

Commentary

Talking biotech with the public

Frank-Olaf Brauerhoch¹ *, Christoph Ewen² ** and Kristina Sinemus³

¹Büro für Sozialforschung, Frankfurt am Main, Germany,

²team ewen, Darmstadt, Germany,

³Genius Gmbh, Darmstadt, Germany

In the estimation of risks involved in complex technical applications, such as, for example, gene technology or nanotechnology, the problem of communication between science and the wider society becomes evident. The path towards transparent, authentic and credible communication must be built upon the reconciliation of the risk perceptions of the scientist – and of his or her institution – with the corresponding ideas of risk and communication existing in the society. Additionally, to accomplish goal-oriented discourse within the public sphere and to realistically assess his or her effective options when addressing this public, the scientist is faced with the necessity of reflecting upon his or her own determining assumptions on the condition, constitution and functionalities of this “public”. Combined with the use of modern tools – and supported with supplementary coaching and organizational consultation – such a foundation allows the establishment of targeted communication with specific groups.

Received 18 July 2007
Accepted 23 July 2007

Keywords: Public perception · Science and society · Science communication

1 Preliminary notes

Scientific applications increasingly transform our daily life. The satisfaction of basic human needs, such as nutrition, health, communication or mobility, is increasingly dependent upon the use of complex technologies to which the user (*i.e.*, the ‘final consumer’) perceives decreasing access. Naturally, such technologies and their applications are associated with risks, as is every technical innovation.

Simultaneously, the perception of the state is undergoing a change in the post-industrial countries of the world: the vigilant (police) state and the accommodating (welfare) state, which quickly neutralize dangers, both are being transformed into a moderating and activating state. In such a state, dangers are addressed less often by the

use of authoritative, ‘policing’ decisions as by the increasing use of negotiation and also by the use of warnings and recommendations. Previous, and predominately state-operated, defenses and campaigns against dangers evolve towards “*risk management*” and “*risk communication*”. Here, risk communication is defined as “the informed and social reflection upon risks,” [1].

The quandary of risk communication is: as consumers (*i.e.*, as “laypeople”), individuals assess risks in a different manner than do scientists. Green gene technology provides here a particularly striking example. In a democratically oriented, broadly differentiated and highly technologically developed society, such deviation poses a problem that must be considered, and not only so in relation to the economic significance of new technologies. If risk management is based increasingly on communication, actual dangerous situations may appear nearly unmanageable when this communication does not function.

2 The role of science as the core of the risk-communication quandary

Even although diverse interest groups exist that communicate on the risks of technology, it is indisputable that the

Correspondence: Dr. Kristina Sinemus, Genius Gmbh, Robert-Bosch-Str. 7, 64293 Darmstadt, Germany

E-mail: Kristina.Sinemus@genius.de

Fax: +49-6151-872-4041

* **E-mail:** mail@brauerhoch.de

** **E-mail:** ce@team-ewen.de

Abbreviation: PR, public relations

basic question to be clarified remains scientific, since “...*despite all uncertainties of the production of knowledge, science is the only legitimate way to generate knowledge in modern society*”, [2].

However, science is unable to fulfill the demand for ultimate and conclusive judgments on questions of risk, since “...*its task is not the publication of secure knowledge but instead the management of uncertainty. The core of this perspective consists of communication on uncertainty and the revisability of one’s own production of knowledge in exchange with public and political spheres*,” [2].

Science finds itself in the role of the advisor who supports the society in its processing of choices, whether fundamental (e.g., concerning the direction of technology) or acute (e.g., concerning potential dangers). At the same time, science also forms part of this society: either as part of its economy (as an assessor), its political structure (as a scientific agency), or its actual scientific systems (as a university or research center). Depending on the relevant orientation, an important influence on risk communication is exerted by institutional aspects, which, among others, may be political, economic, or inherently scientific.

For science, as one player among others in the society, it then becomes important not only to reflect upon one’s own interests but also upon one’s own images and perceptions – and, furthermore, upon the images and perceptions applicable to communication, the public, and risk. The following assessments are based partly on experience that were gathered within consultation procedures for a scientific federal institute in Germany.

3 Understanding of communication

In the perception of many scientists, “communication” is a technical process that, originating at a “sender”, uses a bridging “communication channel” to arrive at a “receiver”. Based on this idea – in communications theory, re-

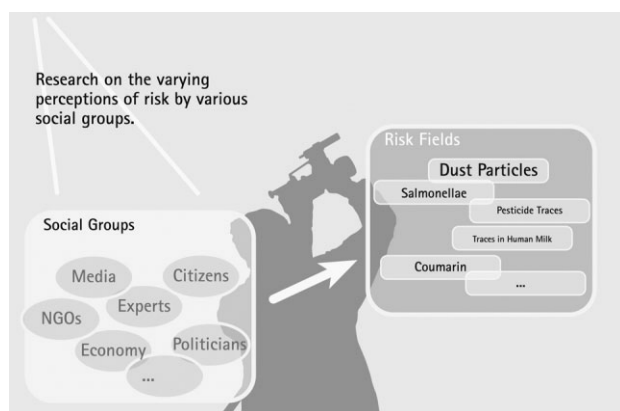


Figure 1. Delphi-questionnaire.

ferred to as the “transfer model” – scientific risk communicators often assume that it is sufficient to provide their counterparts and the media with access to factual information. According to this model, communication operates in a serial manner: information is relayed, and produced images are reproduced. Therefore, the main function of the media would consist of “...*neutrally informing and enlightening about risks and, furthermore, to do so under orientation towards a narrow and technically defined concept of risk*,” [3].

Newer work in linguistics and communication science shows that “meaning” is not an article that may be transferred, but instead is something that, in the process of interchange, i.e., in communication, is repeatedly created anew (known as the constitution model: see [4]). To express this more complicatedly: a communicative activity is designated as the attempt to assemble, influence, modify, expand, constrict or disassemble a specific complex of meaning that, as a cognitive concept, initially was accessible only to an individual. Thereby, serial communication is replaced with parallel communication. Instead of action and reaction, co-action takes place.

According to this idea, social perceptions of risks are derived from a “chorus” of messages, which, in turn, have arisen within an all-embracing communicative process. This chorus is also formed partly by scientists, albeit neither solely by these nor, furthermore, decisively. The image perceived by the public is a surrogate, formed according to the relevant constructs of the many agents participating in the process of communication.

4 What is the public sphere?

“Target groups” are designated by one construct that describes understanding and the formation of social communication. Under the term Public relations (PR), the economy has been occupied for many years with the question of how its messages (advertisement) may be communicated effectively to the broader public. Originally based on sociologically described target groups, psychological and even neurobiological grounds now increasingly are considered as terms of differentiation [5].

“*Target groups are groups of persons who may be described according to specific attributes and which are addressed by targeted advertising or PR measures. Attributes of target groups include socio-demographic, geographic and psychographic data, as well as data on living habits, buying habits and lifestyle*,” [6].

Variably differentiated models of target groups exist. Here, with regard to what is known as “public opinion”, the question of which group possesses which degree of relevance remains important.

The structure of this public opinion may be described with the arena model. A majority of the public sits as the audience: the life of such individuals indeed is increas-

ingly influenced by scientific developments, but such individuals notice in, and among, themselves a simultaneously increasing unawareness with regard to scientific contexts. Here, scientific statements beyond the limits of what is known, *i.e.*, communication of that upon which one has no knowledge, are of no help.

In this arena, a communicative process takes place in which the actors introduce their own images (including those of risks, their degree of difficulty, and counteractive measures). Since the arena is very large and the audience personally cannot be present, the media assumes the role of “theatre critics” reporting to the broader public upon the conflicts and discussions taking place in the arena.

In relating between the agents, the media play a dominant role that encompasses more than merely transporting meaning: they create meaning itself, according to criteria that are not necessarily shared by scientists. Nonetheless, an increasing number of ways to stage scientists’ communication strategies exist, not only within the arena but also outside of its parameters, including the complementary option of establishing direct contact with the contact groups. In doing so, not only do key persons (multipliers, teachers, physicians, etc.) play an important role, but the internet offers new possibilities for the assumption of direct contact with relevant parts of the public sphere.

A central conclusion is: risk communication necessitates the identifying of target groups, as well as the understanding of how public perception functions, and of which agents assume roles in this function.

5 Innovative tools for communication with the public

If one wishes to communicate directly with the broader public and thereby ensure that the communicated content not be ceded to the only partly predictable activities of the media, then the new media offer versatile possibilities to abandon the arena or, as the case may be, to supplement the events of the arena by actively communicating in one’s own right.

The internet offers tools such as weblogs, podcasts or wikis that, as new and possible formats of risk communication, address specific target groups whose main source of information is the internet. Such tools may serve in the propagation of information and in the establishment of interactive risk communication, as well as in the internal management of projects.

In addition to the advantages of temporal and spatial flexibility, the potential of internet-supported tools lies in the commentary function that may be integrated into all communication formats. Through this function, it is possible to obtain a response from the receiver of the risk communication. A two-sided, interactive communications process takes place, which also grants to the re-

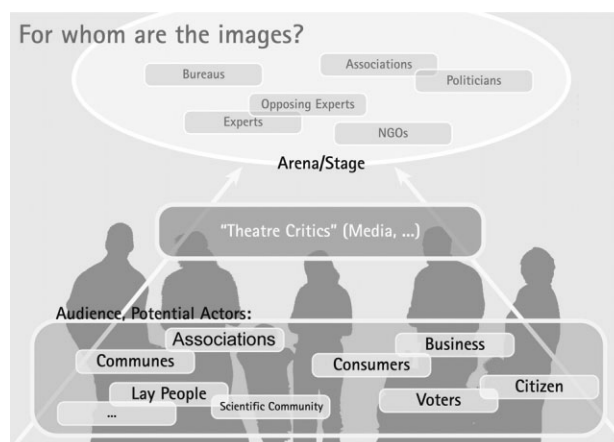


Figure 2. For whom are the images?

ceiver the possibility of sending feedback based on his or her understanding of the sender. Commentaries may then be filtered to provide an answer to the question, “What does our target group actually want to know?”

6 Risk and the images of risk

Scientists have clear criteria for the description and evaluation of risks. According to the field addressed, relevant parameters include breadth of damage, probability of occurrence, exposure, persistence or irreversibility. Such risk assessments draw their strength from their comprehensibility in terms of (natural) science. Their weaknesses lie on the basis that this comprehensibility is valid only within the scientific community. In rivalry to scientific portrayals, popular descriptions often arise that apparently are stronger and, within the public perception, are more easily dovetailed and communicated. It is apparent that social groups (of individuals and of organizations) characterize themselves, as well as distinguishing themselves from other groups, not only through given (and partial) interests but also through given points of view, “language”, and “image”. In short: interests and group-specific models of perception determine the description and reception of risks:

- In politics and administration, risk fields become understandable and manageable under the conditions of the particular situational logic when significant management tasks may be derived from them (threats will be exaggerated in the press, resources will be moved, great plans become necessary). Here, risks characterized as being of “large breadth of damage with a low, or unknown, probability of occurrence” are more interesting than risks entailing “limited breadth of damage with a high probability of occurrence” – particularly since the latter is obviously difficult to combat, due to the associated necessary change in daily routines.

- Similarly, it appears understandable in politics and administration when administrative structures must be changed (e.g., food surveillance in the “Gammelfleisch” or “rotten meat” scandal). Such activity forms part of a “language” in which the thinking of politics and administration is conducted.
- For NGOs in the field of environment and health, risks are less interesting either when lacking the potential effect of scandal or when the “guilty party” is the German consumer who funds the NGO through contributions. Here, self perception is based upon protecting the environment and the threatened consumer from businesses and agencies.¹
- In commerce, risk is perceived as an economic factor. This is most distinct in the case of insurance, but manufacturers also recognize the profit-lowering ramifications of scandals affecting one’s own products and, conversely, the chances implicit in scandals affecting one’s competitors. In this respect, the “bird flu”, for example, becomes a relevant risk when politics and administration resolve the acquisition of large quantities of vaccinations.
- Based on his or her current position of interest, an individual person acts as a consumer, a voter, a member of the civil society or a reader of the newspaper. It is generally concluded that consumers tend to perceive new and unknown risks as being graver than risks that have been known for a while and which are associated with daily routines. Therefore, for example, the risk of salmonella in poultry is perceived as a lesser risk than the danger of contagion from the bird flu. Furthermore, consumers evaluate risks that arise, or lie, outside of their sphere of influence as being graver than risks upon which they may exercise influence.²

From these considerations it becomes clear that identical risks, when seen from varying points of view, may be perceived in very different ways. When this occurs, the “objective point of view” towards risks, as recommended by experts thinking in the language of science, has no opportunity to be applied.

The perceptions of risks are ultimately constructs. *“The case is made for such a constructivist perspective by the contemporary necessity of seeing as failures all attempts towards the problematization of a phenomenon according to its “objective” degree of gravity.”* [7].

The conclusion of such considerations may be presented concisely: to the broader public, rising perceptions

of risk fields are less connected with scientific backgrounds as they are with the events inside the arena or, as the case may be, with the reporting of these events. Within the arena, the discussions that occur are also determined by widely different perspectives and understandings, of which the scientific understanding is only one. This leads to the consideration that, without a “scientific understanding of the public” [8], natural science is able to communicate its assessment results in a manner that only can be limitedly successful.

7 Self perception of scientists and/or scientific institutions

In this process of “talking to the public”, the issue is also one of reflection upon one’s own role and upon one’s own self perception.

- Prioritization of risks: when scientists are asked about the degree of mutual comparability between different risks, the answers are sobering: individual risks may be described indeed at length but, under reference to methodical problems (differing categories) or to the necessary efforts (comprehensive epidemiological studies), encompassing answers are denied. The irritation remains that some risks (for example, those of the bird flu), are viewed with exaggerated seriousness by lay people while the topic of prioritization remains undiscussed.
- Scientists work in institutions, and these institutions are subject to their own rationalities. Such institutions include businesses, agencies, large research facilities, consultancies and universities. Regardless of proclamations of the noble goals of science by scientists, they (and their assessment results) remain touched by the institutions of which they form a part.
- For reflection upon the images held by the communicating scientist (i.e., his or her images of risk, of communication, of the public), and for reflection upon his or her communicative behavior as well as upon his or her institutional framework, individual coaching and the development of organization within the scientific institution participating in risk communication are recommended. In this manner, the self-perceptions of the institutions and of their constituent individuals may be clarified and anchored. The goal of such reflective activity remains the acquisition of the ability to accomplish targeted effects in the communication of risks.

In doing so, a monitor is needed who is familiar with contexts of natural science, with the processes of group dynamics, with communication theory and its practice as well as with the methods of moderation. The collaboration between a natural scientist specializing in scientific communication, a sociologist focused on consultancy, and an

¹ Eisner et al. [7] use examples taken from selected environmental or risk topics in Switzerland (electro-smog, water pollution, forest dieback, atomic energy) to describe the characteristics of NGOs, the media and politics/administration from a similar systemic perspective

² Cf. e.g., Risk appreciation in regard to danger of salmonella at home/ in restaurants [9]

engineer operating as a moderator and process mediator on topics of the environment and technology has proven to be helpful in the example of the previously mentioned federal institute.

8 References

- [1] Abbas, S., Bergholz, A., Dombrowsky, W., Seiwert, B., Biderbick, W., Risikokommunikation; in: Bundesamt für Bevölkerungsschutz (Hg.): Biologische Gefahren – Beiträge zum Bevölkerungsschutz, 2. Auflage, Source of information (13.11.06): http://www.bbk.bund.de/cln_027/nn_398738/SharedDocs/Publikationen/Publikationen_20Forschung/biologische_20Gefahren.templateId=raw,property=publicationFile.pdf/biologische%20Gefahren.pdf, p. 173
- [2] Bechmann, G., Stehr, N., Risikokommunikation und die Risiken der Kommunikation wissenschaftlichen Wissens – Zum gesellschaftlichen Umgang mit Nichtwissen. *GAIA* 2000, 9, 120.
- [3] Bonfadelli, H., *Medienwirkungsforschung II: Anwendungen in Politik, Wirtschaft und Kultur*, UVK Medien Verlagsgesellschaft GmbH, Konstanz 2000. p. 264.
- [4] Sager, S., Medienvielfalt und die Reichweite eines linguistischen Kommunikationsbegriffs, in: Möhn, D. et al. (Eds.), *Mediensprache und Medien-linguistik*. Festschrift für Jörg Hennig. Lang, Berlin 2001, pp. 201–224.
- [5] Ullrich, W., *Habenwollen – wie funktioniert die Konsumkultur?* S. Fischer Verlag, Frankfurt/M 2006.
- [6] Schmidbauer, K., Knödler-Bunte, E., *Das Kommunikationskonzept*, UMC, Potsdam 2007.
- [7] Eisner, M., Graf, N., Moser, P., *Risikodiskurse – die Dynamik öffentlicher Debatten über Umwelt- und Risikoprobleme in der Schweiz*, Seismo, Zürich 2003, p. 20.
- [8] Carrada, G., *Communicating Science – a scientist's survival kit*, European Commission, 2006 (Source of information (15.11.06) http://ec.europa.eu/research/science-society/pdf/communicating-science_en.pdf)
- [9] EU, 2006: "Risk Issues", special Eurobarometer 238/Wave 641 – TIVS Opinion + Social; http://ec.europa.eu/food/food/resources/special-eurobarometer_riskissues_20060206_en.pdf, Fundstelle am 22.2.07: