

## Review

# Handling uncertainty

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The management of health risks related to scientific and technological innovations has been the focus of a heated debate for a few years now. In some cases, like the campaigns against the use of GMOs in agriculture, this debate has degenerated into a political and social dispute.<sup>1</sup> Even risk analysis studies, which appeared in the 1970s in the fields of nuclear physics and engineering and were later developed by social sciences as well, have given completely different, and at times contradictory, interpretations that, in turn, have given rise to bitter controversies. In the last few years, attention has been focused mainly on the mechanisms used for risk communication, because it is believed that the crux of the problem is the information available to the public. However, opinions differ in this field too, and the dispute will definitely go on, generating new ideas in the process.

The above considerations are confirmed by three books which have been published in Italy this year and discuss the problem of risk management and risk communication from different points of view.

The first book was written by Ugo Leone and its eloquent title is *La sicurezza fa chiasso* (Guida, Naples, 2004), i.e. “security is loud”.<sup>2</sup> As the author explains in the introduction, information raises awareness and provides safety. But, only on condition that such information is neutral and accurate, Leone specifies, or else it only magnifies fear. The problem of neutral and accurate information is not a modern one. On the contrary, it is an age-old issue. Leone mentions a little book published in Naples approximately 200 years ago by the abbot Ferdinando Galiani. Its title goes: *Spaventosissima descrizione dello spaventoso spavento che ci spaventò tutti coll'eruzione del Vesuvio la sera degli otto d'agosto del corrente anno (1779). Ma (per grazia di Dio) durò poco* [Fearfully frightful description of the frightful fright that frightened us all when Vesuvius erupted on the evening of 8<sup>th</sup> August of the current year (1779). But, (thank God) it didn't last long]. The abbot later confessed that the eruption was actually insignificant and he admitted having chosen that title in the hope of inducing a few more readers to buy his book.

However, nowadays it is not just natural events such as volcanic eruptions or earthquakes that trigger fear in public opinion. At the end of the Second World War, nuclear technology was used to build up nuclear weapons which were just as terrible and lethal as natural disasters, and made it possible for human beings to deliberately spread destruction. In more recent years, a number of accidents which took place in large industrial plants such as Three-Mile Island (1979), Bhopal (1984) and Chernobyl (1986) have highlighted the fact that even technology used for civil purposes can become a lethal weapon with a permanent impact on the environment and on human health. Such tragic accidents have had serious repercussions on the public perception of science. In what is probably the best-known case, the explosion at the Chernobyl nuclear power station, the community of experts, who suddenly stepped into the limelight, proved unable to control the disaster. What is more, they were divided over the interpretations of what had happened, why it had happened and what needed to be done next. They went so far as to adopt partisan views or views based on principle, thus dealing a blow to the image of a reliable science which provides certainties.<sup>3</sup> Leone points out that this is how we have moved from a society full of certainties to a society of uncertainty. Indeed, uncertainty is a fundamental element of modern industrial societies. However, it is not to be taken for granted that our society is culturally prepared for such a paradigm shift. The ongoing, heated debate on the precautionary principle (a concept that evolves continually) is a characteristic example of this lack of preparation. According to sociologist Bruna De Marchi and professor of philosophy of law Mariachiara Tallacchini, new political strategies need to be devised in order to get out of this dead end:

It is necessary to draw up effective “uncertainty policies” which are based on the acknowledgement that it is, permanently or temporarily, impossible to acquire full understanding of and total control over the risks that are present in every aspect of our everyday lives. Such policies will have to account for a society where citizens no longer accept top-down decisions – even if such decisions enjoy the support of acknowledged experts and reliable specialists – without being adequately informed of and involved in them.<sup>4</sup>

Not everyone feels this way. For example, a fundamentally different opinion has been put forward by Cass Sunstein, one of the major experts in the regulation of environmental risks and advisor of the U.S. government, in his book *Risk and Reason*, which has been recently translated into Italian by Ambiente Editions. Sunstein, who advocates a pragmatic approach to risks based on cost-benefit analysis, says his book is “a plea for a large role for technocrats in the process of reducing risks” because he believes that “a deliberative democracy does not simply respond to people’s fears, whether or not those fears are well-founded”. Sunstein rejects psychologist Paul Slovic’s assertion that the public’s representations of risk are extremely varied because they can include rational and legitimate concerns which are, on the contrary, overlooked in the evaluations made by the experts.<sup>5</sup> Contrary to Sunstein’s views, De Marchi and Tallacchini emphasise that:

Propositions which blend scientific knowledge, or the lack of it, with ethical, social and political evaluations, or even with not widely-accepted popular wisdom, are not rhetorical devices meant to build a reassuring image of technologically advanced societies, but rather, elements of the epistemological vision of uncertainty.<sup>6</sup>

It is far too easy to ironically ascribe the views of “technocrat” Sunstein to his attempt to justify his job: from the point of view of those who have to choose daily how to invest their limited resources, there is an undeniable need for some sort of tool that can make decision-making easier, if not an actual list of risks in order of importance. In order to cater for this need, cost-benefit analysis is undoubtedly useful. However, there are still doubts on whether it can be an “objectivising” tool which can counteract the power of stakeholder groups. This is due to the fact that the choice and weighting of significant parameters in any complex analysis cannot be considered uninfluenced by beliefs, ethical norms and more or less explicit interests.

Although it is not possible to distinguish between “real” and “perceived risks” and nor is it claimed that risks are just a social construction, it certainly appears true (in the words of Italian sociologist Andrea Cerroni, author of the third book of this review, *Homo transgenicus*, published by Franco Angeli) that important symbolic contents are created through a socio-communicative web of social interactions. These contents definitely contribute to shaping the public’s perception of risks. Such a concept brings to mind another important element of risk communication, i.e. the introduction of scientific narration into a mythological context.

“For every complex problem”, warned George Bernard Shaw, “there is a simple solution - that is wrong”. Let us ask ourselves a few questions then: Are we really certain that the public refuses new technologies because it is scared of them just as a small child is afraid of the dark? And are we really certain that the mass media, which cry “wolf!” and exaggerate the real impact of risks in order to attract a few more viewers or sell a few more copies, are entirely to blame and that the origin of all the fuss is just inaccurate information?

In fact, numerous studies have shown that a greater quantity of information (even though accurate) does not necessarily promote a more favourable approach to technological innovations. In other words, the acceptance or rejection of new technologies has little to do with the quantity of information available. It is not a matter of background knowledge either, because, rather than fostering unconditional support of new technologies, knowledge, too, triggers a critical approach which leads to demanding stricter regulations<sup>7</sup> (as an Italian saying goes: “Now that I know who you are, I trust you less”).

According to Cerroni as well, when it comes to participating in decision-making processes and risk acceptability, information alone is not everything:

Therefore, a *citizen* need not only be *well-informed* but also *meta-informed* [...] so that s/he can *handle* information, its sources, the decision-making contexts and his/her own interests.<sup>8</sup>

Moreover, in the last few years, it can no longer be asserted that the quantity of information related to this topic is limited. On the contrary, what we could really ask ourselves is why nuclear power or biotechnologies have given rise to so much discussion in the mass media as to create ideological and social conflict.

The most important point is probably the fact that, in many cases, it is not just a debate on the safety of a technological application or the accuracy of a scientific hypothesis. In other words, the public hasn't become keenly interested in GMOs just because it is scared of their possible impact on human health or the environment, but rather, because genetic manipulation redefines man's role in nature. Similarly, the dispute on nuclear power raises once more the eternal dilemma of the impact of knowledge (it is not casual that Robert Oppenheimer, the scientist who was in charge of the Manhattan Project, said the atomic bomb was the original sin of physics), just like robotics and nanotechnologies suggest the possibility of a new dividing line between animate and inanimate matter. Science and technology thus become a stage for narratives which deal with time-worn issues, buried deeply within ourselves. Such narratives are difficult to explain verbally and therefore, they have to be embedded in heavily symbolic language. Thus, age-old narratives eventually become actual myths of modern society. These narratives are animated by scientists-sorcerers, transforming creatures, forbidden fruit and expulsions from the Garden of Eden, cows driven mad and strawberries with fish genes, all coming out of a medieval bestiary. Such narratives, full of pre-scientific elements related to the control of knowledge and the legitimacy of its applications, are not proof of an obscurantist, anti-scientific, irrational movement which fears technology, although there have been attempts to convince it is so, despite the data which prove the opposite.<sup>9</sup> On the contrary, as Yuriy Castelfranchi has already suggested, they are the proof of the fact that nowadays, and more than ever before, science is deeply rooted in our society:

Science is culture and as such it is not just spread in the form of notions, concepts and statements, but also through stories, metaphors, dreams, complex representations buried deep down in people's minds where ambivalence has a crucial role.<sup>10</sup>

If myths are the projection of the rules, values and aspirations of a community in the form of tales, accepting to analyse them, instead of emphatically rejecting them, could probably help us improve our understanding of the "risk society" we all live in.

*Translated by Anna Drandaki, Scuola Superiore di Lingue Moderne per Interpreti e Traduttori, Trieste, Italy.*

## Notes and references

<sup>1</sup> L. Carra, F. Terragni, *Il conflitto alimentare*, Garzanti, 2001

<sup>2</sup> The title of the book is the Italian translation of a verse by Emily Dickinson: "When Etna basks and purrs/Naples is more afraid/ Than when she show her Garnet Tooth—/ Security is loud—".

<sup>3</sup> B. De Marchi, L. Pellizzoni, D. Ungaro, *Il rischio ambientale*, Il Mulino, 2001.

<sup>4</sup> B. De Marchi, M. Tallachini, "Politiche dell'incertezza, scienza e diritto", Introduction to *Notizie di Politeia*, 70, 2003, p. 3.

<sup>5</sup> P. Slovic, *The Perception of Risk*, Earthscan, Londra, 2000.

<sup>6</sup> B. De Marchi, M. Tallachini, "Politiche dell'incertezza, scienza e diritto", cit., p. 4.

<sup>7</sup> M. Bucchi, F. Neresini, "Biotech remains unloved by the more informed", *Nature*, 416, 2002; G. Gaskell et al., "Biotechnology and the European public", *Nature Biotechnology*, 18, settembre 2000.

<sup>8</sup> A. Cerroni, *Homo transgenicus*, Franco Angeli, 2003, p. 67.

<sup>9</sup> For example, G. Gaskell, M. Bauer, *Biotechnology. 1996-2000 The years of controversy*, Science Museum, Londra, 2001, p. 78.

<sup>10</sup> Y. Castelfranchi, "Per una paleontologia dell'immaginario scientifico", *JCOM*, 2(3), 2003.