European Review, Vol. 11, No. 3, 417–435, (2003) © Academia Europaea, Printed in the United Kingdom

Risk communication: pitfalls and promises

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Over the past 30 years, researchers and practitioners have discussed the importance of risk communication in solving disputes ranging from the public outcry regarding importing GMO foods from the United States to Europe, the siting of waste incinerators in many parts of Europe to the building a permanent high level nuclear waste facility in the United States. In this paper the history of risk communication is discussed, focusing particularly on the importance of the social amplification of risk and trust. This is followed by a detailed discussion on trust as it relates to public perception of risk, where it is argued that trust is composed of three variables. The third section covers the theoretical debate of how to best deal with the decline in public trust. This is followed by a short analysis in which it is concluded that there is no simple solution to increasing public trust (and thereby assuring greater risk communication successes).

1. Risk communication

Risk communication has its roots in risk perception, a field developed by Gilbert White in the 1940s. White's work on natural hazards[1] and that of Baruch Fischhoff, Paul Slovic and others on technological hazards in the 1970s[2,3] showed that the public perceive some risks differently than others for a series of reasons, such as degree of control, catastrophic potential, and familiarity. In the late 1980s, there began to be application of some of the findings of risk perception research to risk communication.[4,5] Whilst risk communication cannot be defined as an independent discipline, it is perhaps best described as 'the flow of information and risk evaluations back and forth between academic experts, regulatory practitioners, interest groups, and the general public'.[6] Thus at its best, risk communication is not a top-down communication from expert to the lay public, but rather a constructive dialogue between all those involved in a particular debate about risk.

https://doi.org/10.1017/S106279870300036X Published online by Cambridge University Press

To date, the outcomes of the various risk communication programmes relating to environmental hazards in Europe and the United States have largely been ineffective. The public tends to remain hostile to the local siting of waste incinerators and nuclear waste dumps, a reaction that has not been significantly influenced by the risk communication programmes.[7–9] Whilst, in part, such responses might be attributable to the lack of funding of risk communication programmes and hence failure to conduct proper evaluations to learn why programs failed,[10] it is more a failure to understand that it is necessary to work together with the public rather than simply 'educate' them.[11,12] More attention must be played to the social amplification of risk and the role of trust.[13,14]

1.1. Social amplification

The relationship between media representation of risks and associated public perceptions of these same risks (and their impact on behaviour) is complex. Theory about the social amplification of risk[15] takes into account the integration of different models of risk perception and risk communication. 'The social amplification of risk is based on the thesis that events pertaining to hazards interact with psychological, social, institutional and cultural processes in ways that can heighten or attenuate individual and social perceptions of risk and shape risk behaviour'.[16] Social amplification is made possible by the occurrence of a risk-related event (an event of physical nature) or by a potential for a risk-related event, which has some kind of substantive or hypothetical reality.[17] The risk-related event is selected by a 'transmitter', in most cases the mass media or an interpersonal network, which amplifies or attenuates the risk. The transmission is then continued by people or institutions within society who may also attenuate or amplify the risk into a message (the so called 'ripple effect'). Such messages lead to secondary effects, which might be financial, e.g. rises in insurance rates, affective such as anti-technology feelings, or economic such as a decline in tourist activity.

The model of social amplification has been criticized, primarily because of the simplistic views of the mechanisms of risk amplification and risk attenuation.

1.2. Trust

One of the most likely explanations for the failures of risk communication initiatives is that reactions to risk communication are not only influenced by the message content and the hazards, but also by trust in those responsible for providing the information.[18–25] This distrust of policy makers and industry officials is due to past history or social alienation.[26]

Leiss[27] points out that in the early stages of risk communication, between

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1975–84, the main concern of the technical experts was to provide accurate numerical information. It was believed that if a risk was estimated correctly then the public would believe the experts and their recommendations on the basis of their expertise. However, public opposition to risk-based decision making resulted in experts expressing an 'open contempt toward the public perception of risk', which was discounted as being irrational.[27] This resulted in further distrust in experts by the public who viewed their actions as arrogant, self serving, and reflecting a 'hidden agenda' of vested interests. Today, experts realize that public trust is extremely important if they are to achieve effective risk communication.[28]

Trust, once lost, is very difficult to regain.[29] It is far easier to destroy trust than to build it, particularly as trust-undermining events tend to take the form of specific events or accidents whereas trust-building events are often fuzzy or indistinct. Barber[30] has identified some reasons that have contributed to a decline in trust in science and the professions more generally. He suggested, for example, that the increased influence that professions have over people's welfare, the high value placed on equality and a better-educated public all contributed to this trend. The political issue of who makes important decisions for others is central to recent discussions of reactions to potential technological hazards.[31] Perhaps a greater understanding of the trust causing/destroying phenomena could contribute to resolving social, environmental and political problems.

2. Trust and risk communication today

Without public trust in authorities/regulators it is very difficult to assemble a successful risk communication strategy.[32] There is a direct relationship between high public trust in authority and low perceived risk and vice versa;[33,34] indeed, it is possible to communicate issues of high uncertainty in a top-down fashion, when the public trusts authorities/regulators.[35,36]

What exactly is trust? Trust can be an expression of confidence between the parties in an exchange transaction[37–39] and can be both process/system- or outcome-based. For example, in some cases, the public will trust regulators even if they do not agree with a regulatory decision, as long as they see the process as credible, i.e. fair, competent and efficient. However, in most cases, the public judges regulators on their past decisions. If the public perceives the regulator as competent, fair and efficient, based on previous decisions, the public is likely to trust these regulatory bodies in the future. I use the term trust in the sense of a complexity reduction thesis, in which the public delegates to authority. That is to say trust means acceptance of decisions by the constituents without questioning the rationale behind it. In such a case, constituents are in effect agreeing to accept a 'risk judgement' made by the regulators.[40] The three most important components of trust are fairness, competence, and efficiency.[41,42]

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2.1. Fairness

Impartiality and fairness are an important element of any regulatory decision that will have an impact on public trust.[43–48] There are two ways to measure fairness in regulation, either via the process itself or through the outcome of the process. Fairness is usually defined by a view of the process or outcome as being impartial. Did the regulators take everybody's interests into account, and not just those of certain powerful industrial bodies? If the regulators are not seen as impartial or fair they are unlikely to gain trust.

2.2. Competence

Public perceptions of risk managers' competence is viewed as the most important component of trust.[49–51] Did the regulators handle the process as proficiently as possible? Did the risk managers have the necessary scientific and practical background to deal with the range of issues associated with the process?

2.3. Efficiency

The third component of trust is efficiency and can be viewed as how taxpayers' money is used in the regulatory process (saving lives or safeguarding the environment).[52,53] The efficiency argument is particularly important during periods of economic stress, when levels of government expenditure have significant effects on the public's welfare and state of well-being.[54] The concept of relating efficiency to trust has not been much developed because, what economists or technocrats see as inefficient – such as spending public funds on cleaning up contaminated land sites (e.g. the US super fund project) – are seen by the public as very important, for reasons other than efficiency.[55–58]

3. Risk communication and present risk management tools – how to rebuild public trust

3.1. Description of strategies that have been implemented to rebuild trust

What is the best way to deal with the decline in public trust? One view is to decrease public involvement, arguing that the public already have too much influence on risk regulation, resulting in both the wrong types of problems being prioritized[59] and inefficient decision making.[60] Others argue that only by increasing public deliberation, from as early as possible can public trust be increased, leading to less public opposition and higher compliance with any regulatory measures put in place.[61–63]

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3.2. Deliberation

In ancient Greece, citizens participated in policy making, and direct democracy likened to the Greek model was also practised in a few small Cantons in central Switzerland in the 13th century. In the free cities of Italy (e.g. Venice), there was citizen participation in the early Renaissance.[64] However, it is fair to say that it was not until the Enlightenment period of the late Renaissance that the fundamental elements of democracy, division of power, and equal opportunity for political action such as voting and running for political office were articulated.[65]

Following the Renaissance, and significantly after the US and French revolutions of the late 18th century when democracy began to bloom, democracy with public involvement in the policy making process became firmly established, in theory if not always in practice.

In the United States, some commentators argue that participation has been a recurrent theme in American history, but that demands for participation have increased over time as the Government has expanded. For example, referenda – a form of public participation, as formal interest representation at the national level – developed in the early part of the 20th century. By the end of the 1930s, the basic types of public participation were well established and used. Following the Second World War, participation in the policy making process continued to grow after the Administrative Procedure Act was passed in 1946. This called for due process and the public's right to comment, and gave opportunity for hearings. The 1966 Freedom of Information Act granted similar privileges. These Acts have been termed the 'old' school of participation, in which participation was seen as a privilege, in which only those organizations that had resources could participate.[66]

During the 20 years after 1960, wide public participation was seen as a necessary element in many federal statutes as an important contribution to democracy and to the quality of the decision making process itself. What distinguishes the 'new' from the 'old' school, is that participation is now seen as a right.

The first 'experiment' with mass public participation was Lyndon Johnson's so-called Great Society initiative, where public participation contributed to defining and establishing anti-poverty programs.[66,67] In the 1970s, participation in the policy making process grew in popularity. The National Environmental Policy Act of 1970 called for public participation in the preparation of Environmental Impact Assessments, which were enforced by the US Federal Courts. In addition, the so-called reformation of the appeal law in the late 1960s and early 1970s led to the use of fairness and equity measures to protect new classes of interests under an expanding government. Undoubtedly, however, the greatest impetus for the growth of participation in the 1970s was from the increase

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in federal statutory innovations. Of all the participation provisions enacted in the 1970s, 60% were based on a Government statute.[68]

In the 1980s, administrative enthusiasm for participation in the policy making process declined in the United States government. The Reagan Administration cut funding for participation initiatives, viewing participation in the policy making process as a way for the opposition to influence it. The Reagan Administration instead promoted the use of cost-benefit analysis as an approach in setting environmental standards[69] (see discussion of rational risk management approach) something that had been originally put in place in the 1946 Administrative Procedures Act and used (on a small scale) by the Nixon Administration.[70] This changed again in the 1990s, when participation grew in popularity at both the national and state levels. On the national level, federal reform proposals, for example, have been used to make agencies more responsive to smaller businesses, while states such as Florida and North Carolina have adopted participation techniques for negotiated rule making.[71]

In Europe, deliberation grew in prevalence in the 1970s when it was used as an aid to urban planning in many communities.[72] The purpose was to understand better and to incorporate into the decision making process public values and preferences.[73] This work led to the development of various public participation techniques ranging from consensus conferences, to advisory panels and citizen juries.[74]

Deliberation itself is a style of exchange of arguments with its origins in theology. There it refers to the Laws of the Catholic Church, in which there was an exchange of arguments among equals or stakeholders. Such exchanges are now commonly found among experts, such as in a Royal Commission in the UK. Deliberation can be used to refer to an exchange of ideas between the public and interest groups, policy makers and industry representatives. It refers to the involvement of the public and various interest groups in a multilevel framework in characterizing the risk that is to be managed.[75]

Deliberation has four main purposes.[76–78] These are the normative democracy, equity and fairness reasons, more effective risk communication, and relativism of knowledge.

Equity and fairness

Public participation levels the playing field by providing citizens with an opportunity to influence their governing. This is an ideological perspective and its proponents argue that we live in an unjust capitalist society where risks are everywhere affecting poor people proportionally higher as burdens and benefits are not equally distributed.[79–81] The proponents do not want economists telling the public what the goals should be. Economists, they argue, cannot tell us what is

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an intolerable risk; involved in discussion, the affected public can help to decide what burdens are tolerable and the concept of fairness gets due consideration.[82]

More effective risk communication

In both Europe and the United States, the use of deliberation did not become popular to risk managers until the advent of dialogue risk communication in the late 1980s.[83–86]

Risk communication studies indicated that the most common form of risk communication, 'top-down', was not successful in alleviating public fears.[87–89] The main reasons identified for this failure was poor communication among the experts themselves, and their disdainful response to public opposition[90] which contributed to increased public distrust in experts.[91]

The development of dialogue risk communication techniques[72,83,91–93] was welcomed by industry and regulators, especially in the United States. Industry and local and federal government regulators, frustrated by the difficulties in siting plants and dumping and burning wastes, were keen not only to learn how to increase public trust via more active engagement but also to gain information on the affected citizens' preferences by having the citizens directly involved in the policy making process.[71] The supposed ability to increase public trust that has made dialogue risk communication very much in vogue at the moment.[73,74,94–95]

Public/interest group participation has been identified as important in rebuilding the legitimacy of the decision-making process,[74] particularly after the 1995 Brent Spar crisis.[96] Present European policy overwhelmingly favours the increase of public and interest group involvement in the policy making process, be they based in the EU, Sweden or the UK.[63] For over 100 years, most European countries such as Belgium, France, Sweden and the UK had the elitist model in place with little public involvement,[97] but after a series of regulatory failures – ranging from BSE in the UK, to tainted chicken feed in Belgium, or contaminated blood in France, it had to be abandoned.[98]

3.3. Technocracy

In the United States, which historically has had much greater public involvement, regulators, policy makers and some academics have begun to question the wisdom of having the public involved in the policy making process. Proponents of this technocratic perspective take the view that risk management should be left to the experts advising government ministers and policy makers with minimal or no public involvement. Only through strong science-led expert advice and strict peer review will risk management ultimately work. Technocrats/experts want risk managers (civil servants) to create outcomes that citizens, after careful

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deliberation and training in relevant sciences, would want the democracy to produce.[99] They see themselves as delegated agents of lay citizens who lack the time, expertise, resources and cognitive capacity to make complex risk-management decisions. Notions of fairness as well as efficiency are important for technocrats who are reluctant to accept stakeholder-based decisions as well as those based on opinion polls or raw popular opinion. Involving the public and interest groups in a deliberative fashion can lead to inefficiencies both in time and funds, to the wrong prioritization of the hazards, to unforeseen difficulties as well as surprises, breeding distrust. By leaving risk management to experts, who know the issue better than anyone else, society benefits. That said, technocrats argue that some form of public participation is needed to ensure accountability, and to force technocrats/experts to formulate decisions that are understood by the public.[100] The technocrats are experts and know the area that they are set to regulate better than any other. They serve as advisors to civil servants and ministers via expert advisory councils and agencies, but are not part of the politically appointed establishment, but are rather a politically insulated group that have been assigned to deal with risks.

The technocratic risk management approach is well mapped out by Graham and Hartwell who argue that regulation of environmental and health problems should be based on the following criteria:

- Scientific expertise indicating that exposure to identified pollutants can represent significant harm to the environment or human health.
- The environmental problems identified should be prioritized by some type of 'comparative risk process' as to ensure efficient use of resources.
- To avoid risk–risk trade-offs, the proposed regulations should be shown to reduce the risks of the targeted pollutants to a greater extent than they increase other risks to the environment.
- The economic costs of the proposed actions must be reasonably related to the degree of risk reduction.

Overall, the view is that regulatory reforms should be based on risk criteria drawn from economic and scientific spheres, avoiding regulatory arrangements that may satisfy the concerned public, but which could have negative effects on the environment as a whole.

Economic risk management alternative. The technocratic approach is the opposite of the deliberative one. Ruckelshaus, the former US EPA Administrator, for example, argued in the early 1980s that having scientists and experts characterizing the risks and carrying out the risk assessments would restore the credibility of the US EPA.[101–104] The process and would not only lead to more efficient and competent decisions, but also greater public trust in the institution.

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3.4. Rational risk policy – efficiency

Rational risk policy takes the view that there is only a limited amount of funding available for risk management and that this funding should be used in the best possible way. It differs from the technocratic approach in two ways: first, it wants risk managers to create outcomes that would have been created by perfectly functioning markets (if such markets had existed); only efficiency counts and there is no room for public or stakeholder involvement. Secondly, it argues for risks to be individualized. The individual should him/herself decide whether it is worthwhile to take a risk or not. For example, by putting warning labels on cigarettes, an individual should know that by smoking, he/she increases the chance of reducing his/her lifespan because of lung cancer. In a free market with warning labels, individuals can decide which risks to take and which not. Also in such a society, insurance is a major factor. If individuals feel exposed they can take out insurance thereby hedging their exposure.[105]

The two leading proponents of this view are Kip Viscusi and Richard Zeckhauser.[106–109] They argue that present day regulation is killing people and costing unnecessarily large amounts of money. As Dana argues:

The central thesis of the critique is that government could achieve the designated ends of environmental regulation at a much lower social costs by replacing rigid 'command and control regulation' with more market-oriented system of tradeable pollution rights, pollution taxes, and monetary incentives for pollution prevention. Proponents claimed that market-oriented reforms would reduce industry's compliance costs and government's enforcement costs. Moreover, a market-oriented system, unlike a command and control system, would give industry an ongoing incentive to develop better pollution prevention technology.[110]

The main thrust of Viscusi and Zeckhauser's argument is that the public and policy makers are prone to certain biases, strongly grounded in cognitive psychology.The most common arguments are:[111,112]

- An underestimation of large risks and overestimation of small ones.
- Greater value attached to eliminating a hazard rather than reducing the risk.
- Greater concern about visible dramatic and well publicised risks.
- More concern about low probability high consequence risk (e.g. a nuclear plant accident or a plane crash) than high probability low consequence risk (a car crash).
- More concern about artificial than natural risks.

These biases can lead to irrational regulation, affecting decisions that policy makers must take on a daily basis. They are illustrated in the EPA example

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mentioned below, but they also come through many other Federal policies. Other examples are seen in the US Food and Drug Administration legislation where regulation of new synthetic chemicals is more frequent than for natural chemicals.

Biases can affect risk management policies in many ways. Irrational fears among the public caused by these biases, for example, can affect local and national policy makers if they perceive that a particular regulation may be popular among the voting public. This was seen in Clinton and Gore's campaign promises to continue funding clean-up of Super Fund sites in 1996, even though research had shown that this would not be efficient in terms of lives saved.

Another issue that rational risk managers see as problematic is the intentional conservative bias in cancer risk assessments which extrapolate animal data (e.g. mice) to humans, which may have led to multiple errors in overestimating risk.[113]

The basis of rational risk policy is the 90–10 principle, in which government regulators may incur 90% of the cost to address the last 10% of the risk.[114] Hence, reducing the risk of a particular problem to absolutely zero is extremely inefficient. Viscusi applies the 90–10 hypothesis to the Superfund case example. His calculations show that the first 5% of expenditure eliminates 99.46% of the total expected cases of cancers averted by hazardous waste clean-up efforts. The remaining 95% of the expenditure leads to virtually no health risk reduction (Ref. 114, pp. 99–100). Moreover these calculations show that the mean value of a life saved by the Superfund clean-up is a massive $11.7 billion. Critics point out, however, that this calculation focuses on existing and not future risks. Superfund was put in place not to re-mediate existing risks, but rather to prevent potential risks by cleaning up sources of exposure before a risk is made real.

Under a rational risk policy, the cost of saving a life or avoiding an illness or injury should be the same across all government departments. When this is not the case, what can happen is that safety is reduced through diverting funding from effective life saving activities to less effective ones. Some industries, due to how the public perceives them, have higher regulatory bands, as measured per lives saved, than others. The nuclear industry is notorious for putting forward regulatory measures that would cost millions of dollars per life saved, and which if implemented would take funding away from road or railway safety where regulatory measures are more cost effective.[114]

Zeckhauser and Viscusi argue that rational risk policies, based on economic criteria, should take precedence over deliberative procedures as bias in this can, in effect, allow people to die unnecessarily. One of the fundamental reasons for the success of the rational risk approach to date has been the so called 'no losses' phenomenon, where:

- regulatory costs are reduced (no litigation);

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- industry does not face extensive uncertainty related to costs and environmental benefits and there is no excessive conservatism in the cancer risk assessments.[115]

4. Strategies for trust building – is there in fact one simple solution?

It can be seen that to deal with the decline in public trust there are several possible solutions. These should ideally be matched up with the three components of trust, that is fairness, competence and efficiency. To deal with public distrust caused by the lack of fairness, for example, some form of public/stakeholder involvement may be necessary, to ensure that the regulators/public authorities have the public's best interest at heart. However, if the lack of public trust is caused by incompetence, greater involvement of experts (technocracy) may be required, and if the process is seen as inefficient then a rational risk analytical approach may be needed. In sum, in addressing how best to communicate to the general public I am not convinced that greater public dialogue (the most popular tool at the present time) is necessarily the best one for increasing public trust in regulators. The simplest way to address the trust conundrum is to test for public trust (via open-ended face-to-face interviews on random populations where the issue has been raised) and, based on the results, develop a communication programme and act accordingly. In so doing the four following risk communication programmes can be developed.

(a) If the interviews show that there is public trust in authorities, top-down risk communication with the general public will suffice. Such a strategy will work even under issues of extreme uncertainty, as long as the message being communicated can be made simple and understandable.[116]
(b) If the interviews show that the public do not trust authorities because they are not seen as fair, then some form of a dialogue needs to be built up with the public to ensure successful risk communication.
(c) If the interviews show that the public do not trust authorities because they are not seen as competent, competent senior civil servants and scientists need to be hired before a top-down risk communication process can commence.
(d) If the interviews show that the public do not trust authorities because they are seen as inefficient, then competent well respected economists need to be brought on board before a top-down risk communication process can commence.

This degree of flexibility is presently not available to many risk managers. In the

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UK, for example, the present New Labour government is arguing (at least in public) for greater public and stakeholder participation in the policy making process as it sees that this is the best way of increasing public trust in policy makers (e.g. UK Strategy Unit 2002). This view is shared by the European Commission, which takes the view that only through greater stakeholder involvement as well as transparency can trust be restored. In the United States, however, the Office of Management and Budget is increasingly advocating the use of strict cost benefit analysis as to help build up a more competent and efficient regulatory strategy (thereby also increasing public trust).[117]

5. Conclusions

Risk communication is never easy, particularly not when dealing with complicated issues fraught with uncertainty. However, if researchers and practitioners address the crucial component of public trust or distrust, the communication process can be more successful. Hence, there is a need to better establish firstly whether the public trust the authorities (of course, on a case-by-case basis), and secondly to address the reasons why, if public does not trust the authorities. To do this, researchers and practitioners need first to break down trust into three components, namely fairness, competence and efficiency and then test for trust. Based on the outcome of these tests, three possible solutions can be proposed. These solutions are for the public distrust caused by lack of fairness – deliberative techniques, for lack of competence – technocratic measures and inefficiency – rational risk strategies. Finally, we should be wary of accepting one-size-fits-all solutions to risk communication no matter who is preparing them, as implementing faulty solutions may actually decrease public distrust rather than increase it.

Acknowledgements

The research on which this article is based was funded by the Swedish Research Foundation via the Centre for Public Sector Research, University of Gothenburg, where the author is a visiting professor. The author wrote large parts of this article when on a sabbatical at the Harvard Centre for Risk Analysis, Harvard School of Public Health. I am indebted to John Graham and Ortwin Renn for their comments on an earlier version of this article.

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