Technological risk, participation and deliberation. Some results from three Italian case studies

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Abstract

Participation is a major issue in environmental research and policy. PRISP, a cross-national inquiry on people's orientations about chemical risks, offered the opportunity to investigate some aspects. In two Italian case studies, interest was focused on the relation between experts and lay people and the function of participation. A key objective was to explore people's opinions about deliberative democracy. This is a currently much-debated alternative to the prevailing 'strategic' forms of democracy, based on the aggregation of preferences or bargaining among conflicting interests. Is there a role for an open confrontation aimed at reaching the common good? Results show that public interest is highly rated, participation is mainly connected to citizenship and understood as a form of co-operation. In a third case study, interest was focused on the analysis of a specific form of collective action according to the 'critical mass', rational choice model. In this case it is argued that a small group of citizens may reduce the costs of starting-up a collective action aimed at pursuing the preferred social goals, i.e. at governing public goods.

1. Introduction

PRISP, a cross-national research concerning people's orientations about chemical risks, was carried out between 1996 and 1998 and included three main phases. Two of them used qualitative techniques (semi-structured interviews and focus groups); the third one included quantitative surveys using structured questionnaires. The research design was based on a tight integration between these phases. However, in this article we only deal with some results of the Italian survey.

Three cases were chosen. The first two are different examples of communities affected by significant chemical hazards. One is a small town (less than 4,000 residents) called Torviscosa and located in the Friuli-Venezia Giulia Region, in the North-Eastern part of the country. It is one of the rare Italian examples of 'company towns', developed around a chemical plant, whose history dates back to the Thirties. The other is Marghera, a big industrial site very close to Venice. Its development dates back to the Twenties and it presently hosts several hazardous chemical plants. About 30,000 persons live around the site.

The third case concerns Monfalcone, a highly industrialized town (40,000 residents) located not far from the Slovenian border. For the first time in Italy, a process of public consultation and negotiation developed around a project having a significant environmental impact (the construction of a methane terminal). This provides the Monfalcone case with a specific interest.

2. The survey in Marghera and Torviscosa

The questionnaire used in Torviscosa and Marghera included a section shared by the three National surveys (Italy, UK and Spain). It was administered by trained interviewers. The sample groups were composed of 200 individuals in each community. They were selected randomly from the electoral lists (age between 18 and 70). The sampling was carried out so as to take into account the gender distribution in the populations of the different communities. The actual composition was 101 males and 99 females in Torviscosa, 101 females and 99 males in Marghera. In both cases, the level of statistical error in the sampling is about 7%. The age structure of the samples is slightly different. In Torviscosa, elderly people prevail (45.5% of the subjects are 51 or older), whereas in Marghera they are exactly one third of the sample. The educational level is a bit higher in Marghera. As often happens, there is an inverse proportional link between age and school education: the older the persons, the less educated they are. The Pearson correlation coefficient between the two variables is .592.

A significant part of the questionnaire was devoted to participation and decision processes, and in particular to three aspects linked to the issue of deliberative democracy:

1) the relation between experts and lay people;
2) the function of popular participation in the decision process;
3) the role of public deliberation and nature of the decision process.

The concept of deliberative democracy is the object of an intense debate at social, political and philosophical level [1]. The basic idea is that there is an alternative view to the traditional, 'strategic' approaches to democracy [2]. From the deliberative viewpoint, democracy must go beyond a mere bargaining among, or aggregation of, conflicting interests. Rather, it can be seen as an association of citizens whose affairs are governed by public deliberation, meant as free and open confrontation between arguments, aimed at reaching the common good. The arguments have to be presented, in order to defend a preferred solution to a problem, and through discussion people can refine or change their own opinions. The result should be a more reasoned solution, thus more legitimate and stable, and better in quality.

Supporters of strategic democracy maintain that deliberative democracy is largely a utopian perspective, abstract and detached from current practices of governance. Supporters of deliberative democracy object that, although models like Habermas's Discourse Ethics [3] clearly outline only ideal situations, they nonetheless offer significant points of reference to which concrete institutional designs should be addressed. Moreover, deliberative models would be of paramount importance in highly controversial situations, where strategic designs, rather than solving, often exacerbate the conflict [4]. For instance, proposals of 'compensating measures' [5] for undesired industrial siting sometimes produce angry reactions. They miss the terms in which the controversy is understood by the local community. Supporters of deliberative democracy maintain that an open discussion could ward off this kind of situation. Of course, one crucial point is the extent to which people actually believe in the possibility and utility of discursive models of risk management and are ready to enter public debate. This was precisely the issue addressed by the part of the PRISP survey on which we shall briefly comment.

2.1. Participation: concept, goals and entitlement

What is participation, what are its goals, and who is entitled to participate, are different but not independent aspects of the same issue.
Participating means either co-operating to carry out a task, or being among those who decide; or else, engaging in a collective action aimed at influencing decisions. The first meaning refers to the fulfilment of a role, the contribution to a collective goal; the second refers to the capability of influencing decisions, from within the decision-making circle; the third to the capability of influencing decisions from the outside [6].
A major portion of the samples makes reference to the first meaning of participation. Both in Torviscosa (about 49%) and Marghera (about 41%), participation is principally described as a form of co-operation. The least chosen perspective is the second one (about 20%), while the third meaning is less significant than could be expected (around 25%). In Marghera there is a higher percentage (12%) than in Torviscosa (5%) of persons that are either unable (or unwilling) to choose among the proposed meanings of participation. These results seem interesting. They emphasise that participation in decision-making processes is not seen as a form of direct democracy, but rather as a form of collective engagement in the task of solving a common problem. This, remarkably, is consistent with a strong point in the deliberative democratic theory, which conceives public deliberation as a means of making people active members of their community. Therefore, when asking to participate, many persons are probably not asking for supremacy of 'popular will' to the detriment of representative democracy and technical advice. They are asking for more involvement, for the possibility of providing their own contribution to a collective process of deliberation and decision-making. This is a significant point for policies that aim at encouraging deliberative designs for decision-making in the field of chemical hazards. Moreover, the 'co-operative' meaning of participation appears linked to age and level of education. The lower the age and the higher the education, the higher the level of consensus towards this idea of participation.

What is the purpose of participation in the decision-making processes concerning chemical plants? In theory, there are two main goals of participation [7]. The first one is that of ensuring the transparency of the decision-making processes. Participation is a means of monitoring decision-making. This is the purpose more frequently associated with democratic participation. But environmental and technological debates have highlighted another goal - to provide room for the local people's lay viewpoints, knowledge and insight, and in this way, to enhance the quality of decisions. As already hinted, the promise of deliberative democracy lies in the ability of an enlarged discussion to provide better and more legitimate solutions to problems [8]. The interviewees' opinions confirm that both aspects are significant. In both samples, people maintain that the importance of participation is mainly linked either to the purpose of monitoring the decision-making processes or to the goal of enhancing their quality. The first opinion prevails (more than 50%), but the other is also widely supported (about 40% in both samples).

An important point was in understanding the interviewees' opinions about the subjects entitled to participate in the decision-making processes on the siting and management of chemical plants. Who are those subjects, besides experts and

regulators? The interviewees could choose among three answers. Legitimacy to participate in the decision-making processes may be limited to the subjects directly involved in the problem, that is, those living in the affected area. On the contrary, the subjects entitled to participate may be those who represent the interests of a broader community (e.g. the environmental associations). In this case, the source of legitimacy is 'representation', not at the level of representative democracy (the questionnaire explicitly excluded public authorities) but at the level of civil society. A third answer links legitimacy to citizenship. Everyone, as a citizen, is entitled to take part in the decision-making processes. Italian environmental regulations assign a role to each of these conceptions of legitimacy [9].

About 50% of the interviewees choose the third answer: citizenship is the most highly emphasised source of legitimacy. The remaining halves of the samples are split between the two other answers. This result is interesting. From people living close to major accident hazard sites, one would have expected a marked preference for direct involvement as the source of legitimacy. This suggests that issues related to major chemical hazards are mainly perceived as 'big', 'common' problems, involving a broader public than the directly affected persons. The latter may of course take part in the decision-making processes, but only as citizens expressing widely shared concerns, rather than 'narrow', selfish interests.

Linked to the problem of legitimacy is that of delegation. In many situations, direct participation is difficult if not impossible for most people, because of the lack of resources (time, competence etc.) or legal obstacles. This raises the problem of trust. Generally speaking, when we are confident that someone will represent our interests and viewpoints, our trust can be based either on interpersonal relations, or on a previous experience with a collective actor, or else on a kind of 'systems' trust [10]. In this case trust is grounded on that subject's social value (competence, fairness, good will etc.) according to his/her reputation, formal qualifications and so on. The list proposed in the questionnaire - including the mayor and the town administration, environmental associations, independent experts, plant managers, health authorities, emergency services, unions, newspapers and other media, political parties, grass-roots citizens' groups - allowed the interviewees to distinguish only indirectly between these kinds of trust.

The subjects felt as better representatives in the decision-making processes on hazardous plants are ranked in a somewhat different way in the two samples, even if the overall evaluation is similar. In other words, the subjects considered as good representatives are the same, but in Torviscosa the highest level of confidence is assigned to health authorities, in Marghera to environmental associations. Independent experts and town administrators score higher percentages of indications in Torviscosa; the opposite is true for emergency services. It is worth noting that the 'groups of citizens' answer does not score high percentages in both samples, and that the same is true of political parties, unions and the media; on the contrary, the percentages of indications of plants' managers is among the highest in both samples.

The differences between the two communities may depend on different experiences with these actors. What is significant is that similar criteria seem to be applied in both cases for distinguishing between those who might or might not be good representatives. Attributes such as technical competence and independence from specific interests seem to play a role in

making someone a 'good representative'. However, these are general qualities that may be attributed to different subjects, according to one's own experience.
These findings may be linked to those obtained by asking the interviewees to evaluate their trust in the information on safety measures or accidents coming from different subjects. The resulting differences (e.g. managers and town administrators are seen as good representatives in decision-making processes but not as good providers of information) suggest that trust is assigned with reference not simply to someone's 'abstract' qualities, but to specific issues and contexts, on the basis of past experiences. This seems a 'reasoned' rather than a 'systems' trust: actual behaviour is more significant than formal attributes and roles.

2.2. Public reason and the decision-making process

As mentioned above, a primary goal of the survey was to understand the perceived role of public motivations in decision-making on chemical installations. We may distinguish different aspects of this issue.

1) A first aspect concerns the relation between the substance and the process of deliberation and decision-making.
2) A second one concerns the role that interests and values play within these processes.
3) A third one concerns the relation between democracy and decision-making efficiency.
4) A fourth one concerns the relevance of public reasoning within decision-making processes and its relation with trust and individual interest.

As already hinted, according to the deliberative democratic theory, discursive procedures play an important role not only in legitimating the outcomes of deliberation but also in increasing their quality. This happens because, through the practice of debating and confronting different viewpoints on a problem, new and better perspectives are likely to arise [11]. Therefore, we tried to understand whether people consider the way decisions are taken as essential for reaching 'good' solutions.
In the decision-making processes concerning hazardous plants, what is most important is the content of choices or the democratic method of choosing? In both samples, people are almost equally divided between the 'decision-oriented' and the 'procedure-oriented' position. More precisely, in Marghera the percentage of decision- vs. procedure-oriented individuals is 51% vs. 46%; in Torviscosa, it is 47% vs. 50%. There is a relation between a procedure- or decision-oriented opinion and age. However, while in Torviscosa procedure-oriented persons are younger individuals, in Marghera the reverse is true. The relation with the level of education is clearer. In both samples, people with lower school education are proportionally more procedure-oriented, while people with higher education are proportionally more decision-oriented.

The situation in Torviscosa and Marghera is partially different as regards the role of values and interests in the decision-making processes. Technological issues often involve different levels of conflict. The first one is that of the material interests (jobs, services etc.). The other is that of the underlying conflicts of values (economic growth vs. conservation of nature, occupation vs. safety, technical or political evaluations vs. people's right to self-determination, etc.). The prevalent opinion in both samples is that defending values and principles is more important than defending

material interests, although legitimate ones. In other words, what is at stake in decision-making processes on chemical plants, is not simply interests, but also and above all, values. This is by a wide margin (81 %) the interviewees' position in Torviscosa, while it is the opinion of less than two-thirds (63%) of the interviewees living in Marghera. There is no simple way to explain this difference. The bivariate analysis does not show any significant distinction between the two samples. We can see in both cases that males and younger individuals are proportionally more in favour of interest-oriented decision-making processes. What is significant is the wide preference for value-oriented decision-making processes. This suggests that an exclusively interest-oriented approach to risk tolerance does not catch the other possible level of conflict. If decisions are to be seen as fair and legitimate rather than imposed, one should take into account that risk issues are often multi-faceted.

Another point concerns the relation between democracy and efficiency of decision- making processes. The debate on environmental and technological issues has focused in recent years on what we might define the conflict between two paradigms [12]. One is 'ecological modernisation' [13], according to which sustainable development can be obtained by means of continuous technological growth. Sustainability is technology-based; the only way to escape present dangers is to further encourage scientific rationality. The other paradigm is 'reflexive modernisation' [14], according to which major technological hazards imply a substantial change in the nature of scientific enterprise. Radical uncertainty in the definition of problems and solutions is linked to the complexity of phenomena, the interaction between nature and technology, the intertwining of technologies. Radical uncertainty calls for a different way to conceptualise the role of science and expertise, the purpose of environmental and technological policies and the relation between science and local knowledge [15]. The reversibility of choices gains major relevance. Policy design and implementation should be grounded in guiding concepts such as the 'precautionary principle' [16], or the idea of the 'co-evolution' of social and environmental systems [17].

We tried to partially translate this debate into a question presenting two criteria for decision-making. Is it more important for choices to be timely or reversible? In other words, which is better: a potentially controversial but rapid decision, or a more in-depth debate aimed at reaching a solution without irreversible consequences? A contrast is suggested here between two ways of conceiving the effectiveness of decisions. Either effectiveness is dependent upon timeliness, or it is dependent upon prudence. Our question referred to the siting of chemical plants (which is obviously different from emergency situations).

Both in Torviscosa (about 60%) and in Marghera (about 70%), most of the interviewees believe that reversibility of choices is more important than timeliness. This represents a strong point in favour of the precautionary principle as a guiding rule in this field. Younger and more educated persons (as already noticed, in our samples age and education are inversely linked) are proportionally more oriented towards reversibility.

At a theoretical level, public reasoning is the distinctive feature of deliberative democratic decision processes. But is the role of debate and public reasoning recognised by people? Two sections of our questionnaire allow us to understand this point better. The first one deals with the role of deliberation as

a form of public reasoning, by comparing it with trust in the reliability of technical norms, expert advice and public controls. When a chemical installation is authorised one can assume that, until proven otherwise, the plant will comply with adequate safety standards. On the contrary, one can require that experts and authorities provide evidence demonstrating that the installation is safe. Of course, if the debate is to be truly public, this evidence must be comprehensible to lay persons.

Both in Torviscosa and Marghera people broadly support (about 80%) the second position. Age, education and other social-demographic aspects do not show any clear relevance. In other words, the interviewees generally look at public deliberation as the correct democratic way of making and implementing such significant decisions as those concerning chemical plants. This suggests that deliberation is not necessarily to be reserved to 'higher' decision-making levels (parliament etc.). We were unable to understand whether this result depends on actual appreciation of public deliberation or mistrust of public authorities. However, the latter possibility should not be overemphasised. Researches show that mistrust is often linked not to institutions and authorities in and of themselves, but rather to concrete experiences, to particular subjects acting within, and in the name of, various institutions. This is typically the case of technical authorities [18].

The significant role assigned to public deliberation is confirmed by another section of the questionnaire. This time the interviewees had to express their opinion about the grounds of people's consensus on decisions concerning chemical plants. Deliberative consensus, based on public argument, was contrasted with two other sources of consensus: namely, trust in decision-makers and supply of economic compensations. Reason plays a different role in the three cases. We may use our reason in order to pursue our own interest, or to look for reciprocal understanding in view of the common good. Reason certainly lies also behind trust. As we have already observed, trust may be based on previous experience of someone's reliability, fairness, and good will. However, trust is also - sometimes mainly - based on emotional components. When I trust someone, I bet on his/her trustworthiness [19].

The prevalent opinion among the interviewees is in favour of a deliberative meaning of consensus. The figures are fairly similar in both samples. About one half of our samples underwrites the first option - people's consensus is based on the reasons provided in order to justify a decision. About a quarter of the interviewees choose the second option - consensus is based on the trust that citizens put in institutions. Only about 15% choose the interest-based explanation of consensus, while 9% thinks that in this area people's consensus is not necessary. The bivariate analysis shows some interesting relations. The deliberative interpretation of consensus is stronger among younger and more educated individuals. The older the people, the more they underscore the trust-based explanation. The less educated the people, the more they underscore the interest-based explanation. The 'consensus-is-not-necessary' position seems proportionally more diffused among elderly and less educated individuals.

To sum up, trust plays a significant role in providing people's consensus on decisions, but not the most important one. Moreover, most of our interviewees think that interest satisfaction is not a solid ground for consensus (the reduced role of the economic dimension is confirmed by other results,

not discussed here). Public deliberation plays a major role. This has significant policy implications. Risk tolerance seems significantly linked to democratic methods of decision-making.
However, the practical implications of the relevance given to deliberative democracy must not be overemphasised. Public reasoning and participation are highly rated in principle. But responses to other questions showed that only a small group of interviewees maintains that people's involvement in the decision-making represents a major goal, when it is compared to the (alleged) warranty of effective safety measures or reduced polluting emissions. Does it depend on the confidence in the experts' competence or on the persuasion that laypersons cannot really enter their discursive space? The questionnaire did not explore this point. However, rather than of a strong demand, it is perhaps appropriate to speak of a remarkable 'reservoir' of consensus towards public deliberation. This potential - as our results suggest - may influence significant aspects of issues related to major hazards, such as risk tolerance, trust, perceived legitimacy of environmental policies and of decisions on individual cases.

2.3. Summary of findings

From the preceding discussion some points can be summarised. Against a 'narrow', interest-based interpretation, the idea of participation seems mainly linked to citizenship. The underlying principles are: access to deliberation and decision-making procedures; centrality of 'broadly-shared' interests ('common good'). Participation is mainly understood as a form of co-operation. Participating means being involved, having the possibility to provide one's own contribution to a collective process. The goals of participation are twofold: the monitoring of decision-making processes and the improvement of the quality of solutions.
Risk tolerance seems linked to a deliberative management of value conflicts. The level of trust may differ according to 'local' variables. Technical competence and independence from particular interests are significant but 'abstract' qualities, whose actual importance depends on context. We may speak therefore of 'reasoned' trust. The priority given to procedures, prudent policy-making and public reasoning highlights a sensible propensity towards a deliberative conception of risk-related democratic processes. This conception finds wider support among younger and higher educated persons. This suggests a connection between willingness to enter dialogical processes and reduction of 'deliberative inequalities' [20]. In particular, the relevance of cultural differences (often linked to economic, ethnic and other differences) [21] deserves further investigation.
The practical implications of the relevance given to deliberative democracy must not be overemphasised. Public participation is highly rated but not considered as a major goal when compared to the experts' 'technical' goals. However, this 'reservoir' of consensus towards deliberative democracy may have effects on risk tolerance, trust, legitimacy and stability of environmental policies.

3. **The Monfalcone Case**

The case of Monfalcone represents a novelty in the Italian context, because for the first time a project having a significant environmental impact was proposed as a process of negotiation between the concerned parties. The

development and result of this process highlight several points we wish to reflect upon for further analysis. These points, in short, are:

1) the identification in the case of Monfalcone of a particular aspect of the NIMBY (Not in My Backyard) syndrome;
2) a Collective Behaviour phenomenon interpretable in terms of Critical Mass;
3) the formation, during the negotiation process, of a combination of transaction (sunk) costs which were not dealt with effectively;
4) an attempt to effect a form of communication with regard to risk;
5) and finally, the possibility of identifying, through an interpretation of the development of events, an alternative model to technocratic and deliberative methods regarding environmental issues.

In this part, therefore, we will begin by briefly illustrating the Monfalcone Case (3.1), and then proceed to analyse in-depth the five themes mentioned.

3.1 The Decision-Making Process

Having predicted an increase in demand for gas in coming years, SNAM (the gas distribution company, part of the group ENI, the Italian National Board for the production of hydrocarbons) decided to develop projects for the importation of gas in liquid form. In the context of this policy, SNAM decided to propose the construction of a methane gasification terminal in Monfalcone, in the province of Gorizia, some 30 kilometers from Trieste at the north-eastern border of Italy. The choice of this location derived from the following conditions: Monfalcone is close to a thermoelectric plant which could be methanised; this city is moreover at the beginning of the Po Valley, that zone of Italy which is most involved in natural gas consumption; it is close to the gas pipelines which ensure effective links with distribution zones; it possesses a port to receive ships which transport natural gas; and it is adjacent to an industrial zone which can support the network of dependent companies that are linked to the construction of a methane terminal.

In 1985 an accord was stipulated between the major international petroleum companies (among them the Italian AGIP) and the Nigerian National Petroleum Corporation (NLNG) for the exportation of Nigerian gas in liquid form (GNL). Ten years later, and precisely on 27 June 1995, SNAM indicated publicly that it intended to construct a re-gasification terminal in Monfalcone. On 24 July of the same year, SNAM presented a feasibility study of the project. In December of 1995, the city of Monfalcone declared that it intended to analyse the project carefully and participate in the drafting, submitting the final product for eventual approval in a consultative referendum. In February 1996 an evaluation of the environmental impact of the project was initiated, while in the meantime a 'No Terminal' committee was formed, as a grass-roots movement which had as its objective the non construction of the facility in Monfalcone, given the ecological and safety risks connected.

In the meantime the environmental impact evaluation procedure suffered repeated delays. In June 1996, SNAM issued an ultimatum to the city of Monfalcone, which had to make a decision by September. In July of the same year SNAM made a proposal to the city of Monfalcone. The company committed itself to assuming a series of compensating expenses towards the realisation of the plant with regard to the clean-up and beautification of the city. In

August the city announced that it would hold on 29 September 1996, a consultative referendum to approve or reject the SNAM proposal; furthermore, the city administration committed itself to respecting whatever result of the vote. In any case the polls seemed to indicate a victory for a 'yes' vote on the construction of the plant. At the beginning of September, a poll indicated that 36.6% of the electorate intended to vote yes, 34% intended to vote no, 22.9% was uncertain, and 6.5% would abstain. Several days later however, another poll indicated 29.5% intended to vote yes, 29.1% no and 31.1% was uncertain, with 9.3% abstaining. The referendum of 29 September 1996 rejected the SNAM project. Some 63% of the electorate showed up at the polls to vote, and 62% of the voters opted for a 'No' vote. With respect to the polls, it seems that in the end all the uncertain voters opted for a 'No' vote. On 16 October 1996 the city of Monfalcone ratified the 'No' result of the referendum, and the SNAM project was shelved.

3. 2 The NIMBY Syndrome

The process of negotiation which took place in Monfalcone has been analysed using the following methodologies:

- in-depth interviews with qualified witnesses;
- analyses of press coverage [22];
- focus group with participation of the principal stakeholders;
- survey through the submission of 200 questionnaires to a representative sampling of the population.

As has been already said, there emerge from a reading of the data several rather significant points to consider in analysing decision-making processes of an environmental character and the theme of public participation in those processes. The first point that I intend to analyse regards a particular manifestation in Monfalcone of the well-noted NIMBY syndrome, related to the installation of facilities characterised by a significant environmental impact.

The NIMBY syndrome, in short, is a form of particularism on the part of the local population in a determined area, who refuse to bear the costs deriving from the environmental impact of an initiative, even in the face of benefits of a universal nature. In the case in question, this syndrome derived from the fact that the use of methane for energy production purposes, in the context of Italian society, represents a significant theme for the possibility of a sustainable and ecologically- oriented development. As has been noted, Italy has in fact rejected, through a national referendum held after the Chernobyl affair in 1987 - the use of nuclear power stations, with the consequence that methane represents a 'clean' and economically efficient alternative. The peculiarity of the NIMBY syndrome in question, however, was that the division between particularism and universalism cut through the same environmental movements. While in fact Legambiente (League for the Environment), the largest Italian environmental movement linked to the DS (Left Democrats, the former Communist Party) was favourable to the installation of the facility in the name of national economic development needs, other movements, like the WWF, Greenpeace, and the Greens (the environmentalist party) and a local circle of the same Legambiente were opposed to the SNAM project.

This division can be interpreted in light of a well-noted difference [23] between movements and institutions. According to this theoretical model, there exists a profound difference between the behaviour of a collective movement at

its inception, when it is strongly oriented towards the issue that it intends to address (a one-issue movement) and a collective movement which has undergone a process of institutionalisation, becoming more oriented towards issues that are more general than the ones for which it was born. Certainly this factor had a significant effect, but it does not explain how a population which had always voted for left-wing parties then contradicted itself on the approval of the terminal, given the collective benefits at the national level.

This decline in voter-trust with regard to their traditional political representatives can probably be explained by a particular type of risk perception on the part of the local population. The SNAM project debate, in fact, was at first only marginally framed in terms of a cost/benefit relationship at the economic level (as we shall see in a successive point), without taking into consideration in an in-depth manner the risk factor. The perception of risk, instead, emerged clearly for a large part of the population only immediately before the referendum. In fact, from the survey conducted it is clear that 20.5% of the population interviewed learned of the risk connected with the facility (essentially deriving from fireball effects and the potential for fires aboard transport ships), only shortly before the referendum, while 36.5% of those interviewed, was actually informed about this risk only during the submission of the questionnaire. The majority of the representative sampling (57%), as a consequence, did not know about the risk factor. Moreover, those members of the population who declared themselves aware of the risk factor from the beginning of the negotiation process (42% of the sampling), indicated the company itself (SNAM) as their source of information in only 59% of the cases.

These data can be interpreted in one way. An immediate perception of the risk factor by a numerically significant component of the population (20.5%), that is, one not filtered by debates and expert testimonies on the possibilities for a reduction of accident risk linked to the planned facility, probably provoked the inversion in tendency of the vote which falsified the public opinion polls. This could explain the last-minute decision of those uncertain voters who opted for a No vote on the facility. The NIMBY syndrome became evident therefore when the risk factor emerged suddenly in the debates for one-fifth of the population. All this reveals an unsatisfying aspect of the negotiation process initiated in Monfalcone, a tendential exclusion from the debate by the actors proposing the project of those elements not predictable in strictly economic terms, elements such as risk, whose value cannot be converted into a price.

3.3 The 'No Terminal' Movement as 'Critical Mass'

According to the principles of the 'Rational Choice Approach', there exists an inversely proportional relation between the heterogeneity of a group and the desirability of a good [24]. In the case in question therefore, while there existed a varied coalition of interests in favour of the facility's construction (SNAM, local economic forces, local administrators, Legambiente, etc.) there were instead several individuals with a strong interest in blocking the facility, capable of organising themselves in an effective manner as a small group. This small group of agents who collaborated and initiated a cooperative regime among themselves, bearing the initial organisational costs (time, effort, money, etc.), is defined at the theoretical level as 'Critical Mass'. Critical Mass therefore consists of agents that are rich in resources (time, motivation, commitment, organisational capacity) utilised to initiate a

cooperation (collective action) who bear the start-up costs and seek the support and contributions of other actors in order to progressively increase the probabilities of success. Using technical language (which we will anyway explain immediately) Critical Mass results in a collective action characterised by a function of increasing production. A function of increasing production is the fact the start-up costs for the initiation of collective action are high, but successive contributions will be capable of increasing in a proportional manner the probability that the good will be delivered, in this case, that the facility will not be constructed. Given that, as we have seen, start-up costs are high, they must be borne by a large contributor or by a cartel of contributors in agreement who constitute a small group. The success of collective action, in this case, once start-up costs are covered, depends in a directly proportional fashion on the number of agents who take part. The higher the number, the greater the probability level of success. If, therefore, that type of good (blocking an industrial facility at risk) is sought after by a combination of actors, the lack of surplus (the need for a greater number of resources) requires the involvement of a greater number of agents working towards the same objective.

In the case under consideration (as in many other cases of collective action of an environmental nature), it is believed that a small group of persons possessing equal thresholds, corresponding to equal risk levels, and bound together by homogeneous values and interests, began a series of actions, bearing the initial costs of the enterprise. By threshold, in this case, we intend precisely the number of actors who must participate in an action before an individual, that is, before which that individual will not participate. The first group of activists (7 persons) who founded the No Terminal committee were constituted by agents possessing a O threshold. Persons, that is, who mobilise independently of the mobilisation of other actors. We can define this first group as the *innovators.*

A second group of actors, desiring to profit from the occasion for various motives (politics, ideals, etc.) make up the first *adopters.* In the case in question this group was made up of political subjects (Reconstructed Communists, the Green Party, etc.) and their supporters, determined to block the SNAM project. The first adopters possess a threshold of 1 (that is, they mobilise only if an initial group has borne the start-up costs).

A collective movement however, enjoys success, and reaches therefore the desired good as an objective, only if it manages to involve other actors possessing a threshold above 1.

In the case of Monfalcone, success was achieved by involving a second, much larger group of actors definable as *a first majority.*

By first majority we mean a group of actors possessing a threshold of 2, that is, a group ready to mobilise only if a smaller group of innovators has borne the start-up costs, and a larger group of first adopters has supported this action in the name of specific interests. The early majority is mobilised by more abstract factors, being ideological, cultural, etc. In the case under consideration in Monfalcone, the first majority was probably made up of persons possessing a sufficiently elevated ecological sensitivity. Such an attitude emerges in the survey above all from the identification of several social groups (mostly middle and high school teachers) equipped to a significant degree with post-materialist values [25]. These persons, very probably, expressed their opposition to the SNAM project even at the public opinion poll level, beyond performing their proselytising activities. For these two reasons, the first majority can also be defined as composed of a particular type of supporters called solidaristic supporters.

Solidaristic supporters, in fact, mobilise without having specific and negotiable interests for the achievement of a desired objective.
If the achievement of a first majority already represents a success for the collective movement, in the case in question the success of the No front against the SNAM project during the referendum can only be explained by the enlargement of the collective action movement to a second group of actors, having a threshold of 3, definable as a *second majority*. The second majority, in the Monfalcone case, represents that group of actors who determined the No victory in the referendum, and very probably was made up of those persons who were informed by the risk connected with the facility on the eve of the electoral consultation. A perception not mediated by the risk suddenly identified before the referendum therefore constituted very probably the decisive factor in the success of the collective action movement contrary to the SNAM project. Such a movement, as described, was developed according to classical rules of collective action theory, but, from the available data, achieved an unhoped-for electoral success in a difficult contest only thanks to the sudden appearance, in the debate over the installation of the facility, of the factor 'perception not mediated by technological risk'.
By way of demonstration, the attempt by the No Terminal committee to constitute itself later as a political party at the local level failed. During the local elections following the referendum, in fact, the political expression of the movement obtained only the votes of the first adopters on a practical basis. This affair explains in a rather complete fashion how the mobilisation of the first and second majorities on environmental themes, cannot be simply translated into direct political support, given the one-issue nature of environmental problems; in fact, success during the referendum (and therefore the involvement of a first and second majority) was due to the presence of a generally post-materialist culture among the first majority (the solidaristic supporters) and a particular type of perception (not mediated) by industrial risk for the second majority.

3.4 The Management of Sunk Costs

Question 13 of the questionnaire submitted in Monfalcone is connected to a series of evaluations concerning the proposals contained in the project as drawn up by SNAM. Such statements, within the context of the question, are distributed on a scale calculated to evaluate the consent of the interviewees on the following themes:

1) the presence or absence, in the project, of economic benefits for the city.
2) the approval or rejection of a hypothetical exchange between economic benefits and environmental risks.
3) the respect for the proposals contained in the project by the proponents.
4) the presence in the project's proposals of a kind of concealment of the risks and disadvantages which the population would have been subjected to.

In essence, therefore, the specific question is necessary to measure:

1) the economic acceptability of the project;
2) the acceptability of a hypothetical exchange between economic benefits and environmental risks;

3) the trust in the reliability of the proponents;
4) the trust in the information offered by the proponents with regard to all aspects of the project.

The results are as follows: the majority of those polled considered the economic benefits included in the project as advantageous for the city. 54% of those interviewed, in fact, agreed substantially with the statement that emphasizes this aspect, against a 40% who declared their partial or total disagreement.
With regard to the second point, the majority of those polled considered as unacceptable the proposed exchange between economic benefits and environmental risks anyway. 59.5% of the interviewees, in fact, agreed substantially with the statement which underlines the unacceptability of the above-mentioned exchange, while only 35.5% declared their disagreement with this position.
As for the trust in the proponents, the majority of those polled declared that they do not trust them. 53% of the interviewees in fact showed total or partial disagreement with the demand of full respect of the proposal against 37% of the people who stated their agreement and therefore their trust with respect to the proposals put forth by said proponents.
On a second level of trust, that connected with the information given or concealed in the proposals regarding the Monfalcone project, the majority of those polled (50.5%) expressed their agreement with the statement that highlights the project's characteristics, while 42% expressed disagreement with the statement, and subsequently, with trust in the project's contents.
To summarise, one can state that, besides recognising the economic advantages to be derived by the city for the project, within the population of Monfalcone there is a consensus contrary to the exchange between economic benefits and environmental risks, a certain mistrust in the proponents of the project and the contents within. In theory, this could be interpreted by stating that, with regard to the situation, the population of Monfalcone, while realising the advantages of the proposed exchange:

1) has above all judged negatively the definition regarding the 'externalities' and therefore has considered the costs of gauging said agreement too high;
2) furthermore, has considered the 'enforcement costs' and 'time discount rates' of the agreement as too high, given the scarce trust placed in the proponents.

Seeking to translate the technical language used into a more comprehensible style, we can state that in Monfalcone the population understood well the advantages inherent in the exchange proposed by SNAM (economic benefits in exchange for the installation of the Terminal), but refused to accept that exchange, that is to place economic advantages and environmental risks on the same level. In this context therefore, the environmental risks become sunk costs inherent in the exchange, not openly debated, but as a whole definitely present in the negotiation undertaken. This phenomenon is completely understandable. The quantification of the perception of environmental risk is in fact impossible, in the sense that the perception of risk is a 'value' for which a price cannot be ascertained. In the context of the exchanges inherent in the SNAM project, moreover, immediate economic benefits were conceded in exchange for a permanent risk, or at least such was the perception. The Monfalcone case from this point of view teaches us that the perception of environmental risk of a technological and industrial nature cannot be exchanged with benefits reduced to a material value, because this inevitably includes sunk costs

destined sooner or later to emerge in the population's perception. What can instead be done, is to openly debate the possible effects of an industrial facility, to then perhaps reach a perception mediated by cultural filters, considerations that are broader than the local reality, etc. the connected risk, so that the population becomes more knowledgeable, rather than hoping in the concealment thereof, or a repression on the part of the population.

3.5 The Communication of Risk

The Monfalcone case is also interesting under the aspect of risk communication. The proponents of the project decided to 'sell' the installation of the terminal as if they were dealing with a product to be marketed through publicity. All this provoked on one hand, a sort of concealment, consciously or unconsciously, of the risk factor, with the consequent increase in sunk costs as discussed previously, but on the other hand also produced a phenomenon known in the field of communication theory as 'redundancy'.
This phenomenon consists of the negative and contrary effects which derive from an excessive insistence on the transmission of a message. In fact, if a message is repeated to excess (in the case in question: 'The installation of the Terminal is to the city's advantage'), such excessive repetition can provoke effects contrary to those desired, and in this case caused many uncertain citizens to have doubts about what such an insistence sought to conceal. A communication that was mistaken, given its excess, therefore led to a reinforcement of that immediate perception of risk of which we have previously spoken. The reasoning of many citizens (as emerges clearly in the focus groups) was that 'if SNAM insists so much on the utility and the advantages of the terminal, it means that they are hiding something from us about the risks connected with its installation'.
The unintended effects of such a structured communication can also be considered in a general fashion, leaving aside the specific case in question. Experience and scientific studies performed in the past teach us in fact that the perception of, and information on, the risks of an industrial facility become structurally inevitable. If the official sources remain silent, informal ones will become active. This means that communication about risk becomes a fundamental factor in any decision of an environmental character, even if quite technical.

3.6 Risk and Governance

The Monfalcone case represents a very useful example of an attempted governance of environmental risk of an industrial-technological nature. From this case we can extrapolate some general rules which we wish to highlight at this point to draw conclusions on the analyses performed.

Rule 1: *The Overload Law*. The greater the number of decision-makers on an environmental issue, the less the decisions are made. This strategy permits a reduction in risk, but does not permit a decision.

Rule2: *The Representation Law*. If I cannot monitor the behaviour of my agents in the long-term (a politician who represents me, a mayor, a deputy, etc.), it becomes impossible to entrust to them risk management in the longer term, whatever I can receive in exchange immediately.

Rule *3: The Do or Don't Do Law*. In case of an overload of decision-makers, if the time factor can be reduced by external intervention (respecting contractual terms, the establishment of a precise time-frame for the beginning of planned works, etc.), the decision will be made through public deliberation in the much cruder alternative of do or don't do.

Rule *4: The Technocratic Decision or 'Whatever is Doable is Defensible' Law*. A restricted number of decision-makers, especially if they are experts, permit a greater speed in decision-making, but an increase in risk which is inversely proportional to the number of decision-makers. This is because technology does not permit the calculation of the collateral effects of its own use.

These four rules have one defect in that they do not illustrate a solution to the 'risk' decision-making on environmental impact issues. One possible solution can be found however in the area of the theoretical school of social sciences called neo-institutionalism. In the school of neo-institutionalism, the problematic governance of environmental risk could be dealt with in a manner that is symmetrical to representative democracy, that manner of regulating conflicts and interests which has been codified since the Glorious Revolution of 1688. Furthermore, the institutionalisation of risk governance permits a reduction in the sunk costs relative to local environmental negotiations. The cost of information, of measuring the effects of decisions and enforcement (guaranty) of those decisions which, as we have seen in the case of Monfalcone, are extremely significant in a completely liberalised decision-making context, would be reduced. Moreover, only in an institutional context is it possible to satisfy those four conditions that permit effective negotiations, conditions which are satisfied neither by the technocratic method of decision-making, nor by public deliberation through referendums, assemblies or collective mobilisation. Such conditions are, in short:

1) informational symmetry (that is, all the decision-makers are in possession of the same information);
2) the possibility of cooperation (interaction among the parties, that is, does not occur, as in games theory language, as 'one-shot games' but rather as interactive games which occur over a period of time);
3) the not-too simplified simplification of problems (avoiding a crude choice between doing and not doing);
4) the constant motivation of the actors participating in the decision-making (which in the phenomenon of collective behaviour does not occur, given that motivation is initially very high and then decreases over a period of time).

The case of Monfalcone therefore teaches us that risk governance needs specific arenas such as Parliaments to make decisions, parliaments that would perhaps be parallel, but different from, traditional ones.

4. Conclusion

The three case studies developed by PRISP offer some interesting insights into the social processes related to chemical risks. Participation is seen as a citizenship right to co-operate, rather than as the possibility to protect one's own interests. Trustworthiness is not an abstract quality of subjects: it significantly depends on past experience. There is a remarkable propensity to prudent policy-making and public reasoning on the common good. Moreover, the application of institutional forms of representative democracy to the

governance of risks has several advantages, such as the non-exclusively technocratic selection of the decision-makers, the possibility of communication between the parties, the achievement of an acceptable level of transparency and the effective assumption of decision-making responsibilities.
These results partially contrast with some established views, such as those concerning the NIMBY syndrome, the grounds of trust, the role of bargaining among conflicting interests in the decision-making process. Their implications for the governance of risks are potentially relevant, and therefore they deserve further investigation.

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The contents of the present article are the sole responsibility of the authors and do not necessarily reflect the views of the European Commission. Although the authorship of the article is shared, paragraphs 1 and 4 have been written jointly, paragraph 2 has been written by Luigi Pellizzoni and paragraph 3 by Daniele Ungaro.

References

[1] There is a growing literature on this issue. See e.g. J. Cohen, Deliberation and Democratic Legitimacy. In A. Hamlin and P. Pettit (Eds.), The Good Polity, Blackwell, Oxford, 1989, pp. 17-34. J. Dryzek, Discursive Democracy, Cambridge University Press, Cambridge, 1990. J. Bohman, Public Deliberation, MIT Press, Cambridge, MA, 1996. J. Habermas, Faktizitaet und Geltung, Suhrkamp, Frankfurt, 1992. A. Gutmann and D. Thompson, Democracy and Disagreement, Cambridge, MA, Harvard University Press, 1996. J. Elster (Ed.) Deliberative Democracy. Cambridge: Cambridge University Press, 1998.

[2] J. Schumpeter, Capitalism, Socialism and Democracy, 5th edn., Allen and Unwin, London, 1976. J. Elster, The Market and the Forum: Three Varieties of Political Theory, in: J. Elster and A. Hylland (Eds.), Foundations of Social Choice Theory, Cambridge University Press, Cambridge, 1986, pp. 103-132. R. Dahl, Democracy and its Critics, Yale University Press, New Haven, 1989.

[3] J. Habermas, Moralbewusstsein und kommunikatives Handeln, Suhrkamp, Frankfurt, 1983. J. Habermas, Erlaeuterungen zur Diskursethik, Suhrkamp, Frankfurt, 1991.

[4] D. Schoen and M. Rein, Frame Reflection. Toward the Resolution of Intractable Policy Controversies, Basic Books, New York, 1994. M. Hisschemoeller, R. Hoppe, Coping with Intractable Controversies: The Case for Problem Structuring in Policy Design and Analysis, Knowledge and Policy 8 (1996), pp. 40-60.

[5] P. Field, H. Raiffa and L. Susskind, Risk and Justice: Rethinking the Concept of Compensation, Annals of the American Academy of Political and Social Sciences 545 (1996), pp. 156-164.

[6] P. Ceri, Partecipazione, in: Enciclopedia delle scienze sociali, Vol. 6, Istituto per l'Enciclopedia Italiana, Roma, 1996, pp. 508-516.

[7] L. Pellizzoni, Sociological Aspects of Environmental Impact Assessment, in: A.G. Colombo (ed.), Environmental Impact Assessment. Kluwer, Dordrecht, 1992, pp. 313-333.

[8] L. Pellizzoni, Conoscenza, deliberazione e cooperazione, Rassegna italiana di sociologia 39 (1998), pp. 577-619.

[9] Legitimacy deriving from direct involvement is, for example, considered by some regional regulations on the Environmental Impact Assessment (EIA). National regulations choose both perspectives - legitimacy as representation of diffuse interests (the main environmental associations can act in the courts representing the 'general interests' of the population against a polluter) and legitimacy as right of citizenship (every citizen may present his/her own observations). See S. Salmi, Danno ambientale e associazioni ambientaliste, Rivista giuridica dell'ambiente 4 (1989), pp. 309-322. P. Maddalena, Il diritto all'ambiente e i diritti dell'ambiente nella costruzione della teoria del risarcimento del danno pubblico ambientale, Rivista giuridica dell'ambiente 5 (1990), pp. 469-484.

[10] A. Giddens, The Consequences of Modernity, Polity, Cambridge, 1990.

[11] L. Pellizzoni, Conoscenza, deliberazione e cooperazione, Rassegna italiana di sociologia 39 (1998), pp. 577-619.

[12] A. Mol and G. Spaargaren, Environment, Modernity and the Risk Society: The Apocalyptic Horizon of Environmental Reform, International Sociology 8 (1993), pp. 431-459. M. Cohen, Risk Society and Ecological Modernisation. Alternative Visions for Post-Industrial Nations, Futures 29 (1997), pp. 105-119.

[13] J. Huber, Die Regenbogengesellschaft: Oekologie und Sozialpolitik, Fischer, Frankfurt, 1985. M. Jaenicke, Preventive Environmental Policy as Ecological Modernisation and Structural Policy, WZB, Berlin, 1985. A. Gouldson and J. Murphy, Ecological Modernisation: Restructuring Industrial Economies, in: M. Jacobs (Ed.), Greening the Millennium? The New Politics of the Environment, Blackwell, Oxford, 1997, pp. 74-86.

[14] U. Beck, Risk Society, Sage, London, 1992. U. Beck, A. Giddens and S. Lash, Reflexive Modernization. Politics, Tradition and Aesthetics in the Modern Social Order, Polity, Cambridge, 1994. L. Pellizzoni, Reflexive Modernisation and Beyond. Knowledge and Value in the Politics of Environment and Technology, Theory, Culture and Society 16 (1999), pp. 99-125.

[15] S. Funtowicz and J. Ravetz, The Good, the True and the Post-Modern, Futures 24 (1992), pp. 963-976. S. Funtowicz and J. Ravetz, Science for the Post-Normal Age, Futures 25 (1993), pp. 739-755. B. Wynne, Uncertainty and Environmental Learning, Global Environmental Change 2 (1992), pp. 111-127. B. Wynne, May the Sheep Safely Graze? A Reflexive View on the Expert-Lay Knowledge Divide, in: S. Lash, B. Szerszynski and B. Wynne (Eds.) Risk, Environment and Modernity, Sage, London, 1996, pp. 44-83. R. Lidskog, In Science We Trust? On the Relation Between Scientific Knowledge, Risk Consciousness and Public Trust, Acta Sociologica 39 (1996), pp. 31-56. J. Clark, J. Murdoch, Local Knowledge and the Precarious Extension of Scientific Networks: A Reflection on Three Case Studies, Sociologia Ruralis 37 (1997), pp. 38-60.

[16] P. Lascoumes, La précaution comme anticipation des risques résiduels et hybridation de la responsabilité, L'Année sociologique 46 (1996), pp. 359-382. O. Godard (Ed.), Le principe de précaution dans la conduite des affaires humaines, Editions de la MSH et Inra-Editions, Paris, 1997.

[17] R.B. Norgaard, Development Betrayed, Routledge, London, 1994. G. Munda, Environmental Economics, Ecological Economics and the Concept of Sustainable Development, Environmental Values 6 (1997), pp. 213-233.

[18] R. Topf, Science, Public Policy and the Authoritativeness of the Governmental Process, in: A. Barker and B. Guy Peters (Eds.), The Politics of Expert Advice, Edinburgh University Press, Edinburgh, 1993, pp. 103-117.

[19] A. Mutti, Fiducia, in: Enciclopedia delle scienze sociali, Vol. 4, Istituto per l'Enciclopedia Italiana, Roma, 1997, pp. 79-87. T. Earle and G. Cvetkovich (Eds.), Social Trust, Praeger, Westport, CT, 1995.

[20] J. Bohman, Public Deliberation, MIT Press, Cambridge, MA, 1996.

[21] N. Stehr, Knowledge Societies, Sage, London, 1994. L. Pellizzoni, Conoscenza, deliberazione e cooperazione, Rassegna italiana di sociologia 39 (1998), pp. 577-619.

[22] M. Del Zotto, Comunicazione e processi decisionali: la stampa locale nell'evoluzione del caso del terminal metanifero di Monfalcone, Isig, Gorizia, 1998.
[23] F. Alberoni, Movimento e istituzione, Il Mulino, Bologna, 1977.
[24] G. Marwell, P.E. Oliver, R. Prahl, Social Networks and Collective Action: A theory of the Critical mass III, American Journal of Sociology 94 (1988), pp. 502-534.
[25] R. Inglehart, The Silent Revolution. Changing Values and Political styles among Western Publics, Princeton University Press, Princeton, 1977. R. Inglehart, Modernization and Postmodernization: Cultural, Economic and Political Change in Forty-three Societies, Princeton University Press, Princeton, 1996.