> Acceptance of Technology and Infrastructure

Observations on a contemporary social phenomenon

acatech POSITION PAPER – SUMMARY AND RECOMMENDATIONS

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Nuclear power, expansion of the electricity grid to facilitate the transition to sustainable energy, GM crops ... the list goes on. In recent times, new technologies and the associated infrastructure have been dogged by public protests and controversy in Germany, owing to concerns about the perceived dangers and impact on the world as we know it. What some people see as technological progress is rejected by others as unwelcome change or meddling with nature. Where some see opportunities, others are more concerned about the threats. In order to ensure the successful roll-out of technology-based innovations, it is therefore often necessary to engage in a dialogue with civil society. **There are a number of major challenges confronting the planning and implementation of technological innovations on a large scale.**

It is only possible for the people affected by a particular change to weigh up the costs and benefits if citizens' engagement in the process is legally regulated so that they are able to exercise their rights and responsibilities. Accordingly, mediation and arbitration processes are increasingly being resorted to by the State as a means of reducing the burden on the legal system. At the same time, people need to be prepared to accept the relevant urban development interventions. Whilst both of these factors are necessary, they are not enough on their own to achieve widespread public acceptance of technology and the associated infrastructure.

"Acceptance" is a term much overused by the media and is inevitably often used imprecisely in this context. It conveys the impression that acceptance needs to be created for something that has hitherto been regarded as unacceptable. In the interests of clarity, it is therefore important to establish a fundamental distinction between **"acceptance" and "acceptability"** when addressing opposition to particular technologies or infrastructure projects. Acceptance describes the empirically measured willingness of people to tolerate a given technology in their surroundings, whereas acceptability refers to a value judgement on how acceptable a technology is deemed to be based on an appraisal of its pros and cons. Ultimately, what is important is to create the conditions that enable the public to make informed judgements about different technologies.

Technology acceptance, i.e. a fundamental receptiveness to technological innovations, is thus key to ensuring that public opinion can be shaped in an objective and rational manner. At the same time, it is also a key factor in business decisions to launch new products and services, build new infrastructure and develop new solutions, all of which will ultimately contribute to the modernisation and competitiveness of German industry.

We also need to ask how "acceptance" influences what policymakers are able to do. There are two key questions in this regard. Firstly, how do the public perceive the threats and opportunities

At a glance

- The German education system should place greater emphasis on teaching people to make informed judgements about technology.
- The public needs to be better informed about the importance of technology both as an integral part of our culture and as the cornerstone of prosperity in a modern, knowledge-based society. Greater emphasis should therefore be placed on engaging in a dialogue with civil society as part of the process of developing new technologies.
- Policy decisions regarding particular technologies or large-scale technological initiatives should be based on a dialogue in which the public are fully engaged and on legitimate decision-making processes.
- Germans are not really technophobes at heart. Nevertheless, they are concerned that technological infrastructure projects or irreversible changes made to the natural environment could have negative long-term consequences and diminish their control over their own lives.

associated with a particular technology and what are the implications of this for the way that policymakers seek to shape public opinion? And secondly, which arguments should be taken into account when striking a balance between social norms, costs and economic benefits?

Energy under the spotlight

In recent times, the **public spotlight** has focused heavily on **the acceptance of energy technology**. Public opposition to a number of infrastructure projects (for example the planned pumped storage power station in Atdorf or high-voltage power lines) bears witness to the fact that acceptance depends **not only on the objective outcome** of an assessment of the initiative's pros and cons, but also on **the way that large-scale technology projects are planned, communicated and implemented**. It should be remembered that it is perfectly normal for the application, use and implementation of technology to have both upsides and downsides – in fact, this is a feature that is characteristic of technology in general. And the unintended side-effects of a technology can undoubtedly sometimes outweigh its intended benefits. In these cases, lack of acceptance of a controversial technology can be interpreted as a signal that people wish it to be modified or replaced by something else.

However, if people automatically react negatively to any form of innovation, this can have increasingly serious repercussions for the economy. In actual fact, it cannot be said that people in Germany are indiscriminately hostile towards technology. Various studies have shown that **there is no evidence to support the accusation that the Germans as a nation are technophobes**, at least with regard to information and communication technology, domestic appliances and consumer technologies. **Germans are no more technophobic than people in other European countries or the US – indeed, there are many product categories where they would even rank as technophiles**.

Nevertheless, **the belief in and desire for progress** that characterised the post-war decades **has given way to widespread scepticism or indifference towards technology**. Ritualised opposition to technology is especially prevalent in the spheres of conventional energy and biotechnology and can be traced back to movements that sprung up in West Germany in the second half of the 20th century. Post-materialist values vis-à-vis manufacturing processes and the constant drive for greater efficiency in a globalised economy also form part of the equation. In 2010, it was the food industry that became the target of heightened calls for reform in the wake of the dioxin scandal. However, **the renewable energy sector is also affected, with protesters increasingly targeting projects to expand the electricity grid or build new storage facilities** because of their impact on the landscape and the places where people live. The decision to accelerate the expansion of renewable energy production is only likely to accentuate these conflicts, which are not solely due to procedural failings.

A threat to the status quo

In industry, people's willingness to accept new technologies is often affected by a reluctance to change the status quo and in particular the fear of losing their jobs. It is extremely important to counter this perception of industrial change by focusing not on the threats but on the opportunities for innovation and competitiveness.

Since the turn of the 20th century, technology has generally been perceived as **an embodiment of "power"**, in the face of which individuals are left "powerless". Opposition to technological innovations thus often has less to do with any hostility towards the technology itself and more to do with **distrust of manufacturers, operators and regulators or dissatisfaction with the relevant procedures.**

A gap in people's general education

There is also a widespread **lack of interest in technology and technological developments that is reflected in the opinion-forming media in Germany. Germans' main interest in technology is purely as a consumer good. They do not perceive it as a topic that should be included in people's general education like art, literature, history and politics once were. Nor is it regarded as synonymous with the prosperity-based progress of the post-war years**. This attitude, which can be interpreted as a failure to appreciate its value as a cultural asset, affects technology more than the natural sciences.

RECOMMENDATIONS

1. Communication about technology should not be regarded as something that should merely be done on an ad hoc basis in order to "create acceptance" – the goal of communication should be to enable people to make informed judgements about the technology in question. It will only be possible to create a climate where the public is receptive to technology if people are actively engaged and fully understand the impact that a technology will have on their own lives.

2. In order to achieve this, action will need to be taken across every level of the education system.

3. Shaping people's views on the acceptability of technology should form an integral part of the technology development process right from the outset. State funding for research should therefore be tied to the requirement to engage in a dialogue with civil society.

4. State-sponsored mediation mechanisms should be set up as soon as potential future conflicts are identified.

5. Policymakers and civil society need to communicate the need to embrace change in order to be prepared for the future. In the interests of building trust, the German government should work towards a common, cross-departmental policy and should be more transparent in the way it communicates the impact of changes in its technology policy, for example with regard to energy. This would apply, for instance, to the decision to expand the electricity grid and construct new storage facilities for renewable energy by 2020.

6. Attitudes towards technology are a yardstick for gauging the extent to which people identify with the world in which they live and indeed with the political class. Emerging controversies in the realm of technology should therefore be taken seriously by policymakers as a barometer of public opinion.

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