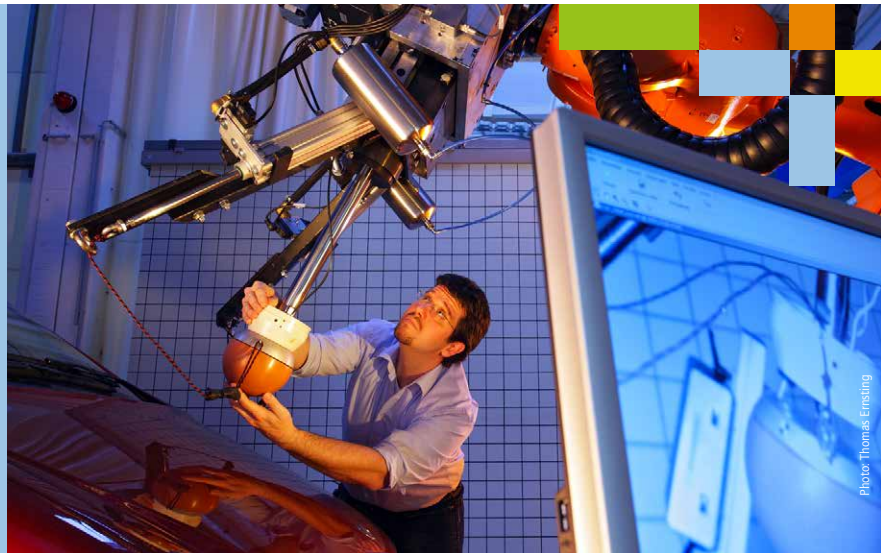# Responsibility in Companies and Institutions for Sustainable Technology Development

acatech (Ed.)

Anyone who develops technologies and brings them into use bears a corresponding responsibility. However, specialisation and the growing complexity and interdependence of technological, social and environmental factors are increasing the risk of diffusion of responsibility.

Consequently, the time has come to take a fresh look at the key questions associated with responsibility: Who is responsible? What are they responsible for? And who are they responsible to? In this context, the definition of responsibility is wider than the colloquial sense of "having caused something" – it also embraces the assignment of responsibility within groups or organisations, for example. The assignment and assumption of responsibility require a knowledge of the subject, object and normative body. As well as having a responsibility towards their employers, colleagues, customers and users, researchers and engineers also have a responsibility towards society and a responsibility to protect the public interest and the environment.

Simply assigning responsibility to individuals or groups is not enough on its own to create a stronger culture of responsibility in the development and use of technology. People in positions of responsibility and the institutions that they work for must be also be willing and able to fulfil their responsibilities.

Accordingly, companies, organisations and institutions must work to develop and strengthen a culture of responsibility and ensure that it receives the appropriate recognition. If someone is to assume responsibility for something, they must be empowered to take the relevant action and be able to align individual and organisational behaviour with overarching guidelines. Agreed procedures for dealing with suggestions and complaints should form an integral part of these guidelines.

This acatech POSITION PAPER aims to stimulate a debate on responsibility in the technological sciences – not only within the technological sciences community and its academy, acatech, but also within organisations, companies and agencies with a research and technology focus.

## At a glance

- Responsible technology design is of vital importance due to technology's growing influence in society.

- Specialisation makes it harder for individuals to take responsibility. This results in a diffusion of responsibility.

- Consequently, companies and institutions need mechanisms that enable a culture of responsibility.

- Companies and institutions could establish ombuds offices to act as a point of contact for complaints.

- STEM degree programmes should once again strengthen their offer of interdisciplinary courses addressing technology assessment and ethical questions.

**acatech**

NATIONAL ACADEMY OF
SCIENCE AND ENGINEERING

# Recommendations

## Responsibility in the Academy

There are four areas in which the National Academy of Science and Engineering can pursue the issue of responsibility:

1. **Formulating an ethical mission statement for the Academy**
   This would involve formulating an "ethical mission statement on taking responsibility" that would apply to the work and stances of the Academy as a whole and of its individual members (it could, for example, be incorporated into the Academy's existing mission statement). The mission statement should support the development and adoption of testing and working processes in the Academy and for its project work, the selection of the topics it addresses, and the framing of public debates (these could be incorporated into the Academy's quality management guide). The areas covered would include collaboration and participation in technical communities, the conduct of members in their specialist field, (a priori and a posteriori) testing processes that acatech members are responsible for, and acatech's involvement in providing advice for research policy, economic policy and policy on specific topics. The mission statement should encompass the full spectrum of relevant areas, such as the Sustainable Development Goals (SDGs), sustainability, climate (Green Deal), justice and social cohesion. It should also address issues relating to resilience and adaptability. Moreover, the mission statement should clarify what is meant by "trust" in the services provided by the technological sciences, technology and engineering, and exactly what their responsibility involves.

2. **Responsibility in the selection of topics**
   acatech could establish a process for assessing and selecting the topics that it addresses in its own work that places even greater emphasis on the economic, social and environmental impacts for current and future generations. This would require a set of tools for assessing the relevant topics, operations, methods, products and services before work on a technological innovation begins, during its development and after its introduction. The acatech Executive Board would take a decision based on the results of the assessments.

3. **Establishment of an in-house ombuds system**
   acatech could establish an in-house ombuds system with an ombuds office and one or more ombudspersons to deal with complaints and suggestions. This would facilitate critical reflection and help to resolve potential and identified dependencies on economic and political factors.

4. **Identifying and addressing responsibility issues as part of acatech's work on different topics**
   While there have been changes in the overall climate, such as the "moralisation of markets", the public debate on corporate ethics and the emergence of "ethical shares", it is also true that some organisations only pay lip service to corporate social responsibility (CSR) and similar concepts as part of their marketing and image strategies. acatech should engage actively in debates on sustainability and its relevance to technology design. Furthermore, topics such as the Supply Chain Act, carbon tax and data tax will have a part to play in the definition and implementation of future technological and environmental standards.

As well as the four points described above, there are a number of additional aspects relating to policy advice and science communication. This is important in view of acatech's contribution to the public debate on general responsibility in technology and science, and on responsibility with regard to specific technological or scientific issues such as artificial intelligence (AI), genetic engineering, biodiversity, the reversibility of technology, and sustainability. It is especially important for the Academy to address these aspects in its dialogue with government, civil society, businesses, professional organisations and the media.

The Academy's science communication work and policy advice provide valuable input for the public and policy debates, explaining the implications of different technologies and setting out the available courses of action. It is thus vital that this work should be guided by the normative principles of honesty, transparency, openness, and a willingness to engage in discussion and listen to criticism.

Accordingly, acatech should consider introducing sanction systems for "dishonesty" and positive feedback and reinforcement for exemplary instances of people taking responsibility both within and outside of the Academy.

## Responsibility in businesses

Companies must engage in an in-depth discussion of their internal and external responsibilities. The ultimate goal should be to create both a supportive institutional framework and processes for internal reporting of potentially unethical conduct.

Both positive and negative examples can make a useful contribution to this discussion. As well as providing in-house presentations and discussion platforms, companies should empower people to speak up and promote a culture that tolerates mistakes, at least up to a point. The appointment of compliance officers and the introduction of business conduct guidelines or codes of conduct in conjunction with the relevant training can also make a significant contribution.

Companies should also contemplate the establishment and development of ombuds systems. These systems could be incorporated into the company's employee participation structures and processes, with clearly defined responsibilities and procedures. If these systems are to be effective and successful, the company or organisation will need to internally agree on and establish common processes for their development and adoption, as well as for the corresponding training measures, the establishment of ombuds offices and the appointment of ombudspersons. The companies represented in the acatech Senate can and should lead the way in this regard.

## Responsibility in education and training

People tend to be more willing to take responsibility in practice if they learnt about the relevant rules and norms during their education and training. It is impossible to overstate the importance of role models in strengthening these attitudes.

Ethical principles can be incorporated into teaching and training – indeed, learning to take responsibility through the demonstration of best practices involving people and processes should result in better learning outcomes. This applies in general to teaching in educational settings (schools, vocational colleges), and to the induction of people starting a new job, be it in a personal or school environment or within a particular social group. Here too, people can be encouraged to reflect about their future role and duties in their job and in their professional community.

Ethics and technology assessment should be important components of STEM study programmes, so that part of their content once again has a clear interdisciplinary focus. Cultural studies should be included alongside philosophy (ethics and philosophy of science), the social sciences and economics. Although in some cases the repeated calls for these changes were heeded, this progress is now increasingly being lost. At several universities, the percentage of interdisciplinary content in study course curriculums is once again being progressively reduced. Far from calling for a return to the old studium generale approach, the aim is to genuinely expand the breadth of the engineering courses on offer by augmenting them with carefully integrated content about their philosophical, historical, sociological, psychological and environmental dimensions. Teachers with the relevant practical experience will have more credibility and will be better placed to provide compelling examples thanks to their professional experience of dealing with and resolving situations that involve taking responsibility – not least when doing so meant criticising their superiors and company management.

Conversely, it would also be desirable for humanities, law, social science and economics courses to offer a compulsory "introduction to modern technologies" module. This would ensure that future decision-makers have at least some familiarity with the technologies they are making decisions about. While some engineering courses offer an introduction to philosophy, there are no courses introducing those who do not study engineering or STEM subjects to nature and the environment and the ways in which technology harnesses them for human purposes, with all the associated opportunities, risks and limitations.

There is also a need to systematically educate policymakers. The coronavirus crisis has highlighted the fact that political responsibility requires a basic understanding of science and technology – a theoretical understanding of fundamental scientific principles is key to science-based responsibility.

## Methodological approach

This acatech POSITION PAPER is based on a broad overview of current opinion within the technological sciences community. The majority of the project group's members were social scientists and humanities scholars with a research interest in the technological sciences. Interviews were also conducted with managers from some of the companies represented in the acatech Senate, encompassing a range of different industries and organisations. acatech also organised a conference attended by representatives of manufacturing industry, IT companies, service providers and the relevant industry associations. The conference provided an opportunity to engage in lively discussions about the project's interim results and enrich them with different perspectives.