

## TECHNOLOGY ASSESSMENT IN THEORY AND PRACTICE

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### THESES

First, scientific research and science-based technological innovation is an indispensable prerequisite of modern life and civilization. There is no alternative. For six or eight billion people there is no way back to a less sophisticated life style.

Second, we live better, far better, than people ever lived before the technological age. However, we are concerned about the future. We realize that our present life style cannot be extrapolated to the next generations. On a global scale, we accumulate less, probably much less, technical capital than the non-renewable and renewable resources that we use up. This economic strategy is not sustainable. The decay, possibly the collapse, of our civilization appears to be only a matter of time.

### TECHNOLOGY ASSESSMENT

Technology assessment (TA) is part of a worldwide effort to deal *systematically* with the question of how we should proceed.

To begin with, there appears to be consent among TA experts on the following six points.

- If we want to gain the future we depend on technological progress.
- We are aware of the ambivalence of any technological progress.
- There are no simple answers with regard to progress in a pluralistic world where preferences and aims are controversially disputed.
- We are as responsible in an ethical sense for what we are doing as we are responsible for what we are not doing: to act or not to act—principle of ethical equivalence.
- Technology assessment is obliged to analyze and evaluate the desirable

and the non-desirable consequences, the chances and the risks, of technologies, new technologies as well as established technologies. At present the major threats to the future stem from firmly established technologies such as burning fossil materials, not from novel technologies.

- The motto of TA is that a new technology must be better than the preceding technology. Otherwise we do not need it. "Better" does not only refer to the scientific evaluation of a technology but also to the social (socioeconomic) and environmental dimensions.

### COMMUNICATION

The result of a technology assessment study must be communicated. The strategies of communication depend on the particular social groups to be addressed. In a comprehensive expert study on gene technology, the members of our group have followed four different paths or tracks of communication:

- advice to political groups (government, legislature, political parties);
- advice to professional associations, e.g., pharmaceutical societies or farmers' associations;
- information to the public, including citizens' movements; and
- information to moral institutions such as the churches.

### THE ROLE OF THE EXPERT

The prestige of any TA study depends on its scientific substance. We have developed new strategies beyond the classical Delphi procedures to bundle and focus the original expert opinions. An iterative sequence of expert statements and workshops eventually leads to a synopsis which can be considered the present view of the expert community.

The 38 experts we asked for cooperation in the gene technology study belonged to three different groups:

- experts from scientific institutions;
- experts from industry and economics; and
- experts from sociology and practical philosophy.

The experts from the sciences had to deal with the question: What is possible in gene technology?

The experts from industry and economic institutions were asked the question: How much of what is possible in gene technology is likely to become industrially relevant?

Our colleagues from sociology and practical philosophy were requested to answer the question: What segments of industrially relevant gene technology are presently desirable and for what reasons?

#### RECEPTION OF TA STUDIES

Clearly, there are problems about the reception of any TA study by different segments of society. The selective perception or rejection of a TA study—or parts of it—by the different political and social groupings is the rule rather than the exception.

Recently in connection with a public forum on gene technology a politician of the Green Party stated frankly: "I cannot afford to learn things from you, which I can under no circumstances communicate to my clients." This means: Whether or not the results of a TA study will be perceived at all will not primarily depend on its scientific quality but on the pattern of preprogrammed opinions which the study meets in political circles, in the media, and in the public.

Nevertheless, TA must remain strictly science-based. Adaptive opportunism is no viable alternative. It is our obligation to find out—in accordance with the standards of scientific inquiry and irrespective of public prejudice and prevailing preferences—what can be stated about technogenesis, and to communicate this knowledge by adequate means.

Competent technology assessment is possible, no doubt. The methods are established, and paradigmatic studies are available. The major problem is communication and acceptance. Most people are reluctant to accept a scientific statement if it does not comply with their prejudice.

I am confident that TA has the potential to become a respected scientific discipline, but I am far less convinced that our fellow citizens will undertake the effort to study our analysis and to consider our advice. Scientific and technological illiteracy is simply too widespread. I have learned recently that more than 50% of the German populace believe in astrology and spend lots of money to satisfy their superstition, while only a handful—in this particular survey—could define a galaxy.

#### REFERENCES

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