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Technology, environment and social risk: a systems perspective

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Abstract

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The paper pleads for conceptual changes in the ways we describe modern society. We may use the same words, but should replace the antonyms or redefine their contexts. Technology can be conceived of as being not primarily a proven relation of cause and effect, but rather as a simplification within a causal context, a simplification that has its own consequences. Risk is not simply the lack of safety, but rather the possible damage that may result from one's own decisions. The antonym of risk, then, would be danger as possible damage stemming from external sources. Steering (or public policy) can be conceived as generating differences in order to minimize other differences, rather than controlling the state of the system.

Introduction

At the end of the twentieth century, we have become different observers from the nationalist, imperialist or socialist observers of the end of the last century; our ideas are even more different from those of the ages of reason and enlightenment, or the future-oriented ideas of the French revolution. However, observations are programmed by descriptions. They depend on semantic traditions; they are almost enslaved by linguistic frames, by words, concepts and texts. Thus, we see a much more problematic society than our ancestors, but we use their vocabulary to describe it.

Changing our way of describing our society is, to a large extent, "conceptual

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politics" (Skinner, 1978; Ball et al., 1989). On the one hand, we are restricted by the limits within which words can be understood. On the other, we need conceptual innovations. Moreover, we normally think of words as having a certain, albeit ambiguous, meaning. Thus, the question becomes one of how to change this meaning without leaving the zone of understandability. But, since Saussure, we know that words (and even more so concepts) are distinctions. They mark a difference and indicate one side (but not the other) of a distinction. But of what distinction? Can we choose or even manipulate the distinctions we use in observing and describing modern society?

Sometimes, this simply happens without our being aware of it. Sometimes words simply cross the boundary of their distinction. "Saving," for instance, formerly meant (among other things) keeping one's money. Today, if we follow the discourse of the advertisements, it seems to be a special way of *spending* one's money, by carefully comparing special offers. And of course, this correlates with the fully developed credit system, and credit card system, of the modern economy. In other cases, words change their meaning by antonym substitution (Holmes, 1989), by manipulating the other side of the distinction. Or, last but not least, we continue to use words like technology, or risk, or system, but place them within another kind of distinction. As planned change, as conceptual politics, this requires an observation of the previous use of distinctions, i.e. the observation of observers. Observing distinctions means observing observers (Von Foerster, 1981); it means second-order observation.

Second-order observation

Let us use this technique of second-order observation to analyze the three cases mentioned in the title of this paper.

First, *technology*. Usually technologies are conceived as relations between cause and effect, confirmed by scientific knowledge or practical experience. Their use should always achieve the same results. The "natural technologies," if I may call them that, of the movement of the stars or the ebb and flow of the tides serve as models because they cannot make mistakes, and deviate only very little from expectations. We try to emulate them, and even though our artificial technologies do not operate with the same relentless reliability as natural technologies, at least they make it possible to recognize mistakes and the need to make repairs or replacements. The underlying distinction seems to be: it works/ it doesn't work.

But the gist of technology is simplification (Murphy, 1968), or as Husserl (1954) said, "idealization." Whatever the term, the decisive distinction is unreduced/reduced complexity, i.e. *enclosing* something that operates reliably and

in a way that can be iterated, and *excluding* the rest of the world — above all, excluding the actual living individual, the meaning-constituting subject. We gain the possibility of calculating resources, of seeing malfunctions and improvements, of making and avoiding mistakes, that is, the possibility of learning. Paradoxically, we lose control of causalities, as they become much too complex.

Seen from the point of view of second-order observation, technology rests on the attribution of causality, on the selection of some out of many causes and some out of many effects. The famous problem today of "social costs" (Coase, 1960) is only one aspect of this selectivity, stated in economic terms. The more fundamental fact is the attribution as such. And we are increasingly observing the attribution for this attribution, triggered by the increasing visibility of uncontrolled and perhaps uncontrollable effects that motivate distrust in technologies, and in the inventors, planners and users of these technologies. The quest for responsibility is one consequence (Jonas, 1979); but how can it be a solution?

The specious security of technology, based on repeatability and the control of defects, is a delusive one. This has consequences for our second concept, the concept of *risk*. Usually, risk is defined by the counter-concept, security. Safety experts, for instance, work with risk research because safety is not a measurable item and risk assessment can be quantified. The more risk, they assume, the less safety. This means, however, that safety, or in more general terms security, is used as a negative term (although positively valued, like "health" in medicine). It is used as a term without designation value, as a term for reflecting risk. We may try to proceed from reflection of risk to reflection on risk. In any case, there is no security on earth.

Should we than say that there is only risk? This would devaluate the term. I therefore propose to move on by antonym substitution and to distinguish between risk and danger instead of risk and security. Again, we can do this by using the variable of causal attribution at the level of second-order observation. Risk can be defined as the possibility of future damage, exceeding all reasonable costs, that is attributed to a decision. Risk is the hopefully avoidable causal link between decision and damage. In other words, it is the prospect of post-decisional regret. In fact, the modern obsession with risk management has the practical function of teaching one how to avoid the regret of regrettable decisions. At least you can claim to have been a correct and successful risk manager. Danger, on the other hand, is the possibility of future damage which is attributed to external events. Risk is an attribute of decision making, while danger is a condition of life in general that cannot be avoided.

Using this distinction of risk and danger we accomplish a remarkable shift from danger to risk perspectives in modern life. We see our life now and in the

future as controlled by decisions and, not least of all, by technologies. Paradoxically then, we enter a vicious circle. Trust in technologies breeds attribution of effects to decisions. Dependence on decisions shifts our sense of the future from danger to risk. Risk awareness breeds distrust in technologies. The result is that we feel it increasingly appropriate to complain about and to attack decision makers, in particular those responsible (and therefore attracting attribution) at high levels. But what could be the aim of this critique, given the fact that refraining from decision making is also a decision and eventually a decision which runs even higher risks? (Think of the by now famous case of not taking a close look at the waste disposal of the chemical industry.) Risk aversion is not a meaningful organizational programme (Wildavsky, 1988).

This, however, is only part of the problem made visible and accountable by our distinction between risk and danger. It is the context, not the content of the social issue of decision making. For whatever we expect from representative democracy, decisions are always the decisions of somebody, not the decisions of everybody. Therefore, *the real dangers in modern society are the decisions of others*. Almost all other dangers, including natural disasters, can be avoided, for instance by moving out of a region threatened by storms or earthquakes and settling elsewhere. But the danger that results from the decisions of others cannot be avoided because others are everywhere.

We can observe this social coupling of risk and danger in many different fields. We can see it, for example, on the streets and in hospitals. The most spectacular field, however, is applied technology. Technologies are invented and put into practice by decision makers at what they consider to be reasonably calculated risks, and in fact the refusal to employ technologies would involve other risks, such as the risk of not having sufficient energy or the risk of economic decline. But for people who do not participate in the decision making process things look different. For them technologies are dangerous, and the acceptance of dangers produced by others is much less likely than the willingness to incur risks in the search for profitable outcomes. Apparently we use a double standard of evaluation, depending on whether or not we are in control of the situation and its further development.

The emergence of new social movements shows that this discrepancy, the double standard of evaluating risks and dangers, has become an important political problem. Their emergence does not eliminate the classical problem of the distribution of wealth, nor does it eliminate the socialist parties and unions set up to correct the outcomes of the market economy, far from it. But the ecological issues, the "green" topics, are attracting more and more attention and it could well be that they will overtake the problems of welfare and wealth distribution on the political agenda. We are used to a yearly supplement to our income, though it may be more apparent than real, but technologically induced

dangers cut deep into our daily lives. They provoke anxieties (or at least a political chance for the rhetoric of anxiety) and we know of no political remedies against anxiety.

Finally, the distinction between *system* and *environment*. The word "environment," as well as the German *Umwelt*, was invented in the early nineteenth century. There were no environments before that time. The world was thought to contain and support (in the sense of the Greek *periéchon*) what is in the world, including itself. It was described under the logical premises of ontology as consisting of things (*res*) visible and invisible. Environment is an expression of modern — by no means post-modern — relativism.

But there can and should be refinements in understanding this distinction. Systems are not simply some kind of objects (again, *res*) and the term environment does not simply denote all other objects. The system/environment distinction is a form (Spencer Brown, 1979) of describing the world by a specific cut, a specific script (in the sense of Derrida). You may use this distinction to form your observations or not; but if you use it, you have to accept its consequences.

System/environment is a form of describing the reflective powers of the world, a way to describe how the world observes itself, by introducing a boundary over which systems can observe their environments and themselves. In Fichte's sense, we are within and above the boundary. And this was also the position of Hegel's *Geist*, dancing his or her brief dance on the edge of the cut.

But of course, we do not find ourselves strictly "above" the boundary, observing the world from on high. We are participants, realizing the reflection potentials as parts of the total world, as sides of distinctions. In observing, we continue to depend on the split. And by winning reflection potentials, we lose access to what was (and continues to be) the "unmarked state" (Spencer Brown, 1979). We are not, as Fichte and Hegel came close to thinking, in the position that tradition reserves for the name of "God." We — whatever system is meant with this "we," individual subjects or society — have to accept our limitation as the condition of our possibility to be and to operate as observing systems.

Public policy

Turning finally from theology to public policy, I would like to draw some consequences, given the proposed redefinition of technology, risk, system and environment.

Starting from the distinction between system and environment, we can observe and describe public policy as a concern of the political system to cope

with the complexities of its natural and social environment. This task has come to be defined as guidance or steering or even control. But what does it mean? It could be, and has been, understood as applied technology. In this case, the problem is to select specific causes in order to produce specific effects. One has to find causal relations which are sufficiently reliable and one has to face the famous problem of unintended, counterintuitive, even perverse, effects.

There is nothing to say against steering technology and there is no point in assuming that we would be better off without it. It is not a bad, immoral habit of systems engineering, or one that neglects human concerns. But, I have to repeat, the gist of technology is simplification. Unanticipated effects are just the reverse side of the coin and the same holds true for what could be called "unattributed causes." Control, in other words, is possible only from a position which itself is submitted to control. Power holders have power only because they adapt to pressures or, for that matter, "reasons" suggested to them. There are always many more causes and many more effects than we can take into account when we describe a technology. From the perspective of second-order observation, technology is a selection of specific causes and effects, and a selection not only from *alternative* causes and effects, as decision makers on their first level of observation are used to think, but also from causally *effective* causes and effects.

These considerations strongly suggest reformulating the concept of steering. It cannot mean to produce the intended state of the system, certainly not in the long run. Instead, it means (in the sense of cybernetic control) to reduce the difference between a real and a preferred state of specific variables (for example, the rate of unemployment) (Luhmann, 1989b). But *reducing differences* always requires *producing differences*. You never get a system which no longer deviates from expected values. By reducing unemployment you may produce inflation. By reducing pollution figures you may increase bankruptcy figures dramatically. In this sense, steering seems to be a self-sustaining business. And in the long run we may well observe the deviation-amplifying tendencies of the welfare state. The system is not in the state it would have been in without steering; nor is it in the intended state. For all the planning and steering, with all its good and bad intentions, the system is subject to evolution.

Even if political steering technologies were available they would not help much in situations in which decisions involve risks, i.e. in almost all cases of ecological and economic policies, not to mention education, science and many other fields of political intervention. There is no safe way to achieve the desired results without running the risk of effects that may lead to post-decisional regret or, even more likely, to the risk of not achieving the intended results in spite of high costs, including opportunity costs. But how does public policy cope with these risks? And how does the public accept the danger of risk-taking politics?

One possibility is through the loss of memory. Politicians are accustomed to being saddled with urgent topical problems: they look forward to ever new possibilities of satisfying demands. And they tend to forget their own contribution to the formation of these problems.

Moreover, the daily struggle between government and opposition makes all causal constructions of origin and result controversial anyway. There are always people around who criticize decisions. This noise, to which politicians are accustomed and on which they thrive, makes the prospect of post-decisional regret a normal fact of life, that has to do with the essence of politics and not with the content or merit of a particular decision. The important thing is to remain accepted within your own power network. Hence, politicians become inured to daily criticism and rejection; the predominant question is from which side it comes. They develop rhetorical techniques and network-repairing devices in order to survive, and the causal network is complex enough to provide for divergent attributions.

All this shows that politics has a high institutional, well-nigh constitutional, capacity for absorbing risks. It dissolve risks into noise and news. But if we continue to expect a political solution to the larger problems of modern society we will be disappointed. The political system appears as a collective actor. It is the prime addressee for all kinds of problems which find no solution elsewhere. To some extent it possesses steering capacities, in the sense of diminishing differences by creating differences: it redistributes problems. And there is a soothing effect in knowing at least who is in charge. But the political system is only one out of many functional subsystems of modern society with very limited and specific modes of operation, and it cannot do what it cannot do (Luhmann, 1989a).

And last, but not least, we have to admit that the pervasive effects of technological and other risks invalidate important assumptions on which our constitutional liberties are built. The apparatus of legally protected subjective rights presupposes a large array of possible actions which can serve the interests of the actor, but will not have any harmful effects on others without their consent. This is a factual, not a normative premise. But the transition from the ethics of virtue to utilitarian ethics during the eighteenth century was based on this assumption. It allowed one to replace the complex medieval system of specific legal remedies with a more general notion of fundamental rights, procedural thinking of writs or actions with a few principles of nature and reason which justify subjective rights as the only prerequisite for lawsuits. It cleared the path for the transition from hierarchical differentiation of legal positions according to estate and gender to the modern condition of juridical equality. This did not mean that Pareto optimal solutions had more chances than nowadays, but it did presuppose that all burdens which fell on others could be regulated and

compensated by contracts. Freedom of rights and contract are complementary institutions.

However, insofar as the risk taking of one person becomes a danger for others, this hidden connection between freedom and contract breaks down. The danger produced by the risky decisions of others, which may eventually lead to large-scale catastrophes, can no longer be absorbed by contracts and payments and it therefore undermines a latent premise of our constitutional liberties. For the constitutional state, liberty means that politics did not have to or need to control how these liberties were used. With the increasing emergence of technological risks, this restriction, beneficial for both sides, seems to collapse. On a very fundamental level, therefore, the "risk-and-danger" syndrome becomes a new political problem (Slovic, 1987; Gardner and Gould, 1989) and our political institutions are not prepared to handle it. The constitutional state could easily develop into a welfare state as long as the problems remained problems of distribution and redistribution. But you cannot distribute benefits to cases of anxieties. Presenting anxieties to political agents becomes a new form of political activism. The system may react by rearranging the scheme of political parties, for example with parties for industry and labour on one side and parties for the frightened public on the other. But could this scheme be attenuated and moderated to fit into regular political business? Could it lead again to normal and non-revolutionary changes of office between governing and opposing parties? We cannot know without trying it; but at least we can describe the problem.

Conclusion

If we continue to observe our society in traditional terms as a political society or even, as has become fashionable again in recent literature, as a civil society, we shall be inclined to find this state of things unacceptable. Then society itself becomes unacceptable. But what can this mean? We cannot just go and live in another society. What would be the technologies of transformation? Reasoned discourse? And what would be the risks? There are neither progressive nor conservative ways out. It makes no sense to distinguish acceptable and unacceptable societies, where society is understood to be the encompassing social system which includes its own descriptions. Within a similar context of self-referential implication Jeremy Bentham, by no means a conservative writer, asked: "Is it possible for a man to move the earth?" And his answer was: "Yes; but he must first find out another earth to stand upon" (Bentham, 1948). We can, for practical reasons, neither start from, nor aim at, another society. But it

may well be that we can improve on our descriptions and thereby sensitize ourselves to different views on problems and solutions.

Given the serious problems and the high probability of ecological or economic disasters which results from the very structure of modern society, we need a new seriousness in all our concerns.

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