The Best Principle is the best principle

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Note

My paper ‘Research implications of science-informed, value-based decision making’, was published in 2004 in a Special issue of the *International Journal of Occupational Medicine and Environmental Health* devoted to the Precautionary Principle (vol 17, pp.83–90). (An earlier version of that paper had been presented to a WHO workshop in Rome 2001.) At its end I noted that it was drawn from a much longer manuscript, with a final section specifically elaborating on the argument directed at the Precautionary Principle. This manuscript was never submitted for publication and is submitted here, deliberately unchanged, because the argument remains just as relevant in the world of Covid 19, where it is currently resurfacing. Subsequent and contemporary offerings on the subject involve mainly minor differences in terminology and organisational detail.

Abstract

The Precautionary Principle represents an attempt to avoid the issues and difficulties in establishing the best course of action. It is closely associated with the methodological confusions arising from ‘the risk approach’ and the fallacy of ‘science-based policy’. The only principle relevant to responsible, coherent and transparent public decision making is the Best Principle.

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1. A paradox?

When dealing with potentially hazardous exposures the need to exert caution is supported by all, but the choice of specific cautionary measures is controversial. We observe that the unanimity behind support for ‘precaution’ in general breaks down when any specific precautionary measure is proposed. One is reminded of Sartre’s Auto-didact in *Nausea*, who pontificates about humanism and about how he loves his fellow-men - not any particular person of course, but everyone in an abstract way.

But this is not a true paradox. At bottom it is a simple reflection of the fact that general statements of principle or sentiment come cheap. They are *cognitively* cheap in that, compared with any specific proposal, they involve almost no complexity. Bluntly speaking, one doesn't have to think, one can just intone the mantra. And they are *economically* cheap in that, compared with any specific proposals, they do not require consideration of the losses as well as the gains which will come from implementing the principle. Bluntly speaking, one does not have to worry about the trade-offs.

Of course there have been many attempts to give the Precautionary Principle operational meaning as well as emotional appeal and I will consider one or two of them. But only after identifying what I see as the key pathologies in contemporary policy making in relation to health risks - and the treatments I feel are needed to address them

2. Diagnosis and Treatment

Whether the focus is on what we should do about mobile phone base stations, global warming, or anything in between, there is widespread confusion in the internal discourses of the scientific, lay and political communities, as well as in all attempts to promote multi-discourse communication among them. This confusion has its fundamental origins in the incoherence inherent in the concepts of *risk* on the one hand and *science-based policy* on the other. But the removal of these two firmly embedded impediments requires the acceptance of a formidable series of propositions. For space reasons they will have to come essentially in the form of assertions. Some are touched on in a recent editorial by Chauncey Starr (Starr 2003).

1. Acceptance of policy/decision making as the continuously on-going activity of identifying and implementing the Best course(s) of action. Conceptually there is always a policy in place, so that policies can really only be changed, not 'made'.
2. Rejection of the Precautionary Principle - and all other analogous or alternative principles, such as Prudent Avoidance or ALARA (As Low As Reasonably Achievable) or Sustainable Development - in favour of the Best Principle, i.e. identifying and implementing the Best course of action. The 'Satisficing' Principle is not an option in the cases we are looking at - if it ever is - though any maximisation strategy must take into account the costs of researching and transacting.
3. Acceptance that identification of the Best course of action always requires the integration of values and uncertainties, and that policy/decision making must always be seen (and referred to) as a '*value-based and science-informed* activity', since it can never be a 'science-based activity'. If it involves recommendation for action, 'scientific advice' is an oxymoron.
4. Acceptance that, while it is legitimate for scientists to use error valuations and time discount rates that reflect their societally-approved goal of long-term knowledge accumulation - it is right that they place an almost infinite disutility on false positive

conclusions and use a zero time discount rate - policy makers in a democracy are ethically required to use loss functions (trade-offs between false positive and false negative errors) and time discount rates that reflect the real world lived consequences for, and values of, their constituents.

5. Acceptance that while the legitimate ultimate goal (dream) of science is *certainty* about *causation*, the legitimate function and obligation of policy making is to decide and implement the Best course of action, *given* that at any (and indeed every) point of time, our knowledge concerning most policy-relevant uncertainties will be in the form of probabilistic causation at best and typically in the form of probabilistic association.
6. Acceptance that attempts to set up distinctions between states of ‘ignorance’, ‘uncertainty’, and ‘risk’ are a toxic distraction. From a *decisional* perspective there is only uncertainty and the appropriate measure of uncertainty (whatever its origins) is probability. Excursions into confidence intervals and second order uncertainties reflect the persistent belief that one can arrive at a *decision* ‘scientifically’ and reinforce the confusion of inference with decision (Claxton 1998). Under uncertainty a decision should be driven by value judgments about the relative seriousness of the various errors that may be made - judgments that need to be elicited from respondents under uncertainty.
7. Acceptance that a vitally important role of publicly-funded ‘scientific’ activity, conceptually distinct from its role in knowledge building, is to provide high quality informational inputs of the sort required by policy/decision analysis and making, and to do so in maximally disaggregated and unsynthesised form so as minimise the pre-emption of value judgments. For the same reason, any data interpretation that is carried out by scientists and statisticians should be done neutrally, not ‘prudentially’ or ‘cautiously’. Where value judgments are unavoidable – as in the quality weighting of evidence – this should be done explicitly and transparently.
8. Acceptance that neither in the case of biophysical relationships nor values does the absence of high/acceptable quality evidence (by *scientific* criteria) mean that decisions can be postponed and resort to lower quality evidence avoided. Setting a quality cut-off in accordance with the evaluation criteria appropriate for science is inappropriate for policy/decision making, where the Best available (quality weighted) evidence must be used.
9. Acceptance that establishing the health impact (‘burden’) of a ‘problem’ - such as Electro-Magnetic Forces (EMF) or Global Warming (GW) - has only derivative relevance to determining the Best course of action in relation to it, since the latter requires establishing only the health impacts of possible ‘solutions’ /interventions - including their ‘costs’.
10. Acceptance that the ‘costs’ of any policy, including the status quo, are correctly interpreted as the benefits foregone by not adopting the best alternative policy.

11. Acceptance that scientific expertise in a ‘problem’ area (e.g. EMF, GW), is only one of many sources of the expertise needed in designing and evaluating ‘solutions’, since the latter will require competencies in modelling all the multiple *health and non-health impacts* of the possible interventions and many of these will be completely unconnected with ‘the problem’.
12. Acceptance that establishing the trade-off between health and non-health impacts is a key issue in implementing the Best Principle in all cases where health is involved. Statements that health considerations are ‘overriding’ or ‘paramount’, or ‘must be given top priority’, are without operational significance until a specific trade-off is provided. Unless an *infinite* trade-off is intended, which it never is.
13. Given that all policies must be value-based (whatever the extent to which they can be science-informed), acceptance that the systematic and rigorous investigation of values and preferences is as vital (in a democratic context) as that into biophysical relationships/states and that the development of the necessary *evidence-base* in respect of values and preferences must be approached with equivalent commitment, rigour and resources.
14. Acceptance that terms which appear to have the advantage of crossing multiple discourses may in fact mask deep conceptual confusion and exacerbate rather than reduce misunderstanding. ‘Risk’ is a particularly good example of the need for clarification and reform, along with ‘safe’ and ‘dangerous’ and all their cognates. Where ‘risk’ is used as a synonym for ‘probability’ the latter word should be used; where ‘risk’ is used as a synonym for ‘harm’ the latter should be used; and where it is used to indicate some compound of probability and harm it should be replaced by a word or phrase that specifies (with precision requisite to the task) precisely how this critical compounding of technical and value judgments has taken place (Dowie 1999a, Dowie 1999b, 2000).
15. Acceptance that (in the light of all the above) the comparative evaluation of courses of action – and identification of the Best - is a task of such complexity that analytical aids/support systems are essential in the development of coherent and transparent policies, even if ultimately the precise content of these policies must be a matter for political judgment and responsibility.
16. Acceptance that the procedures for determining the Best course of action are generic, not domain or problem-specific, and that there are relevant generic analytic skills and competencies - essentially decision analytic modelling in its most comprehensive sense – that can be brought to bear to assist, whatever the social context and political process.
17. Acceptance that it is vital not to confuse (as in, e.g., (Ravetz 1998)) scientific models, whose purpose is to describe and predict, with decision models, whose purpose is to evaluate alternative actions. The former should be evaluated by scientific criteria, the latter must be evaluated in ‘level playing field’ comparison with alternative decision technologies, of which the conventional one is reasonably well described as ‘taking into account and bearing in mind’.

18. Acceptance that the use of a maximally independent structure and process is essential if value conflicts between interest groups and the differential impacts of different possible courses of action on different sections of the community are to be explicitly identified and addressed - on the way to determining the Best course of action. The 'rational co-operative discourse model' (Renn 1998) incorporates most of the essential desiderata, subject to the employment of decision analytic support.

Taken together I believe these imply the need for:

19. Replacement of the orthodox, but conceptually problematic and analytically confusing, Risk Assessment-Risk Management framework – along with the particular division between, and sequencing of, 'science' and 'policy making' responsibilities it implies - with the Decision Analytic framework. In short, the replacement of what I will call the Risk Approach by what I will call the Decision Approach.

20. Reframing what is currently thought of as the single *problem* of 'Risk Communication' as the multiple problems, but more optimistically the multiple *opportunities*, of Decisional Communications within an 'analytic-deliberative process'. (Stern and Fineberg 1996) While advanced as a means of coping with 'Risk' conflicts within 'Risk' debates, the key elements of the 'analytic-deliberative' and 'co-operative discourse' models actually reflect the essence of the Decision Approach as proposed here.

3. The Risk Approach vs the Decision Approach

Here is a slightly stylised version of the 'Risk Approach' in action. An excellent example is provided by the events surrounding the Independent Expert Group on Mobile Phones in the UK, responsible for the Stewart Report (Stewart 2000) .

1. A 'problem', such as EMF, is uncovered, discovered or recovered.
2. An existing advocacy group identifies a particular 'solution' to the problem as in line with its mission, or sees that a particular 'solution' can be used to further its much wider mission. Or a new advocacy group forms around the problem. Or both. Other stakeholders, often with a commercial interest, take up contrasting positions in the rapidly crowded 'risk arena'.
3. Under pressure the authorities follow the orthodox 'Risk Approach', in keeping with their wish to maintain that their policies are 'science-based'. This means setting up an expert group (review committee, independent enquiry) to 'evaluate the scientific evidence on the problem' and report back, until which time everything can be put on hold.
4. The group consists largely of scientific experts in the field of the problem (e.g. EMF), who carry out a review of the evidence, conceptualised as a 'risk

assessment'. This follows the conventional staged sequence of hazard identification, exposure assessment and exposure-response assessment, followed by a 'risk characterisation' phase in which summary and synthesising statements are made about 'the risks' associated with 'the problem'. Much is made of the need to treat the data and results with 'caution' and 'scepticism' in the light of their manifold deficiencies though no indication is given of where these may be obtained or how to apply them.

5. Typically the group also addresses some of the 'risk management' possibilities in relation to 'the risks' and may go so far as to urge a 'cautious' or 'precautionary approach' to the problem, but only until 'full scientific certainty' has been reached and 'conclusive scientific proof of causal links' is available. However, in contrast to 'risk assessment', responsibility for 'risk management' is placed firmly in the hands of government, who it is expected will 'take everything else into account'. Widespread consultation is urged, along with major efforts to improve communication with the public about 'the risks'.
6. The authorities, faced by the task of coming up with a specific course of action (intervention), announce that they will indeed adopt a 'precautionary approach'.
7. When eventually required to go beyond this and do something, the authorities adopt what is claimed to be a 'reasonably practical/feasible' policy/standard/target/level. That is, they adopt a policy which recognises that most interventions to address 'the problem' (and 'the risks' associated with it) have multiple impacts beyond the problem itself, both in terms of benefits and harms to individuals and groups and in terms of resource costs, public and private. In other words, they do something which might be thought of as being in line with either the Prudent Avoidance or ALARA principles ...or one reading of the European Commission's six criteria for implementation of the Precautionary Principle (see below, section 5). However, this policy will rarely be based on any rigorous evaluation of the alternative policies using a decision analytic aid/support system - in striking comparison with the scientific rigour that has been demanded in the 'risk assessment' of 'the problem'. Most likely its introduction will be accompanied by an announcement that a rigorous *retrospective* evaluation *will* be undertaken later to see whether it '*has worked*' (rather than whether it was, *ex ante*, the best policy to adopt).
8. A 'Risk Communication' campaign is launched.

What is the alternative? The alternative is, *at stage 3*, to replace the Risk Approach by the Decision Approach. This involves immediately beginning an analysis of the possible interventions (*solutions*) rather than a risk assessment of the *problem*, setting researchers (including scientists) the task of providing the inputs needed for a comparative, and inevitably decision analysis model-based, evaluation of these alternative courses of action. This research must address not just the health impacts of 'the problem' - though of course it will encompass these - but the health and non-health impacts and costs of the possible solutions in their detailed specificity.

Adopting the Decision Approach - starting out from the options - ensures that all the relevant scientific evidence (mainly in the form of probabilities, though certainties are welcome) for all the option scenarios is identified, gathered and processed simultaneously and that all relevant outcomes and uncertainties are treated with equal significance. The hazard identification, exposure assessments and exposure-response assessments which are at the centre of a 'risk assessment' of the problem under the Risk Approach, are *part* of this exercise, but only a part and need to have their results expressed in decision-relevant not science-relevant format (usually as the probabilities of hypotheses given the evidence, not the reverse). Moreover, there is no place for the fourth, 'risk characterisation' stage of 'risk assessment', because the Decision Approach means that the necessary evidence concerning the *value* basis of the policy decision is collected and processed separately, so that cross-contamination is minimised.

The necessary integration of these distinct types of evidence, required in order to provide comparative evaluations of each course of action, must be carried out as a final stage in the analysis and by some explicit and transparent principle.

The final results of this analytical support exercise are explicitly contingent on the inputs and, therefore, like human decision makers, are only as good as the data fed into them. They can of, course, be accepted or rejected by the policy makers, but ethically it can be argued that they should reject them only when they have an evidence-informed belief they (the policy makers) can 'outperform' the analyses, not simply that they can demonstrate that the analyses are 'flawed' or 'inadequate'. (The Partial Or Non-Comparative Evaluation of decision technologies is widespread, usually involving those with heavy investments in the current technology assuming, fallaciously, that successfully demonstrating flaws in a new competitor is sufficient to end the contest. But this is 'the sound of one hand clapping' and clearly *comparative* evaluation is essential here, as is accepted in drugs and all other technologies.)

Where has Risk Communication gone in the Decision Approach? It has shifted from being a third element, separate from and outside 'Risk Assessment' and 'Risk Management' to becoming an integral part of the decision analysis process. Taking the form of two-way Decision Communications (plural) concerning the various conceptually distinct components of decision making – probabilities, outcomes, preferences, time discount rates, integrating principles and so on. Fascinating, but irrelevant, diversions into differences in 'risk perception', or exploration of various 'risk' constructs, are replaced by exploration of policy-relevant differences in probability assessments for well-specified events on the one hand and by elicitation of policy-relevant values and preferences on the other. None of this will be easy, given the vast variations in relevant competencies and desire for participation, but the attempt to disguise and/or deny these by the use of 'risk' is the easy way to ensure the continuation of the problem.

Figure 1 summarises the two approaches.

4. The Precautionary Principle vs the Best Principle

So where does the Precautionary Principle fit in? It is irrelevant. In no way does that imply that we might not want to be cautious, very cautious or even ultra-cautious in relation to some development – and be ‘right’ in this attitude. The best course of action may indeed be to (for example) stop all development of some new technique or product. But the best course of action might be to go full steam ahead with it. Or the best course of action might be to do any of the many things in between these two extremes. But there is no need for the Precautionary Principle because we already have the Best Principle. This ancient principle states that, faced by a choice between competing alternative actions/strategies/policies, in which the scenarios following from the adoption of each are characterised by a variety of uncertainties on the one hand and a variety of value conflicts/differences on the other, our aim is to identify and implement the Best of these alternatives.

I assume we are on a level playing field, so a discussion of how ‘Best’ is to be defined and the best course of action identified is no less – *but no more* - required than how ‘Precautionary’ is to be defined and how the action/s consistent and inconsistent with the Precautionary Principle are to be identified.

If we were to perform an analysis that identifies the Best course of action there are two possibilities.

The action identified as best may be consistent or inconsistent with that identified by some application of a principle such as the Precautionary one. I hope we can agree that it is inherent in the meaning of the terms that Best trumps Precautionary if the two are different. And that, if they are always the same, there is no need to use the Precautionary Principle.

Since the proponents of the Precautionary Principle are presumably suggesting that it will lead to the adoption of the Best course of action (in the circumstances where they urge its application) why don't they simply argue for the Best Principle? Why, indeed, should anyone suggest that we follow the Precautionary Principle instead of the Best Principle? The only reason I can come up with is that people realise that it is *very* difficult to set up a procedure which identifies the Best course of action and prefer to try (unsuccessfully) to evade this task by convincing themselves that some other principle is appropriate. But logically no other principle can outrank the Best principle and neither normatively nor politically can one see any authority trying to justify not following it, if asked.

Isn't it virtually a tautology to argue that policy decision making must identify and implement the best course of action? No it isn't, if some other principle is advanced which claims to be an alternative and, by implication of its very advancement, superior – to be better than the Best.

The clinching argument is as follows: To see whether being 'Precautionary' is the Best course of action we have to define operationally what being Precautionary involves – which action/s is/are in line with the principle and which isn't/aren't. In order to do that we will have to do an analysis of the various possible courses of action. So we can't decide *how* to be precautionary without doing the same analysis that is necessary to identify the Best course of action.

5. The European Commission's Guidance on the Precautionary Principle: the Best Principle heavily disguised?

In February 2000 the European Commission issued a discussion document on guidelines for the application of the Precautionary Principle. (European Commission 2000) According to this communication:

Where action is deemed necessary, measures based on the precautionary principle should be, *inter alia*:

- *proportional* to the chosen level of protection,
- *non-discriminatory* in their application,
- *consistent* with similar measures already taken,
- *based on an examination of the potential benefits and costs* of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis),
- *subject to review*, in the light of new scientific data, and
- *capable of assigning responsibility for producing the scientific evidence* necessary for a more comprehensive risk assessment.

It has been suggested that in this definition, the Precautionary Principle is 'risk-oriented', in that it requires an evaluation of risk research including cost-benefit considerations. But in terms of my distinction between the Risk Approach and the Decision Approach the EC interpretation of the Precautionary Principle as embodied

in these six criteria is *not* clearly ‘risk-oriented’. In fact, in my preferred reading of the six guidance criteria, taken in isolation from the rest of the document, it is very much in line with the Decision Approach.

How? Because I believe the six criteria can be reduced to one, criterion 4. Criterion 4 is the only one of independent substantive significance and it captures the essence of the Decision Approach and the Best Principle. We can subsume criteria 1-3 on the grounds that they are covered in 4, when the latter is defined as requiring (as prescriptively it does) the consistent use of the same (appropriate) ingredients in all decision/policy analyses. We can eliminate criterion 5 on the ground that it is unnecessary insofar as all measures should be provisional and subject to revision in the light of new data. And we can eliminate 6 on the ground that it is both off the substantive point and inconsistent with criterion 4, insofar as the ‘comprehensive risk assessment’ is confined to the health impact of ‘the problem’, rather than the full range of consequences of ‘the (proposed) solutions’.

On the other hand, it is clear that the Commission document *as a whole* is very much in the grip of the Risk Approach. From the extracts which follow (with little further comment) the reader will be able to see that it unquestionably affirms the distinction between, and chronological ordering of, risk assessment and risk management. In practice - because of its concentration on ‘the problem’ and its attempt to engage in ‘risk characterisation’ – this distinction and ordering does *not* ensure the distinction between ‘scientific evaluation’ and ‘(political) decision making’ which the Commission rightly holds dear. In upholding the chronological location of risk assessment before risk management it misses the opportunity to ensure that the research (scientific and other) is done in a decisionally-relevant rather than (or as well as) scientifically-relevant way (i.e. relates to all scenarios emanating from possible interventions and not just those emanating from ‘the problem’). And, most worryingly, it strongly endorses the view that scientists should pre-empt value judgments that should be the prerogative of society and its decision makers by being cautious, or ‘incorporating prudential aspects’ in *the interpretation of their data*.

“There is a controversy as to the role of scientific uncertainty in risk analysis, and notably as to whether it belongs under risk assessment or risk management. This controversy springs from confusion between a prudential approach and application of the precautionary principle. These two aspects are complementary but should not be confounded. The prudential approach is part of risk assessment policy which is determined before any risk assessment takes place...; it is therefore an integral part of the scientific opinion delivered by the risk evaluators. On the other hand, application of the precautionary principle is part of risk management, when scientific uncertainty precludes a full assessment of the risk and when decision-makers consider that the chosen level of environmental protection or of human, animal and plant health may be in jeopardy. The Commission considers that measures applying the precautionary principle belong in the general framework of risk analysis, and in particular risk management.

The precautionary principle should be considered within a structured approach to the analysis of risk which comprises three elements: risk assessment, risk

management, risk communication. The precautionary principle is particularly relevant to the management of risk. The precautionary principle, which is essentially used by decision-makers in the management of risk, should not be confused with the element of caution that scientists apply in their assessment of scientific data. The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty.”

We are given hope that these amazingly confident declarations about who is confused about what might be revisable (when their in-built incoherencies are pointed out):

“... the Commission wishes to stress that this Communication is not meant to be the last word”

but unfortunately it appears to be resolutely hooked into the Risk Approach:

“rather, it should be seen as the point of departure for a broader study of the conditions in which risks should be assessed, appraised, managed and communicated.”

6. The Precautionary Principle: right diagnosis, wrong treatment?

The Precautionary Principle may be seen most positively if it is interpreted as a misguided attempt to overcome the limitations and biases of the Risk Approach. It is misguided because it fails to identify and address the key pathologies at the heart of that approach – the mutually supportive concepts of ‘risk’ and ‘science-based policy’.

Tickner et al (Tickner et al. 2000?) illustrate this point very well. They actually speak of setting the Precautionary Principle within a ‘decision tree’ but this is simply a set of steps that recall the Risk Approach to ‘the problem’ or ‘the threat’:

- Identifying the possible threat and characterising the problem
- Identifying what is known and what is not known about the threat
- Reframing the problem to describe what needs to be done
- Assess alternatives
- Determine course of action
- Monitor and follow up

Anchored in the ‘assess the risks of the problem’ approach, when they do go on to talk of considering ‘the unintended consequences of proposed alternatives’ these are still very much consequences associated with ‘the problem’ (e.g. pesticide spraying or waste landfilling). Attention is concentrated on the problem-related harms, rather than the overall impact (health and non-health) of each solution. On the other hand the desire to bring in wider considerations is a major advance on the traditional Risk Assessment/Management approach.

However, if they are right and ‘Risk Assessment provides an air of quantitative, technical sophistication to inexact, assumption-laden and politically –driven science’ then the answer is not to abandon quantitative, technical sophistication in policy analysis, but to clear the air of the misinterpretation of what good quantitative technical analysis can achieve. Formal quantitative analyses are given an ‘air of sophistication’ mainly by their *consumers*, not by their producers, at least not those of the latter who have no connection with vested interests. Most such analysts are very happy to expose and admit the flaws and limitations of their explicit and transparent analyses and claim only that they are *comparatively* superior to the alternative - conventional untechnical, qualitative discursive procedures that are even more open to covert manipulation by powerful interest groups. The fact that analysis is not perfect is the weakest of all arguments against it, because perfection is not on offer.

Tickner et al. are pessimistic about widespread public participation in either scientific analysis or decision making and see it as ‘legitimising a pernicious process’. If the attempt to communicate with the public is about ‘risk’ then we agree that it will indeed be a waste of time and possibly pernicious, since there is no way the public views about ‘risk/s’ (as opposed to their views on individual components of decisions) can be entered into an analysis of policy options.

If analysis, like the hammer and other tools, has been and is abused or misused, the answer is not to seek to replace poor or biased (value-laden) analysis by some non-analytical process that can even more easily and much less transparently be abused or misused. The answer is to ensure that decision analysis is carried out openly with the aim of determining the best course of action. This process will expose very clearly the extent of ‘scientific uncertainty’ and value conflict within society and ensure that these two fundamental characteristics of every policy decision must be addressed ‘full frontally’. That is what the currently disempowered should be seeking.

Once we have re-conceptualised the Risk Communication problem as the Decisional Communications opportunity we are making progress towards a transparent and accountable democracy. A democracy where the multiple complexities of policy making, including the way in which conflicting beliefs and values are dealt with, are brought into the open, as opposed to being obscured up within and by the language of ‘risk’ and ‘science-based policy’. We will have made a giant step towards acceptance that there is no such thing as the right policy, only a policy which is Best in relation to some weighted set of beliefs and values.

7. The soft Hard Approach vs. the hard Soft approach

In sum, my basic argument is that we must increase the analysis-to-intuition ratio (Hammond 1996) if we are to arrive at the Best course of action and do so transparently and with due accountability.

The decision analytic model in its variety of manifestations and implementations and in association with causal web modelling provides the necessary vehicle to support this move. The quality and power of the software essential for this support task is

expanding rapidly, both in the form of specialist commercial programs and the variety of purpose-built programs attempting the more ambitious task of modelling multiple trajectories for multiple parties at multiple levels, with or without multiple criteria. These programmes are unapologetically quantitative in orientation, processing and output, a reflection of the underlying assumption that the Best course of action must be the one that ranks higher than any other on some *quantitative* scale, however multicriterial and complex. They represent what might be called the soft Hard approach to policy making. In contrast many (Ravetz 1998, Rosenhead and Mingers 2001) see the future in 'soft systems' qualitative modelling - the hard Soft approach if you like - and regard the soft Hard approach as appropriate to a bygone era, within

... a general 'Fordist' paradigm of rational planning by neutral administrations. Many areas of public life are now in a transition into a more 'post-Fordist' era, where decisions horizons are shortened, sectoral boundaries have dissolved, and rational strategic planning has shifted towards entrepreneurial partnerships, dialogue and 'enablement'. In this context, decision makers and other stakeholders are sceptical of integrated modelling, which is costly, vulnerable to all the problems above [structuring, data, trust, equity, etc.], and distracts attention from the practical agenda. (Ravetz 1998, p151)

But these objections are eminently contestable. Judgments of what is 'costly' are notoriously a function of one's own technological position in the policy 'industry'. *All* decision technologies are vulnerable to the problems identified and dialogue based on qualitative methods usually 'solves' many of them only by omission. Finally, while 'hard' modelling may indeed seem to be a distraction from the practical agenda of those absorbed with developing short term 'entrepreneurial' partnerships, this may be its prime function - providing a check on the knowledge and competency claims of the partners, both individually and collectively. It does so both in their own interests (exposing their inherent biases and short-termism) and in the interests of those affected by their actions who have not been able to be registered as stakeholders. So if programs like ISCAM and NAIAD (European Commission 1996), are offered as 'a tool for a method of structured qualitative discussion, exploration and consensus building, for definition of both problems and solutions' then those such as POHEM (Wolfson 1994) and PREVENT (Gunning-Schepers 1989) can be legitimately interpreted as 'tools for a method of structured quantitative discussion, exploration and clarification of consensus and dissensus, for evaluation of alternative solutions.' But whichever approach is adopted the Best Principle is the best principle.

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