, did not care, because they were not really affected, at least in the industrial countries, when not doing so. Now, with the ever increasing shift of the extractive industries (raw materials production) to developing countries (DCs), with the constant dumping of raw material prices (energy included) but, nevertheless, with steadily rising prices charged for them from the private end-user, e.g. because of transportation costs (and the overall amount of transportation can almost not grow any more - at least not with present technologies and their pollution) or pollution prevention necessities, the question of recycling, reprocessing and decentralisation has acquired a most prominent position in our discussions and is starting to challenge our economic models as well as real systems more and more.

In order not to go too deep into details, I refer here only to one of the standard topics of the ecological discussion: “alternative virgin production“ instead of “classical end-of-pipe technologies“² with the far-reaching and momentarily illusionary goal of zero pollution production or material and vastly increased energy efficiency (from factors four till ten, depending on the position of the author between realist and utopist).

Before I venture on my second thesis I want to point to building-industry sector (broadly speaking, including roads, tunnels, airports, etc.), which amounts to up to forty percent of all transportation. There is hardly any walk of live, which is as resistant to change and as criminal as the building sector and the transport sector. There, ecology meets criminality most intimately.

Second thesis:

Supposedly, everybody had got all information on environmental perils and had also read them. Why will the situation probably still not change dramatically, even if announced that time is running out rapidly?

In order to illustrate this thesis with a concrete example: Even if the information on how to reduce the flow of materials, on how to increase their efficiency or how to improve the building-industry (less materials - higher material and energy efficiency, less dumpings and vast treatments, less transport, less energy, less water consumption and lesser costs - and better inner climate and air, etc.) has reached everybody, why does change not come about automatically?

² i.e. technologies, which try to minimize or neutralize the pollution of other technologies (pollution when producing the technology as well as pollution when the technological end-product, e.g. a car, is put to use.

Answers to questions of that sort are not easy and tie in with reflections on what the slogan of the coming information society could mean: Does information alone already change the system? Seemingly not. And why? Because there is something like an anthropological resistance to change; or: because “real systems“ are resistant to change. And:

Third thesis:

No single measure or policy will be able to assure the sustainability of the whole system. But every part-system needs urgently to improve its sustainability, because all part-systems are intertwined, none is independent, or: none can be improved beyond a certain dimension as long as the interconnected neighbouring one is not improving as well.

4. How to recognise problems and how to find solutions?

Within the principle of countervailing forces, one has to realise that economy will not be sufficiently self-controlling to avoid ecological doomsdays. That is why politics has to find the appropriate policy, which presses economy into a proper frame.

Theses one and two were based on induction, thesis three on deduction. To give reason to that, I have to introduce more theorems: there is techno-optimism and there is techno-pessimism. The optimist will tell you: whenever there is a growing danger, savers and saving ideas (new technics/technologies) are growing as well. And the pessimist can point to historical evidences, when optimism quite often failed.

In the following, I first want to cite a few observations:

- in boom-times, decision-makers only want to increase their profits; why didn't they start reforms, ecological ones as well, when they could have afforded them?
- in recession-times, decision-makers try to survive. Questions beyond the survival of their companies do not interest them at all; most common recipe: replace people by machines and save money; i.e.: jobs are played against profit and (ecological) reforms;
- independent of economic ups and downs, life expectancy has been growing since a long time. But what do people get out of their longer lives? More quality of life? It does not seem so. They rather are permanent patients of doctors, the medical and pharmaceutical sectors have been booming for decades. Now, with recession everywhere, people and systems just can't afford modern medicine any longer.
- Unemployment has positive sides as well: Forced consumption reduction, i.e. less pollution. Ergo: Shouldn't *we install more self-regulatory systems?* Or: Why can't unemployed invent improvements?

Then I would like to mention some of the proposals or remedies most common to discussions on sustainability (no matter “of what“ in particular):

- conservatives often evaluate pledges higher than laws. The best examples usually are given by industry: in order to prevent laws, they pledge a lot and do a minimum, usually only that much so that one can't precisely say that they haven't done anything. In order not to be unfair: the “certification campaign“ of the EU was without success. - But the opposite policy, state rules and laws, has proven much better results in many instances: refusals of modernisation result in higher taxes, compliances result in lower taxes or even primia;
- much debated, however already experimented with positive results in some countries: ecological tax reforms; i.e., and in principle: put taxes rather on raw material and energy consumption than on labour. The hoped for consequences would be less material and energy consumption and less unemployment - what could be called “administrative ecology“;
- building and transport industries are closely connected: the more buildings are put on agricultural land, the more agriculture is jeopardised (and the danger to the world's food supply is tremendous) and the more transportation-necessity arises. Transportation in connection with buildings amounts to almost 40% of all transportation worldwide.
- going more into technology, in particular in production technology: preventive waste policy gradually changes from end-of-pipe technologies (which could also be called waste-treatment <disposal, dumping or burning> technologies) to virgin technologies, i.e. technologies which do not cause so much waste and pollution from the very beginning.
- and finally I will tackle one particular technology: Hydrogen based electricity on the basis of seawater dehydration with solar energy. This story has so much to it that already many dissertations have been written about it. That's why I can allow myself to be only superficial and brief: This technology is not without dangers, but relatively far developed, if not ready. It is even hoped that the first prototype of a hydrogen-powered jet will land at Hannover's EXPO 2000. But it requires commitments which do not raise eyebrows in globalisation circles but fears with others: solar energy is only abundant where there is already gas or oil, i.e. in southern and/or Islamic countries. Though we already depend on them, these circles hate to see that dependency prolonged.

Another broad spectrum of problems can be seen in the assumption that our system requires growth and that growth constantly requires technical as well as administrative inventions and innovations.

How can one assure that this is going to happen (a question permanently raised by the Japanese who fear that their culture's conformistic group-orientation will not

produce enough non-conformistic innovators)? By new policies of participation, in particular in the area of decisionmaking ³.

Thesis four:

Amongst the various part-system, two are of pre-eminent importance:
 - *the legal or law-like frames, determining the start as well as the reach and realm of each activity;*
 - *the type of technology decided on to be developed or put to use (or altered) when already existing.*

5. Mutually enforcing spirals

Globalisation became synonymous with the (economic) freedom of the post-cold war-, post-duopol-, post-socialism-time. It will reach its summit in not too far a distance but a new world system will have been born by then. Its characteristics will be twofold:

- The influence spheres of the five to seven world-players will have become clear ⁴;
- The importance of local and regional entities will have grown considerably and forms the true countervailing power to the world-player system.

It will all depend on the appropriate start of the mutually enforcing spiral so that also Globalisation and Regionalisation turn into countervailing and mutually beneficial forces. Then also technology will have found its appropriate place.

6. Signs of hope?

Apart from solution proposals which do not merit their name because they are nothing but short-term reliefs, I envision a high percentage of decentralisation and regionalisation (localisation), coupled with economies of small scale and high-quality and with long lasting and recyclable (reprocessible/remanufacturable) products to be

³ See Peter H. Mettler and Thomas Baumgartner, How Participation is improving decisionmaking (for the time being the book is only available in German as "Partizipation als Entscheidungshilfe für Technologie-, Wirtschafts- und Sozial-Politik - PARDIZIPP", ein Verfahren der Langfrist-Planung und Zukunftsforschung, Westdeutscher Verlag, Wiesbaden).

⁴ These will be, for almost sure, the four following ones: China, India, South-East Asia under Japanese hegemony and whatever kind of political-military entity set up by Islamic states; more uncertain seem to be the following "already world-players", or rather, how they are going to cooperate: the Americas under US (or NAFTA) hegemony and the EU, parts of Africa as well as of the follow-up states of the former Soviet Union included. That would bring the overall number to six. But there is also a certain probability that the latter two will form something like a Transatlantic Union, so that the number of world-players would only be five.

the solution to many of our present problems, and most of the needed technologies are already available. May be that household baking machines, high-speed compostation and mulching methods till perma-culture, zero- or even positive (i.e. surplus producing)-energy houses or breweries for individual restaurants are too simplistic examples, but they are easily comprehensible and point in the right direction. Those technologies still missing, like new and/or appropriate production technologies for de-centralised production, could be financed by eco-taxation and by an end to the subsidies for outdated large-scale technologies like nuclear energy or individual high-speed street cars with fuel combustion engines.

ABSTRACT

Why is it that we have started to question the sustainability of consumption, invention and innovation, economy, nation-states, whole systems and even the globe, in short of almost everything? What are the new paradigms, what new approaches have been proposed? And: is it "only" the question to develop new technologies?

Lectures given by Peter H. Mettler in Turku School of Economics and Business Administration, Finland Futures Research Centre on 13 March 1997 and in Finnish Ministry of the Environment, Helsinki on 14 March 1997.

PREVIOUS PUBLICATIONS:

2/97 Kamppinen, Matti (1997) *Cultural Models of Risk – The Multiple Meanings of Living in the World of Dangerous Possibilities.*

1/97 Malaska, Pentti (1997) *Sustainable Development as Post-Modern Culture.*