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Internship at the U.S. Congress
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Research Paper:

Citizen Participation in Technology Assessment:

Practice at the Congressional Office of

Technology Assessment

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Contents

Tables

1. Introduction

During the last decades, the pace of scientific and technological development has greatly accelerated. This rapid progress led to new possibilities for society, such as enhanced productivity, but it also created new problems; for instance, through environmental hazards or conflicts about the ethical basis for scientific endeavors (genetic manipulation). At the end of the 1960s, a growing public disenchantment with the side-effects of technological progress contributed to a new perception of science and technology. These two factors, that have to be seen in close connection as scientific discoveries are transformed into technical applications sooner, do no longer enjoy the assurance that they will benefit society almost by definition. Instead, science and technology are more explicitly tied to social and political objectives. They are directly linked to the political process, both as tools for accomplishing a certain goal as well as a reservoir of knowledge for policy-making.

The creation of the Office of Technology Assessment (OTA) as a policy advice instrument of Congress has to be seen in this broader context. OTA was established in 1972 in order to function as "an aid in the identification and consideration of existing and probable impacts of technological applications" (Technology Assessment Act 1972: Sec. 1). As rationale for the need to form a new organization dedicated solely to this task, the Technology Assessment Act refers to the rapid change and expansion of technology. Furthermore, the applications are described as "large and growing in scale; and increasingly expensive, pervasive, and critical in their impact, beneficial and adverse, on the natural and social environment" (Technology Assessment Act 1972: Sec. 2a).

The growing public demands for more participation in the field of science and technology are not addressed in the Organic Act. But if there had not been a lack of consensus on the direction of scientific and technological development, it would have been questionable if a political necessity to act and to create an institution for policy advice had been perceived at all. In this sense, the aspect of citizen participation is closely connected with OTA, even when other factors - such as the attempt by Congress to take a strong stand towards the Presidency (Dickson 1984: 236) - emerged as the more important forces that drove the establishment of this new Congressional Office.

It is remarkable that despite this relation between participatory demands on the one hand, and technology assessment on the other, very few analyses were done on participation and technology assessment in general, or citizen involvement at OTA in particular. Therefore, this study begins with a broader approach, and utilizes literature on participation theory and on participation in science and technology to develop a framework for analysis of participation at OTA.

The following working definition of participation is used as reference point in this paper:
"Public participation is any activity by any person, group of persons or organizations, other than elected or appointed officials of government or public corporations, that directly or indirectly is aimed at taking part in influencing the affairs, decisions, and policies of the government or public corporation" (OECD 1979: 15).

This definition was chosen because it assigns an active role to the citizens, and stresses that mere information of the public is not sufficient to constitute a participatory activity, despite the fact that it is a necessary prerequisite. Thus, because of the citizen-oriented perspective of this definition, any cooptation of citizen demands is excluded from the list of participatory policy making.

Furthermore, this definition has the advantage of covering the channels of influence that are beyond the traditional methods of election and formalized representation. Its broad range corresponds well with the exploratory character of this study because it allows to include a variety of activities that might be identified in the course of study, but could not be anticipated beforehand.

This study is a research paper prepared during an internship at OTA that was persued in cooperation with the Graduate Program in Science, Technology, and Public Policy at The George Washington University, Washington, D.C.. It is based on a literature review and an exploratory survey of OTA staff's orientation toward citizen participation in technology assessment. Because there are few publications that deal with the topic of participation in science and technology, and the limitations of the survey due to a small sample and the necessarily judgemental character of some of the responses, this analysis is intended more to phrase the right questions and to contribute to an analytical framework than to provide final answers.

The study first describes the context in which participation in technology assessment has to be seen by characterizing the trends in the field of science and technology in relation to the development of the political system during the last two decades. Hence, a background is established for the demands for more participation in science and technology policy-making.

Part two focuses on the reaction of the political administrative system. For this purpose, a theoretical framework for analysis is suggested by reviewing the literature and developing a new scheme that can be used for further discussion of public participation in this policy field. On the basis of this model, present forms of citizen involvement are described both in the broader area of science and technology, and for the more specialized practice in technology assessment. Finally, the analysis of citizen involve-

ment in technology assessment is reviewed under a more theoretical perspective in light of participation theory, so that the arguments identified in the previous chapter can be tied to a broader conceptual context.

Part three of this study looks at participation at OTA on two levels: first, by examining the degree of participation that is incorporated in or allowed by the institutional structure, and second, by setting up a guideline for analysis how participation is actually realized in the OTA assessment projects. For this latter purpose, the main issues are identified that have to addressed in respect to citizen participation at OTA. Because clear procedures for participation were neither established by Congress nor by OTA itself, an exploratory survey of OTA staff's approach toward participation was necessary to generate data. The survey design was developed in connection with the issue identification mentioned above.

Part four present the results of the survey and dicusses their representativeness. This is done in close reference to the issues described in part three of this study.

Finally, part five draws conclusions from the survey results, evaluates the place of OTA in the participation scheme that was developed in part two, and identifies areas that require further analysis.

2. Growing Demands for Participation in Science and Technology

At the beginning of the 1960s, a series of new policy initiatives was started to establish regulations for a potentially hazardous use of technology. Until the mid-1960s, health or environmental side-effects identified with new technologies had been widely accepted as an inevitable price for technological development.
Even when science created these problems, confidence remained high that the cause of the difficulties would offer its solution as well. Thus, negative effects were widely tolerated because continued progress was expected to resolve the problems of previous stages (Dickson 1984: 222 f.). By the end of the decade, however, this attitude began to change. A growing number of people started to argue that the costs of unrestricted technological progress were too high. Major changes were demanded in the way technology was regulated, and this criticism was extended to include the proceedings how the scientific community conducted its own affairs (Gibbons 1979: 175 f.; Dickson 1984: 222 f.; Coates 1972: 69).

In response to public criticism of insufficient democratic representation in decision-making on science and technology questions, and in reaction to a growing complexity of the technological development, Congress passed a number of laws that all contain requirements for greater direct participation in ad-

ministrative agency decisions (Nelkin 1984: 27; compare also chapter 2.2.2. of this paper). Thus, the establishment of the Office of Technology Assessment in 1972 as a policy advice institution with some provisions for citizen participation (see chapter 3.1.) is not a single event, but must be seen in a broader context.

The following paragraphs therefore describe general trends in the science and technology field that contributed to the growing disenchantment with citizen influence on the application of science and technology. In close relation to these issues, trends in the political system influenced by science and technology are analyzed in order to account for the increased demand for public participation in technological decision-making at the end of the 1960s.

2.1. Trends in Science and Technology

Major features of modern technology and a central concern are the large scale and the far-reaching consequences of technological enterprises. Compared with earlier times, man has highly increased his capacity to intervene in nature (Coates 1971: 226) and to distort ecological systems and biological cycles. In contrast to the ancient world or early phases of industriali- zation, tech- nology now allows man to conquer nature: for instance, changing the flow of rivers, influencing the weather or even creating new beings through genetic manipulation.

Modern Americans already live in a man-made world, brought into existence and maintained by technology (Coates 1977: 63 f.). Hence, they are not directly confronted with the imperatives of natural systems. At the same time, however, modern technological enterprises, such as dam building or space exploration, demand enormous investments and long planning periods that require an early and continuous attention to the impact of such projects. might be.

The irreversability of a growing number of undertakings makes a careful planning and consideration of secondary and tertiary consequences of technological enterprises mandatory (Coates 1971: 226). The devastating effects of a major accident with a nuclear power plant, for example, cannot be corrected in thousands of years, so that every effort must be made to reduce the level of risk connected with this kind of technology.

But the need for thoughtful planning has to overcome other obstacles set by modern technology: the rapidity of change is a permanent challenge for every attempt to assess possible impacts (OECD 1979: 16). The fact that technology itself is a crucial factor in shaping future technologies (Coates 1977: 63) makes the task of overseeing a complex and highly interrelated policy field even more difficult.

The pervasive character of an increasing range of effects constitutes another characteristic of modern technology. While some hazards are directly visible, others - such as the cumulative impact of nitrogen oxides on the ozone layer or of computerized data banks on personal privacy - are hidden or aggravate to a threat over a longer period of time (OECD 1979: 17), so that they exceed the present predictive capacity of science on the one hand, and the usual horizons of political action on the other hand.

Finally, many issues brought up in the science and technology field today are completely new. Weather modification or genetic engineering and foetal research may appear to a large group of non-scientists as subjects that were associated with science fiction quite recently (OECD 1979: 19). Because of this novelty and complexity, the ethical standards of society are not prepared to provide answers to the questions raised by the forefront of scientific endeavour. It is argued that without letting a broader part of the public participate in decisions how to regulate this new technology, increased fear and rejection would almost be certain. Furthermore, the lack of consensus on these issues requires a permanent feedback between scientists, decison-makers and the public (Kiefer 1973: 168; OECD 1979: 18; Carroll 1971: 647).

2.2. Trends in the Political System

In order to cope with problems raised by technological progress, policy makers are themselves to a high degree dependent on the advice of technical experts. They need the help of specialists because the state of complexity industrialized societies have reached requires a certain level of specialized knowledge for policy making (Stoeber/Schumacher 1973: 73). This trend towards a growing dependency on technical expertise is reflected in the enormous expansion of Congress' technical staff (Nelkin 1984: 26).

New institutions such as the Congressional Research Service, created in 1970, or the OTA, established in 1972, stand for the recognition that the old decision-making apparatus did not have the structure to cope with the questions raised by the technological development. The division of tasks between the legislative, executive and judicial branch on the federal level, and the additional distinction between federal, state and local authorities, limits the oversight capacities necessary for an early intervention if negative side-effects should occur (Hartje/Dierkes 1977: 552).

Furthermore, the bureaucratic structure of the political system with its non-risktaking, non-imaginative and often self-serving characteristics of a bureaucracy (J.Coates 1974a: 665) prevents a strongly future-oriented approach to gain influence in policy-making. Thus, the structure of government is increasingly

mismatched with the technical issues it has to deal with. The tendency to think short-term - as, for instance, occurs in the political arena - contradicts with the increasing need to account for the external and long-term costs of technological innovation.

While the political system has inherent difficulties to handle the complexity of modern technology, it is using technology more and more to achieve political value objectives. Social goals, such as the production of a certain number of housing units in a given time period, often depend on the ability to translate the desired aim into technical tasks (Carroll 1971: 648). In this context Marcuse observes that "the historical achievement of science and technology has rendered possible the translation of values into technical tasks - the materialization of values. Consequently, what is at stake is the redefinition of values in technical terms, as elements in the technological process. The new ends, as technical ends, would then operate in the project and in the construction of the machinery, and not in its utilization" (Marcuse 1964: 232).

The demand for a broader participation in technological decisions can be based on the fact that technology is not only a means for achieving political ends. Its function reaches further than perceived in instrumental perspective because technology often embodies and expresses political value choices, too (Carroll 1971: 648). While public law and governmental action are the most significant forms of determining social norms, technological processes have become the equivalent of a form of law in the sense that they incorporate value decisions from which the individual may have no immediate recourse. When the construction of a new highway is decided, this implies some kind of value consideration in which trade-offs between environmental quality and transportation needs are made. Hence, a more or less conscious authoritative allocation of social values and benefits in technological form takes place.

Another reason for the demand for more participation in technological decisions rests in the status enjoyed by technology as an agent for both bringing about and legitimizing social change (Carroll 1971: 649). As Jacques Ellul points out pessimistically, there is a tendency that change caused by technological progress tends to be accepted not so much in respect to its results but because of this agents traditionally high regard (Ellul 1964: 412 ff.). Certainly this seems less true today when compared with the 1950s or the beginning of the 1960s. But it explains the origin of demands for a greater control of technology. Nevertheless, the affinity of the political system to pay insufficient attention to the double character of technology is still used as a valid argument why it is necessary to have continuous public surveillance of the basis on which decisions in science and technology are made.

The political process, however, is characterized by some difficulties public participation seeks to overcome: When broad political problems are often defined in narrow technical terms, a system of "closed politics" is the result (OECD 1979: 17): In order to take part in decision-making, such a high level of technical competence seems to be necessary, that the public is widely excluded. This tendency can be observed on a general level which shows that the political arena is more detached from everyday life, and that the expanding executive branch has a strategic advantage in knowledge over citizen initiatives or interest groups. Hundred years ago, the construction of roads, for example, was largely a matter for the local community. Decision processes and inputs to them were generally known and understood by the people in the community. Today, in contrast, these decisions are mostly the result of economic and technical studies far removed from the understanding of ordinary people. Affected groups rely on the advice of scientists and technicians remote from them both geographically and psychologically (Wengert 1976: 28).

On a concrete level of single decisions, such as highway construction or reactor safety, it is immediately apparent that access to specialized technical information largely determines the influence on the policy formulation process. Thus, the demand for an increased involvement of citizen representatives and other laymen in decisions about science and technology can be seen as a necessary corrective method to open up a political process that otherwise would take over more and more characteristics of "closed politics", the more specialized information is needed for policy-making.

2.3. Request for more Participation

As a reaction to the trends mentioned above, there was growing criticism of science and technology and of the decision-making process in this area in the 60s and 70s. Yankelowich identifies three elements which caused the shift in attitudes. First, science and technology were seen as ravaging nature and threatening "Spaceship Earth". Then, technology was identified with the abuses of materialism and industrial civilization. Finally, science's epistemological monopoly on thruth was challenged (Yankelowich 1984: 9; see also Coates 1972: 69).

Carroll interprets this development as one aspect of growing social alienation in contemporary societies to which the scope and complexity of science and technology are contributing (Carroll 1971: 647).

Criticism of science and technology focused on both the impacts of technology and the conduct of research (Nelkin 1984: 20). Protests against the development of nuclear weapons after WW II were one of the first signs of increasing disenchantment with

technology (Dickson 1984: 217). Later military-sponsored research in the universities was a main target of the student protest movement (Dickson 1984: 110). The emergence of the environmental movement was another reaction. It was based on the growing awareness of environmental damage caused by science-based, industrial processes and the health and safety problems these ' processes created (Dickson 1984: 218).

In general, controversies over science and technology involve a variety of different groups concerned with greater infuence over the direction and control of science and its application. Different publics are involved and as they organize, their concerns are translated into participatory demands. Most demands come from persons who are directly affected by planned projects because of land expropriation, immediate risk, or rapid economic, environmental, or social change. Direct recipients of such professional services as health care base their demands for participation on the right of individuals to have some choice in their own treatment. Consumers of products of science and technology form a more vaguely defined public. Protests against government regulation are a sign of the participatory impulse in this area. Finally, members of major environmental and public interest associations share global concerns based on ideological or moral principles (Nelkin 1984: 24f; see also: Carroll 1971: 651).

Self-organization is the first reaction of citizens to the perceived problems discussed above. Most citizen groups are only temporary coaltions formed to challenge specific decisions. Often they disband after the issue is resolved. But sometimes a core of activists who remain interested in other projects affecting the community keeps organized. These activists are able to mobilize a larger constituency when specific problems arise (Nelkin 1984: 25).

Furthermore, there are large national associations (Sierra Club, Friends of the Earth) with a relatively stable constituency which can be mobilized to intervene in diverse technical areas. Consumer protection and public interest science groups such as the Center for Science and the Public Interest, the Center for Concerned Engineers, the Coalition for Responsible Genetic Research, the Clearing House for Professional Responsibility, and Science for the People have also proliferated. They try to provide citizen groups with the technical expertise necessary to challenge policy decisions (Nelkin 1984: 25f).

Thus, citizen groups call for better information, provision for counterexpertise and greater opportunities for participation (Nelkin 1984: 26). This development was caused by the perception that the traditional political institutions had failed to prevent the new problems associated with science and technology from emerging (Dickson 1984: 211). Coates observes that the permeation of society by middle-class values fostered the trend toward

participation (Coates 1977: 59). Because of the emerging problems analyzed above it was claimed that science had become a field to which these democratic norms should be applied (Dickson 1984: 217).

3. Adaption of the Political Administrative System (PAS)

The PAS reacted to the emerging problems in the field of science and technology. But its actions were also responses to public criticism and growing pressure for public participation. Therefore the measures discussed below have to be viewed as attempts to (re)gain legitimation as well as to solve genuine science and technology problems (Nelkin/Pollak 1979: 55).

3.1. Framework for Analysis

The participation literature provides several typologies of participation, which have core similarities but vary considerably. Nelkin/Pollak discuss three models for participation (Nelkin/-Pollak 1979). An "infomation model" is used by governments to improve public access to information. It aims at enhancing trust in administrative decisions (Nelkin/Pollak 1979: 58ff), because the perceived legitimation problem is inadequate public information (Nelkin/Pollak 1979: 55).

The "advisory model" seeks to provide decision-makers with information that is based on "scientific truth". This truth is established through debates among conflicting scientists and leaders of key institutions (Nelkin/Pollak 1979: 56).

The third model is "public consultation". Here the goal is to involve citizens more directly in formulation of policy in order to cope with the problem of alienation (Nelkin/Pollak 1979: 55ff).

Arnstein creates a "ladder of citizen participation" which serves as a typology of categories of participation and non-participation (Arnstein 1969). Arnstein treats citizen participation as a categorical term for citizen power. "It is a redistribution of power that enables have-not citizens, presently excluded from the political and economic process, to be deliberately included in the future" (Arnstein 1969: 216).

"Manipulation" and "therapy" are degrees of nonparticipation which enable powerholders to "educate" or "cure" participants (Arnstein 1969: 218f). Informing, consultation, and placation are degrees of tokenism. Citizens have the opportunity to hear, be heared, and give advice. But they lack the power to ensure that their views will be heeded by the powerful (Arnstein 1969: 219ff).

Finally, Arnstein discusses degrees of citizen power. "Partnership" enables citizen to share planning and decision-making power (Arnstein 1969: 221f). Citizen could also achieve dominant decision-making authority over a particular plan or program (delegated power) (Arnstein 1969: 222f). The highest degree of citizen power is citizen control. It "guarantees that participants can govern a program of an institution, be in full charge of policy and managerial aspects and be able to negotiate the conditions under which "outsiders" may change them." (Arnstein 1969: 223).

OECD's "Technology on Trial" uses four categories: informing the public, informing decision-makers, reconciling conflicting interests, and collaborative decision-making (OECD 1979). "Informing the public" includes access to information, information on decision-making, and public understanding (OECD 1979: 21ff). "Reconciling conflicting interests" consists of administrative decision-making, regulatory decision-making, and administrative and judicial appeal (OECD 1979: 81ff).

Glass provides a fourth typology. He discusses five objectives of citizen participation (Glass 1979). "Information exchange" is defined as bringing planners and citizens together for the purpose of sharing ideas and concerns. "Education" refers to the dissemination of detailed information about a project, about proposed ideas, or about citizen participation itself. "Support building" aims at creating a favorable climate for proposed policies or the resolution of conflict among citizen groups and the government. These are objectives associated with an "administrative perspective", they do not involve citizens directly in the planning process (Glass 1979: 182).

From a "citizen perspective" other objectives emerge. "Decision-making supplement" refers to efforts to provide citizens opportunity for input into the decision-making process. "Representative input " is defined as an effort to identify the views of an entire community or public on particular issues (Glass 1979: 182).

A typology of public participation in science and technology can draw on these sources and synthesize them. However, some changes and clarifications are necessary. All participation mechanisms can contribute to legitimation of government. Therefore, it is not useful to create a separate category "support building" as Glass does. Furthermore, administrative and regulatory decision-making (OECD) are actions to (re)gain legitimation but no participatory mechanisms. Hence, they are categorized as "legitimation through outcome" because according to our basic definition, public participation is an activity that directly or indirectly is aimed at taking part or influencing public decisions. Administrative and judicial appeal fulfill this requirement but they are a mechanism for somewhat "obstructive participation" as they aim at protecting groups but do not allow for active engagement in policiy formulation and decision-making.

The concepts discussed above agree that participation can fulfill three main internal functions within the decision-making process: informing the public, informing decision-makers, and actual decision-making. Within these main categories sub-categories can be established. As this typology is utilized for an empirical analysis, it has to focus on observable procedures and contents of participation. Categories which aim at revealing underlying objectives of "powerholders" can generally be of heuristic value but do not serve the purpose of this analysis. Because of this, Arnstein's categories "manipulation" and "therapy" are not included.

Instead, "informing the public" is divided into the functional sub-categories: access to information relevant to the problem under discussion, information on the decision-making process itself, and education or improvement of public understanding of problems in the field of science and technology. It is noteworthy that according to our definition of participation mere information of the public does not constitute a participatory activity. However, information can be seen as a prerequisite for citizen involvement.

"Informing decision-makers" allows for at least indirect in-fluence on decisions. The last category "collaborative decision-making" focusses on active direct involvement in decision-making. At this level Arnstein's proposal appears to be useful as it ad-dresses the extent of control over the decision-making process. Therefore, the sub-categories are "partnership", "delegated power", and "citizen control". "Partnership" refers to shared planning and decision-making responsibilities (Arnstein 1969: 221f). If citizens achieve dominant authority over a particular plan or program this can be categorized as "delegated power" (Arnstein 1969: 222f). The highest degree of "citizen power" is "citizen control". It guarantees that participants can govern a program or an institution and are able to negotiate the con-ditions under which "outsiders" may change rules (Arnstein 1969: 223).

Besides this dimension of internal function of participation in the decision-making process, it appears to be useful to include another dimension into the framework which focuses on charac-teristics of participants. Arnstein emphasizes participation for "have-nots" and Freudenberg/Olsen see the danger that parti-cipation leads to unwanted results because those participate who are already at the top of the societal hierarchy (Freudenberg/-Olsen 1983: 73). Therefore, in view of affected publics a destinction between organized and non-organized interests is useful. Furthermore, interest groups differ in terms of their influence on the policy-making process. In a spectrum reaching from very powerful to only marginally powerful, their status is determined by the following factors: resources (money, manpower, knowledge), relationship to the public they claim to represent

(degree of organization, coherence of interests, monopolistic or competing organizations) and their "threatening power" (opportunity to distort economic or political process).

However, it is difficult to provide a clear definition for "powerful" or "less powerful" groups, especially as influence of groups probably varies in different policy arenas. But the distinction is of heuristic value and should be kept in mind while analyzing public participation.

This distinction of affected publics has an impact on the functions of "collaborative decision-making" and "informing decision-makers". At the latter stage it is necessary to include another group, scientific experts, into the framework, because many supposedly participatory mechanisms for advice emphacize scientific expertise (Nelkin/Pollak 1979: 56).

The framework developed above (see table 1, p. 46) is used for further analysis of citizen participation in the science and technology field and in technology assessment.

3.2. Citizen Participation in Science and Technology

Legitimation can be fostered through procedures and through decisions which lead to an accepted result. To achieve "legitimation through outcome", new strict environmental, health, and safety regulations were introduced (Dickson 1984: 226). Congress also expanded its technical staff and established research services (Congressional Research Service in 1970 and Office of Technology Assessment in 1972) in order to achieve "better decisions" (Nelkin 1984: 26).

At a procedural level "participatory reforms" were introduced. One procedure applied was "informing the public" through easier access to data and reports underlying the decision-making process. The Administrative Procedures Act requires administrative agencies to publish proposed rule-making in the Federal Register. The Freedom of Information Act and the requirements for Environmental Impact Statements allow extended public access (Nelkin 1984: 27f).

Educating the public and improving access to scientific expertise (for instance: NSF's Science for Citizen Program) are other components of this function (Nelkin/Pollak 1979: 59; for information about the NSF program: Hechler 1980: 529ff). As was pointed out, mere information of the public does not constitute a participatory activity, but it can be seen as a prerequisite for citizen involvement. Therefore, informing the public can be interpreted as a move towards more participation. A step further would be to establish feed-back processes between the public and decision-makers..

"Informing decision-makers" was another strategy (OECD 1979: 55). Nelkin/Pollak state that the advisory model applied to this approach (for instance Science Court) aims at ascertaining "scientific truth" in cases were lack of confidence is thought to be the problem (Nelkin/Pollak 1979: 55, 61). But this model often involves only scientific experts and no representatives of affected publics.

"Collaborative decision-making" (OECD 1979: 97) tried to overcome the problem of alienation (Nelkin/Pollak 1979:55). Public consultation models are part of this category. They serve as forums for comprehensive discussion of specific projects and as channels for the expression of a range of opinions. Hearings, environmental mediation and citizen advisory committees or groups are used to fulfill this function (Nelkin/Pollak 1979: 56f; Nelkin 1984: 28f). Legislative action fostered this development. The Airport and Airways Development Act, the Federal Water Pollution Control Act, the Highway Safety Act, the Coastal Zone Management Act, the National Environment Policy Act, and the Energy Reorganization Act all contain requirements for greater direct participation (Nelkin 1984: 27). The growing use of referenda is another feature of collaborative decision-making. Participatory experiments which employ mediation procedures can be subsumed under this category. Citizen review boards which were formed to advise city councils in several communities emerged as another participatory procedure from the recombined DNA dispute (Nelkin 1984: 32).

A more indirect form of allowing participation (obstructive participation) was to increase chances for administrative and judical appeal' (OECD 1979: 81; Carroll 1971: 649; Klomann 1974: 52).

Most of these participatory reforms have been based on the assumption that they would lead to acceptance of controversial technologies and to restoration of legitimation of the PAS (Nelkin/Pollak 1979: 55). However, as participatory procedures are easily co-opted, token participation could be used to merely preserve the status quo (Nelkin 1984: 36; Freudenburg/Olsen 1983: 71; Dickson 1984: 257).

3.3 Contribution of Technology Assessment to Public Participation

The technology assessment movement was one aspect ot the reaction to citizens' criticism and demand for greater public participation (Dickson 1984: 231ff). Therefore, in this chapter the relationship between technology assessment and public participation is analyzed. The debate about this relationship emphasizes two aspects, the contribution technology assessment can make to public participation or at least to alleviation of concerns about technology, and the role participation should play in the technology assessment process.

As technology assessment was one part of a broader societal development, arguments about the relationship between technology assessment and public participation have to be analyzed in view of the broader political context. In this chapter arguments are traced back to the different categories of response discussed in the previous chapter. Furthermore, they are analyzed in terms of different rationales for public participation used in political theory.

Technology assessment is considered to be a reaction to participatory demands (Carroll 1971: 650), which ensures a better expression of public interest rather than traditional means (courts, lobbying, hearings) through which citizens have participated in decisions about technology (J. Coates 1975: 68). Yet the role of technology assessment in view of public participation is by no means clear. There are two ideal types of technology assessment which are based on opposing assumptions in terms of public participation.

Proponents of the sequential approach argue that assessments should be performed free from all political, organizational, and personal biases. An objective statement of options and impacts should then be presented to the decision-makers. Contrary to this, proponents of a participatory approach state that values, judgements, choices, political and social forces are an integral part of technology assessment. Therefore the public, practioners, and the power structure must interact in order to produce a viable assessment (Hahn 1986: 47f). Henderson traces these opposing approaches back to conflicting "philosophies of technology assessment", a "value free" and a normative view (Henderson 1975: 77f).

However, the discussion about technology assessment which centered on the establishment of the OTA cannot easily be classified according to the two categories. These two approaches are merely extreme points on a continuum which embraces almost all the arguments used in the debate. Nevertheless they are useful because they reveal two contrasting perceptions of the relationship between technology assessment and public participation.

The scientific or sequential approach is in so far a reaction to participatory demands as it leads to proposals for "better decisions". Consideration of a broad range of possible impacts enables decision-makers to enact sounder policies in response to problems of science and technology. This raises acceptance of these decisions and thereby increases the legitimation of the whole system. In terms of the categories developed in the previous chapter this approach therefore can be classified as "legitimation through outcome". It also aims at fulfilling the functions of "informing the public" and "informing decision-makers". In contrast, the participatory approach aims mainly at "collaborative decision-making" but also tries to achieve the other functions.

In the Technology Assessment Seminar of 1967, sponsored by the House Subcommittee on Science, Research, and Development, which can be described as "the first major discussion of possible mechanisms for technology assessment" (Chalk 1974: 58), the focus was still very much on information. Involvement of the public was not seen as an active process, but as something guaranteed through a greater attention on communicating the results of a study accurately. While this understanding not even fulfilled the prerequisits for real participation because in this context the role of the public was merely receptive, the division between a more sequentialistic and a more participatory approach was already visible.

Dael Wolfe, publisher of "Science", argued that even "hearsay evidence" ought to be considered in technology assessment because the value of the process was not limited to scientific evidence, but aimed at ensuring political legitimation (Chalk 1974: 59). On the other hand, Harvey Brooks, Dean of the Engineering and Applied Physics Department of Harvard University, warned that "complete openness at all stages of assessment would completely destroy the integrity of the process" (cited in Chalk 1974: 59; emphasis in origional). Thus, his concern was the quality of the result ("legitimation through outcome") that might be influenced by a strong standing of non-scientific appointees.

In November and December 1969 the same House Subcommittee held a series of hearings on technology assessment during which the controversy about public participation was formulated in a more pointed way. Emmanuel Mestene, Director of the Program of Technology and Society at Harvard University, lined out that the increased amounts of spending on science and technology in connection with the aggravating costs through environmental side-effects required a greater involvement of the public in decisions in this policy field.

Responding to Mesthene's argument for participation, Richard Carpenter, Chairman of the Engineering Foundation Research Conference on Technology Assessment, described the extremes for choice as follows: "If you go the full way of the technocratic elite you'll wind up with a technocracy. But if you go the way of those who want full participation you'll wind up with chaos" (cited in Chalk 1974: 64). Carpenter admitted that the technology assessment discussion so far had not managed to discover a "third way" in which the values of participation would be integrated into the decision-making for a complex society.

The academic studies which were requested by the House Science and Astronautics Committee in 1969, discuss public participation only briefly and offer no elaborate concept. However, it can be inferred that the report prepared by the National Academy of Engineering prefers the "scientific approach" as it emphasizes the need of objective unbiased assessments. The report concludes:

"(3) Members of a technology assessment task force should be chosen for their expertise but not as representatives of affected parties or special interests. The viewpoint of affected parties should be brought to the task force by volunteered or solicited presentations, and with special concern to elicit views from those who are not normally organized in their own interests.

(4) ... Experience shows that task forces composed of members posessing a wide range of personal interests have been able to focus on the public interests and to neutralize the biases of the organizations with which they are associated" (NAE 1969: 4).

In contrast, the report of the National Academy of Science supports much broader public participation: "Perhaps an idealized system of public participation in technology assessment would provide effectvie representation for every potentially affected interest at every such point" (NAS 1969: 66). Obviously it leans more toward a participatory approach which would fit into the category of "collaborative decision-making". Here much more emphasis is put on the procedure through which decisions are made. This is also true for the report of the National Academy of Public Administration (NAPA 1970: XI and 5) while the report of the Science Policy Research Division of the Library of Congress does not address the question of participation (SPRD 1969).

It is remarkable that the NAS did not mention concerns about "objectivity" as reasons for constraints on direct involvement of the public. Instead, the report argues that "the best guarantee of objectivity might well be to open the new mechanism to as wide as possible a range of countervailing influences rather than to attempt to shut out such influences altogether" (NAS 1969: 83).

The argument that participation could provide comprehensive information about impacts and especially about value considerations of affected publics is also stressed by supporters of advocacy or adverserial approaches (see: Mayo 1969: 49; Mayo 1970: 88ff; Jones 1970: 59; Mottur 1972: 265; see also: Chalk 1974: 65ff). They are in favor of a more participatory approach. But it is noteworthy that their approach is also outcome-oriented, indeed would fit into the category of "legitimation though outcome", because it emphasizes the value of information obtained through participation for the assessment process.

The debate about public participation and technology assessment, briefly presented above, dealt with public participation mostly in an instrumental way. Emphasis was put on the "value" public participation could or should have for the technology assessment process. Arguments did not refer to participation theory. Only "beliefs" concerning the relationship between technology assessment and public participation were stated: "... technology assessment is far to crucial to the shape of our future to be left to the professional assessors and the special interest groups involved" (Mottur 1972: 266). Furthermore, it was realized that the (then) present system failed to give all affected

parties effective representation (NAS 1969: 41) and also that there was demand and pressure for public participation (Kloman 1974: 57; see also Chalk 1974: 65).

3.4 Public Participation in Technology Assessment under Perspective of Participation Theory

While examining the different arguments concerning technology assessment and public participation, it was necessary to categorize them in terms of different responses to demands for public participation identified in the previous chapter. This was a somewhat higher theoretical level but still only loosely related to participation theory. It therefore appears to be useful to analyze the different technology assessment models in view of democracy theory.

According to Keim's typology there are three types of justificatory arguments for participation in democratic theory: self-protection, self-rule, and self-realization (Keim 1975: 2). The notion of participation as a means of self-protection is expressed by proponents of "democratic revisionism" (especially Dahl). They state that people only turn to politics when actions or inactions of government threaten their primary goals and the probabilities of gaining the reward at least balance the costs of getting involved (Klein 1975: 4; see also Pateman 1970: 8ff).

Obviously these ideas are based on Hobbes' thoughts (Keim 1975: 4). Furthermore, they are closely related to the "elite theory of democracy" (Michels, Schumpeter, Lippmann), which sees the role of ordinary citizens in a democracy limited to periodical elections of leaders who can represent and defend citizens' interests more effectively than they can themselves (Rosenbaum 1978: 50; see also Pateman 1970: 1ff). There is also a connection to the argument for representative democracy (for instance Lowi) which is based on the assumption that the primary goal of government is to act fairly in achieving the common good for all citizens. Here public interest is distinguished from the aggregation of individual and group demands (Kweit/Kweit 1981: 44f).

The idea that participation is only necessary under special circumstances for self-protection can be related to the scientific technology assessment model. This approach aims at providing decision-makers with valuable information which leads to "better decisions". As long as these decisions are "good", i.e. produce accepted outcomes, there is no need for further participation. It can be included in this model, however, to the extent that it is necessary for "better technology assessment", i.e. participatory procedures produce information which is otherwise hard to obtain. According to this rationale even more "participatory" technology assessment models are based on the legitimatory argument of "self-protection" as long as they are outcome-oriented.

A second type of justificatory argument for participation is "self-rule". Here equal and direct participation is considered to be necessary not simply for purposes of self-protection but also because only in so-doing the individual would be an autonomous human being. "Self-rule" is based on the assumption that each individual has the equal right to share in the establishment and exercise of power. Political freedom is defined as absence of heteronomy (control by others). The radical or Rousseauist democratic tradition emphasizes this argument for participation (Keim 1975: 9).

Some statements in favor of "participatory technology assessment" can be traced back to this source of legitimation. Mottur's argument that "technology assessment is far to crucial to the shape of our future to be left to the professional assessors. and the special interest groups involved" (Mottur 1972: 266), appears to be the clearest expression of this idea. Jones' criterion of adequate technology assessment: "openess of participation" (Jones 1970: 59), probably fits into this category but is less clear as the purpose of participation is not stated. The same is true for the discussion of participation in the NAS report. However, the statement that an idealized system of technology assessment would provide effective representation for every potentially affected interest (NAS 1969: 66) can be traced back to the idea of "self-rule", especially as the report criticizes that "the present system fails to give all affected parties representation in the crucial process of decision" (NAS 1969: 41).

Self-realization is the third legitimation for participation. There are two slightly different arguments in support of this idea. The first is the conception of man as a composite of faculties that require exercise for their full development, an idea expressed for instance by Marx. Mill also supports this rationale (Keim 1975: 16). The second argument sees participation as self-realization of citizenhood. Its main theme is the conception of political man. Active engagement in actions, in citizenship, is considered to be a mode of existence rather than a type of activity. Pranger and Arendt support this argument (Keim 1975: 17ff).

The debate about technology assessment and public participation did not go back to this source of legitimation. Obviously, self-realization was not considered to be a valid reason for involvement of citizens into the technology assessment process. Only Joseph Coates states that "participation is fun and fulfilling for some" (Coates 1974: 664).

In summary, most argumnets can be traced back to the idea of participation as a means of self-protection. Some authors in favor of a participatory technology assessment probably refer to the notion of self-rule, while participation as a means of self-realization does not play a role in the debate.

4. Participation at OTA

In the previous chapters trends in the field of science and technology, and reactions of citizens and the PAS to these trends were examined. Furthermore, a general framework for analyzing public participation was developed, and the discussion about the possible contribution of technology assessment to public participation was examined.

This provides the basis for an analysis of public participation at the Office of Technology Assessment (OTA), one actor in the field of science and technology. The general framework is used to categorize OTA in terms of public participation. In order to achieve this, the analysis first focuses on the institutional framework for public participation as established in the Technology Assessment Act (TA Act) and the internal rules at OTA. Then a survey is used to examine public participation at the project level. This survey is derived from the general framework.

4.1. Institutional Setting

In 1972 OTA was established in order to "provide early indications of the probable beneficial and adverse impacts of the implications of technology and to develop other coordinate information which may assist the Congress." (TA Act 1972: Sec.3c). In the "collective Congressial view", OTA was also expected to provide the public with information about the likely consequences of possible governmental decisions (Gibbons/Gwin 1985: 336; see also TA Act 1972: Sec.3)

Furthermore, it should propose to Congress a reasonable range of options or alternatives for public policy, but not recommend particular legislative actions (Gibbons/Gwin 1985: 336). The TA Act states that:
"d) Assessment activities undertaken by the Office may be
     initiated at the request of:
     1. the chairman of any standing, special, or select commit-
        tee of the Congress, acting for himself or at the request
        of the ranking minority member or a majority of the
        committee members;
     2. the Board; or
     3. the Director, in consultation with the Board."
(TA Act 1972: Sec.3, d)

Most of the assessments are formally requested by Congress. However, there are informal channels of communication between OTA staff and Members of Congress through which OTA influences the initiation process and tries to ensure further continuation of its programs (Gibbons 1987).

In this context it is remarkable that in 1978 OTA initiated a process for identifying priorities for studies. The priority setting became a primary activity within OTA for several months.

This process was open and broadly participatory. Over 5000 people were asked to "submit their choices of issues, problems, and opportunities of special importance to the United States and the world during the next generation." (Coates 1979: 18ff; see also Dickson 1984: 241).

Former advisors to OTA, consultants, contractors, and panel members, the staffs of OTA, GAO, and CRS were included. To reach other people, a "snow-ball system" was used (Coates 1979: 18ff). The conduct and later utilization of this priority list, however, was overshadowed by conflicts within OTA (Dickson 1984: 242: Smits 1986: 26). After only nine month in the post director Peterson resigned. His decessor Gibbons focused on less-speculative, shorter-range forecasts and tightened the budget. "To economize, he abruptly eliminated more than 10% of the staff, including Joseph F. Coates, head of the exploratory group, and several other top-level people." (Business Week 1979: 94L). Despite the fact that several reasons not directly related to the priority setting initiative with its broad outreach contributed to the controversy about OTA's role, the following institutional shake-up may as well have minimized the attention the priority list received.

OTA as established in 1972 provides mechanisms for public participation at an organizational and a procedural level. At the organizational level there is the Technology Assessment Advisory Council. The council is composed of ten members from the public appointed by the Board "who shall be persons eminent in one or more fields of the physical, biological, or social sciences or engineering or experienced in the administration of technological activities, or who may be judged qualified on the basis of contributions made to educational or public activities"; other members are the Comptroller General and the director of the Congressional Research Service (TA Act 1972: Sec.7, a). This selection criterion indicates that experts and not public participants are choosen for the TAAC (see also Gibbons/Gwin 1985: 337).

During the debate about the establishment of OTA, H.R. 10243 provided for a Technology Assessment Board consisting of 11 members, including four members of the public. But this section was amended. Now the Board consists of six members of the House, six of the Senate, and the director of OTA as non-voting member (TA Act 1972: Se.4 c). Thus, Public participation was eliminated from the Board (Chalk 1974: 76: see also Hechler 1980: 564).

The only institutionalized aspect of participation at a procedural level are the advisory panels. For every major assessment OTA establishes an advisory panel which includes not only scientists and engineers, but also affected parties from labor, industry, the academic community, public interest groups, state and local governments, and the citizenry at large (OTA 1987: 56). Most panels consist of 12 - 20 members. The role of the panels is strictly advisory. Normally they meet three times

-23

during an assessment in order to review and comment on the study plan, the results of OTA staff and contractor research, and finally the draft report itself (Wood 1982: 215; Gibbons/Gwin 1985: 342). Gibbons and Gwin state that the panels provide OTA with "assurance that the work is comprehensive, accurate, fair, and as free as possible from bias and advocacy." (Gibbons/Gwin 1985: 342).

In its projects OTA often uses other mechanisms for involving the public. But there is no codified rule which addresses the scope of public participation in OTA projects.

The establishment of OTA as a result of the technology assessment movement can be interpreted as one reaction of the PAS to the emerging problems in the field of science and technology and the growing public criticism and pressure for participation (Dickson 1984: 231f). Gray states that it was hoped that OTA would "contribute to restoring and supporting public confidence in the wisdom of the Congressional decision process." (Gray 1982: 305).

In view of the categories developed in chapter 3, OTA obviously fulfills the functions of informing the public and informing decision-makers. This can be inferred from its formal task and its formal organization and procedures. But it is not clear what kind of participants are involved, whether they are only experts and powerful interest groups or also less powerful groups and non-organized publics.

The institutional framework provides limited opportunities for further participation which would fulfill the function of colla- borative decision-making. There is no formal public participation at the initiation level of assessment. Furthermore, OTA does not make decisions, it does not even make a distinct policy recommen- dation, but provides a range of alternative options.

The only way OTA could achieve at least some degree of col- laborative decision-making is by involving citizens in the assessment process. But the formal use of advisory panels probably is not sufficient, especially if they are restricted to advisory functions only. Other forms of citizen involvement especially at the stages of problem definition and policy formulation could provide a better opportunity for collaborative decision-making, at least in the sub-category "partnership". But this cannot be analyzed on the basis of formal procedures. It therefore appears to be useful to look at public participation at the project level in more detail.

4.2. Participation in OTA Assessment Projects: Issues and Survey Design

As described in chapter 2 of this analysis, the arguments used in the literature generally were in favor of increased citizen involvement. Despite this diffuse appreciation of "more partici-

pation", the TA debate falls short of a definition what this objective means in more precise terms, and how it could be achieved.

OTA does not have a working definition of participation either. It uses a descriptive characterization of its participation efforts in the Annual Report to the Congress by mentioning advisory panels, workshops, surveys, and formal and informal public meetings as techniques for citizen involvement (OTA 1987: 56). But in practice the decision how to involve the public is left to the staff working on every single project. Only for the establishment of advisory panels a standardized procedure exists.

In regard to the lack of a working definition and of clear procedures for public participation, an exploratory approach in form of a survey of OTA staff's orientation toward participation seems to be the best way to generate data. By this inductive method, it is possible to obtain more precise information how OTA fulfills the function of collaborative decision-making that was singled out as the major point of interest in the previous chapter.

The questions for this survey (see appendix) were formulated in reference to the general TA discussion. Hence, some major issues developed from the analysis done so far were used as focal points to find out where OTA stands on the question of citizen participation in technology assessment.

The following paragraphs describe the main issues that were identified and how they are addressed in the survey. Because of the wide array of factors that might influence an assessment, it is necessary to tie the questions directly to a single project. A broad approach that simply asked about objectives, techniques or other features in general would probably not allow for a meaningful response. Thus, the questions refer to the most recently completed project as the example for the answer in order to provide a clear reference point.

4.2.1. Entry Level for Participation

If more than only information of the public is sought, and thus an active approach to participation chosen as defined in our working definition, the entry level for any "citizen input" already constitutes a crucial decision (Krimsky 1982: 4): it matters if representatives of affected groups are involved in the review process only or if they may contribute to the definition of the problem under analysis. This destinction is decisive at least as long as the general supposition for participation as defined in our working definition is taken for granted: that participation should actually make a difference and go beyond pro forma significance (Krimsky 1982: 17).

Furthermore, it is crucial if the options for the solution of the problem are allowed to broaden through the inclusion of views of

-25

affected parties, or, if the possible impact is limited to minor adjustments of a pre-formed policy (Krimsky 1982: 17).

A possible obstacle to the early involvement of stakeholders could be the following dilemma: citizen involvement with its highly political character tends to convert the investigative process into an adversary proceeding (Coates 1978: 44). This is especially true when directly affected groups, mobilized by a concern with strong emotional involvement, are entitled to challenge a technological project at an early stage in the assessment process. This might crystalize opinions before all alternatives had a fair consideration (Coates 1978: 44). On the other hand, adversary proceedings are useful to avoid that social conflicts are rapidly transformed into technical questions, and made amenable to an oversimplified numerical measurement (Wynne 1975: passim). The entry level for participation is an important channeling mechanism through which the problem of adversary proceedings is approached.

Question F addresses this whole issue where in the assessment process participation comes into play by offering five choices for different stages. The steps offered as possibilities for an answer are derived from the literature on social risk assessment (Krimsky 1982: 10) and from categories suggested directly for technology assessment at OTA (Wood 1982: 212).

4.2.2. Selection of Participants

A central problem is the selection of participants and the directness of their involvement (Krimsky 1982: 16; Porter/Rossini/Carpenter 1980: 404). They can be represented by experts who function as their advocates or by spokespeople they choose out of their midst. Furthermore, there must be some control that self-identified representatives of affected parties actually speak for the constituencies they claim to represent (Coates 1978: 44). A special difficulty exists because of the diversity of different "publics" (Coates 1979: 31; Nelkin 1977: 79) which probably cannot be included entirely so that a choice between a variety of stakeholders is inevitable.

Special concern is required to include possibly affected publics which are poorly represented, not yet organized or even unaware of their potential status as stakeholders (Chalk 1974: 66; NAE 1970: 4). Freudenburg and Olsen argue that the failure to include these parts of the public can deteriorate the whole participation process because well organized groups have already developed channels of influence on policy decisions. If no special attempt is made to include less vocal groups, with a lower ranking in education, occupational status and income, it is likely that only that only those who may need governmental assistance the least, participate the most - thus widening the gap citizen participation originally sought to narrow (Freudenburg/Olsen 1983: 73).

If a technology or project studied is in the early development stage and there exist no clearly defined communities of interest, public participation arrives at an inherent obstacle: the professionals necessarily have to take over an early warning function for the public at large (Rossini/Porter 1982: 25 f.).

Finally, the selection of participants brings up the problem which level of competence - if any - is considered a necessary prerequisite for participation. Where the technological issue is highly complex and beyond the grasp of the untrained layman, it must be decided which ratio between expert opinion and judgement of affected groups is appropriate (Coates 1978: 43).

The survey deals with the question of selection of participants by concentrating on two points which were considered basic for this whole issue. The first is the involvement of powerless, non-organized possibly affected publics in contrast to the participation of interest groups with a great influence on the policy formulation process. Questions C to E measure this aspect in reference to the three different levels of participation described before.

The second point selected for the survey is the consultation with experts in relation to direct interaction with parts of affected publics, for instance through public hearings in communities, workshops or focus groups. This aspect is covered by question B.

A limitation of the survey is that it depends on the perception of the assessors which groups are powerful. But as they are knowledgeable in their field of study, it can be expected that they are able to judge whether participants belong to a powerful group or not. In view of the different policy arenas OTA reports are addressing, it was impossible to generate a more detailed definition of groups with great influence. Nevertheless, the special judgemental character of the responses has to be kept in mind, and it might be expected that the general theme of the survey loads the responses toward a more favorable view of participation in general and the inclusion of powerless groups in particular.

4.2.3. Techniques for Participation

In accordance with the problem definition, the goal that is sought to be accomplished, and the way the issues described so far are addressed, different techniques for participation have to be chosen. As was outlined before the literature on TA does not provide an elaborate concept and specific methods for participation. Therefore, the following categorization of techniques is drawn from the broader context of public participation in decision-making.

If the problem is defined in terms of an inadequate information exchange, neighbohood meetings, public hearings and increased

-27

soliciting can be used to improve the feedback process between decision-makers and citizens (Nelkin/Pollak 1979: 59; Glass 1979: 185). More passive ways to gather and exchange information include citizen surveys or delphi processes (Coates 1978: 42).

If the controversy is assumed to arise from insufficient technical evidence, workshops or citizen review boards are an appropriate way to involve experts and the public in order to increase the support for decisions on science and technology questions (Nelkin/Pollak 1979: 61; Glass 1979: 185 f.).

If the goal is to reduce alienation, a more participatory or consultative system offers a solution. Closely related to the previous mechanism, it may use advisory boards as well, but could go further to include mediation processes (Krimsky 1982: 12; Nelkin/ Pollak 1979: 57).

For each technique special limitations have to be considered. Advisory committees, for instance, often do not represent the actually affected groups, but the most active parts of the public which already use other channels such as lobbying to persue their interests, and which are organized in the most effective way (Sewell/O'Riordan 1976: 19). In 1976 a survey of sixteen federal energy advisory boards reported that nearly half of the board members were industry representatives, while consumer and environmental representatives added to four and three percent only (Nelkin 1984: 28).

Lastly, it is important to recognize that the implementation of one participatory technique can only achieve a limited number of objectives to both citizens and decision-makers. Consequently, the choice of techniques for participation has to be made in careful consideration of the circumstances that apply to every single assessment project (Rossini/Porter 1982: 32; Glass 1979: 188). This is a condition that makes citizen participation in TA even more difficult because it turns out to be impossible to use clearly structured, formalized procedures which normally are prefered in the political process.

In question B which addresses techniques for participation, the categories offered as choices for an answer were derived from the general discussion about citizen participation (Glass 1979; Nelkin/Pollak 1979) and OTA's characterization of its own work (Gibbons/Gwin 1985; OTA 1987: 56).

4.2.4. Objectives for Participation

The objective for having the public participate already determines many of the other aspects explored in this survey. The entry level for participation, the selection of participants, and the techniques used are no independent, exchangeable factors, but derive from the purpose of the whole undertaking. The character of this relationship was discussed before and the major catego-

ries of objectives were established earlier as well (see chapter 3.1.), so that the background for question G is already established.

The different choices offered as answers are derived from the debate about participation and the role of technology assessment. Answers one and two cover the "scientific or sequential approach" which aims at enabling decision-makers to enact "better policies". Besides "legitimation through outcome" (i.e. better policy decisions based on knowledgeable TA; answer 1), the importance of the category "informing decision-makers" is addressed (answer 2). Answers three and four cover the category "collaborative decision-making". While answer four asks to what degree the improvement of chances for relatively powerless groups was a goal, question three looks at the function of creating consensus among stakeholders and thereby sustaining legitimation (see Wood 1982: 212). This aspect of legitimation (support-building for decisions) is also addressed in answer five.

The interrelatedness between objectives for participation on the one hand, and other features such as entry level, selection of participants and techniques on the other hand, allow for a closer look if the practice of citizen involvement at OTA really matches the objectives. In this sense, question G is equivalent to a screening question, too.

Because it could be that the function of participation in the most recently finished assessment project was not so much derived from a theoretical approach, but determined by constraints beyond the control of the assessor, question H examines the factors influencing the role of participation.

4.2.5. Sreening Questions and Representativeness of Answers

Because the majority of questions refer to the most recently completed assessment project, it is considered useful to obtain information how typical this example is when compared with others. If a great number of the respondents indicated that their last project was exceptional, the ability to generalize from the results of this survey certainly would be severely limited. In order to allow for conclusions even in the case that an exceptional focus on participation is indicated, answers one and two specify the nature of this exception and thus extend the chance to come to useful data. However, it has to be kept in mind again that the overall theme of the survey might bias the response to question I and lead to an overestimation how strong the attention toward participation really was.

Questions A, J, K and the statistical information are used as screening questions. They allow to analyze whether the perception of OTA, the attitude toward science and technology, the political ideology and the years of experience in technology assessment correlate with a specific use of participation in OTA projects.

Questions J and K which address the general evaluation of risks
and benefits from developments in science and technology, provide
the additional chance to compare opinions among OTA staff with
the attitudes of the public at large: the two questions were ta-
ken from a survey on public attitudes toward science, biotechno-
logy and genetic engineering (Louis Harris and Associates, Inc.
1987) based on a national probability sample of 1,273 American
adults. Hence, it is possible to see if there is a discrepancy
between the opinions held among staff people of OTA and the
public at large this institution is supposed to serve.

5. Survey Results

In order to describe the results of the survey, an overview that
is based on the absolute ranking (assignment of 0-5) for a single
answer will be presented first. This brief summary provides the
context for a more detailed analysis of the patterns that emerged
from the responses on a nominal level. In a third step, the
screening questions and certain profiles generated from the
previous analysis are used to identify patterns through inter-
relation; for instance, by comparing those respondents who
indicated an exceptionally high or low interest in providing
a chance for less powerful groups to influence the policy formu-
lation process.

The issue areas characterized in chapter 4.2. function as a
guideline for presenting the results of the survey. The precise
statistical data on which the following summary is based can be
looked up in the tables presented in the appendix.

5.1. Overview

OTA uses participation predominantly on stages where the influ-
ence on policy-making is less direct. In terms of the entry
level, the involvement of citizens for review of the study,
fact finding, and consideration of ethical and political values
for impact assessment prevails over both problem definition and
formulation of policy options.

In the selection of participants, representatives of well-organ-
ized and already influential interest groups are clearly favored
over spokespersons of non-organized possibly affected publics.
This pattern is consistent for different stages in the assess-
ment process; ranking from soliciting for descriptive and factual
matter, then soliciting for opinions or viewpoints, and then
enlisting in discussions intended to influence the analysis.

Among the techniques used to obtain information about affected
publics, consultation with experts, literature study, and
consultation with advisory panel and representatives of in-
terest groups prevail over approaches with a broader outreach,

-30

such as direct interaction with affected publics through hearings in the community, workshops or focus groups on the one hand, or surveys and opinion polls on the other hand.

Among the objectives for having the public participate, providing decision-makers with a broad range of opinions, and generating additional factual information for the projects's staff team are assigned a higher priority than the goal of giving a chance to less powerful groups to influence the policy formulation process. Support-building for policy decisions, and the creation of consensus among stakeholders rank lowest among the aims public participation is directed towards.

The general tendency that derives from the results of the survey is a mixed status of public participation at OTA: citizen involvement is not a matter of high priority, but nevertheless it is part of the various stages of the assessment process. Where participation takes place, it tends to focus on the already powerful groups, and favors a less participatory form of involvement over direct, basis-oriented interaction with a wide array of possibly affected publics.

5.2. Representativeness of the Answers

The questionnaires were distributed among all staff members of OTA, including both scientific and administrative personnel. Thus, some 150 people received the questionnaires, while 43 responded. Among these, one person answered question A only, and several skipped questions that did not apply to their most recently completed project, or could not be answered because the respondents had just started to work for OTA. Consequently, the sample varies from 43 for question A to 36 for answer 6 to question H (see tables 3 and 10).

Despite this relatively low return, the prerequisites for the limited objectives of this exploratory survey are met, because all programs of OTA are covered (see table 18), and the enormously broad range of different professional profiles (see table table 16) and experiences in the field of technology assessment (see table 15) among the respondents guarantees a sufficient cross section of OTA personnel. The fact that among 43 staff members a total of 33 different fields of professional training was mentioned -with an emphasis on policy analysis (mentioned seven times)- underscores the interdisciplinary and multiprofessional character of OTA's work.

It is noteworthy that three respondents had not finished any assessment project when they filled out the questionnaire, and that eight had completed only one study. However, this is still a result in accordance with what might be expected from an organization with a personnel turnover of 28 percent from fiscal year 1986 to 1987 alone.

As a consequence of the limited practical experience with OTA projects some of the respondents indicated, only 31 answered question I about the representativeness of their most recently completed study. Among these, a majority of 48.4 % described the project used as example for their answers as "fairly representative", while 35.5 % characterized it as "exceptional because it focused on participation more strongly than usual" (see table 11). This exceptional status because of unusually strong participation may in fact be explained by a methodological difficulty that was anticipated before: the consistent focus on citizen involvement throughout the survey may have loaded the answers in the direction of a more favorable attitude towards participation in technology assessment. Because the respondents were asked to answer the questions in reference to their most recently completed work, this project could in fact have been perceived as especially strong on participation when compared with others that were not explicitly reviewed under this perspective.

Nevertheless, 16.1 % of the respondents indicated that their last project was "exceptional because it focused on participation less strongly than usual". The exceptional character that was assigned to the last project both in terms of more or less participation has to be kept in mind when generalizing the results, but it does not prohibit broader conclusions from the data, because it was specified in which way the exceptional status influences the response. If the last project was unusually strong on participation, it can be assumed that the general trend of participation being a matter of limited concern at OTA -- as it was described in the overview -- is more likely to be confirmed than to be questioned.

In summary, the data generated by this survey has to be interpreted with respect to statistical limitations, due to a small sample and the judgemental character of some of the questions. But it is sufficient for the more impressionistic purpose that corresponds with the exploratory approach of this analysis.

5.3. Entry Level for Participation

The highest ranking stage for participation turned out to be the review process: 65.5 % of the respondents assigned a high (22.5 %) or very high (40 %) priority to this level when asked where in their most recently completed project citizen participation took place. On the other hand, a greater variation can be seen when "fact finding" (20 % high and 25 % very high) and "consideration of ethical and political values" (25 % high and 20 % very high) that share the same rank, are compared with the first group of responses. "Problem definition" (27.5 % high and 12.5 % very high) and "formulation of policy options" (20 % high and 3 % very high) were the least weighted stages. Hence, a clear pattern emerges that the involvement of citizen is strongest on those stages that influence the outcome of the analysis the least.

-32

5.4. Selection of Participants

In terms of the selection of participants, exemplified by the involvement of representatives of non-organized, powerless publics on the one hand, and well-established, powerful interest groups on the other hand, a clear pattern is visible: regardless of whether the objective of participation is directed towards soliciting for descriptive and factual matter (question C), soliciting for opinions or viewpoints (question D), or inflencing the analysis (question E), the powerful always by far prevail over the less influential constituencies (see tables 5 to 7).

It is remarkable that there is a slight decrease in average scores from the objective of factual input, over inclusion of opinions, to influence the outcome (see averages for C, D and E on tables 5 to 7). This decrease is in accordance with the pattern found for the entry level.

Furthermore, a bimodal distribution evolves: the choices for an answer are either ranked high or low, while few respondents chose an average degree. This phenomenon requires special attention later on when the data generated by this survey is interrelated (see chapter 5.7.).

5.5. Techniques for Participation

Among the techniques, "consultation with experts" was assigned by far the highest importance (14.3 % high and 76.2 % very high degree), followed by "literature study" (50 % high and 40.5 % very high), "consultation with advisory panel" (26.3 % high and 35.7 % very high) and "consultation with representatives of iden- tified interest groups" (40.5 % high and 26.2 % very high). With a remarkable variation when compared with the first group of re- sponses, "direct interaction with parts of affected public", the use of a "survey or opinion poll drawn from a sample of affected publics", and the utilization of "formal decision-making or fore- casting models" are placed at the end of the list, in each case downgraded by a predominance of a low or very low importance that was assigned to these three techniques (see table 4).

With the exception of the formal models, the pattern that evolves from this question is the emphasis OTA puts on techniques that tend to be less participatory. This tendency is stressed not only by the rank order of the techniques, but by the variation in assigned importance between consultation with experts or liter- ature study on the one hand, and direct interaction or use of public opinion polls on the other, especially when compared by the average degrees of importance that were assigned (4.6 and 4.2 for the former; 2.1 and 1.6 for the latter; see table 2).

5.6. Objectives for Participation and Constraints

Among the objectives for participation, "providing decision-makers with a broad range of opinions" was assigned the highest priority (25 % high and 22.5 % very high), followed by "providing additional factual information to your project's staff team" (10 % high and 27.5 % very high). The advocat's role of "providing a chance for less powerful interests to influence the policy formulation process" ranked third (30 % high and 10 % very high), while the aims of "helping to build support for policy decisions" and "seeking consensus among stakeholders" were rejected with a clear predominance of low ranking for both choices (see table 9; in the case of seeking consensus a meaningful 42.5 % stated that this objective is "not at all" valid for OTA).

Hence, the purpose of participation at OTA as reflected in the responses to this question is clearly oriented toward the decision-makers and the staff itself, which utilizes citizen involvement in order to obtain information needed for the assessment. Both of these objectives fall into the category of the scientific or sequential approach.

The citizen-oriented concept of providing a channel for less powerful interests is subordinated when compared with the first two objectives (see table 9 for difference in the average degree of importance that was assigned). Together with the two legitimation-building goals, this low-ranking for the advocacy role leads to a secondary place for the category collaborative decision-making that assembles all three of the less high-ranking aims. Thus, the results of question G show a consistent pattern when set in reference to the theoretical concept the answers were derived from.

The answers to question G basically correspond with the responses to question A which asks about the objectives OTA tries to achieve in general. Again, the policy-maker-oriented goal of providing "sound objective information based on a high level of expertise", which ranks nearly equally with "presenting a broad range of views on the problem under assessment, both by experts and affected groups", is clearly distinguished in importance from the advocacy or consensus-seeking role which were assigned lower priority (see table 3). Consequently, the results for questions A confirm what has become obvious before, and this question is not used as an additional screening question because it does not promise to provide factors different from what is covered by question G.

Among the constraints that determined the role of participation in the most recently completed project, the "characteristics of the technology" were judged most important, followed closely by the "characteristics of affected publics" and the "personal evaluation of the usefulness of participation" which gained the same degree of importance (see table 10).

These three reasons are remarkably distinguished in their ranking from "time limits", "budget constraints", "influence of advisory panel", and "decision of superior" (see table 10 for the average degree).

Especially because of the variation between the high-ranking and the four low-ranking constraints, a pattern emerges that shows a dominance of built-in constraints and voluntary decisions over internal limitations as the basic factors that set the boundaries for citizen involvement in technology assessment.

5.7. Explanatory Variables

None of the variables used as screening questions has any explanatory power for the conduct of participation. 44 % of the respondents describe themselves as "liberal" and 37 % as "moderate". There is no "conservative". 18 % of the respondents use other terms to describe their political ideology. But political ideology (liberal or moderate) is not significant for explaining the conduct of participation (see table 19). Neither is the experience in the field of technology assessment (see table 20).

The professions of respondents vary considerably and it is not possible to aggregate them (for instance into natural and social sciences) because the actual meaning of terms is not always clear. This screening question therefore is not used for statistical analysis.

A similar problem occurs in view of the assessment of risks and benefits of science and technology (see tables 12 and 13). The respondents are more optimistic about benefits science and technology will provide for them and their families than the general public. 66 % expect a lot of benefit, 31 % some benefit and only 2.5 % little benefit (the numbers for the general public are 41 %, 39 %, and 14 % respectively). 31 % of the respondents think that science and technology will cause a lot of risks to them and their families. 61 % expect some and 7 % little risk. Here the general public foresees less risks (22 % a lot, 43 % some, 20 % little, and 7 % none). As only three respondents expect more risks than benefits it is not feasible to compare this small sample with those who expect more benefits than risks.

Apparently, the most significant variable for explaining the extent of public participation in OTA projects is the objective for having people participate. Those respondents who indicate that a high or very high degree of importance was assigned to the objective of providing chances for less powerful interests to influence the policy formulation process score significantly higher on all dimensions of participation (see table 21).

There is significantly more participation at all stages of the project besides the review process which is a procedural requirement. Non-organized publics are also involved to a

significantly higher degree. This difference in the conduct of participation is also reflected in the use of techniques. Direct interaction techniques are applied more often. But there is no significant difference in the use of surveys or public opinion polls. The latter point contradicts to some degree the finding presented above, as the use of polls would also be a technique which allows for more participation.

There is another limitation to the finding that the objective for having citizens participate makes a difference: respondents scoring both high and low state that the main factor determining the role of public participation in their last project is "characteristics of the technology under assessment". Their personal evaluation of the usefulness of participation ranks only second. Finally, all these results are based on self-evaluation of OTA staff. Therefore, misperceptions or a tendency to strive for high scores in all categories related to participation could have affected the outcome.

As the general results show a bimodal distribution in terms of participation of non-organized publics, it appears to be useful to analyze this in more detail. Therefore two groups are created and compared; one consisting of respondents who score at least twice high (4 or 5) in view of the three questions addressing participation of non-organized publics (questions C,D, and E). The control group consists of respondents who score low at least twice (0-2).

Respondents scoring high use significantly higher degrees of direct interaction techniques. There is no difference in the use of polls. Participation takes place to a higher degree at all stages of the project besides those of the lowest (review process) and highest impact (formulation of policy options). Besides the objectives of support and consensus-building, all other objectives for having citizens participate get higher scores (see table 22). Obviously, those who have representatives of non-organized publics participate use different techniques, have other objectives, and include more participation in their project. But they do not allow participation to influence the formulation of policy options to a higher degree.

In contrast, those respondents who claim that participation was to a high degree part of the process of formulating policy options (scores 4+5) do not involve non-organized publics to a greater extent than those scoring low in view of this question, although they put significantly more emphasis on the objective of providing more influence to less powerful groups (see table 23).

Therefore, it appears that there is no clear relationship between the two dimensions of participation, selection of participants and entry level. Those who score high in view of including non-organized publics do not provide more chances for influencing the formulation of policy options. Contrary, those who put emphasis on involving participants in the analysis at this stage do not include non-organized publics significantly more.

The objective of providing a chance for less powerful interests to influence the policy formulation process, therefore, appears to be the variable with the greatest explanatory power for predicting the extent of participation in OTA projects.

6. Conclusions

This study aimed at assessing the degree of participation at OTA, the first institution extablished to conduct technology assessment. It is clear from the results of this analysis that according to the conceptional framework, OTA allows for only moderate degrees of participation.

The organizational and institutional framework of technology assessment at OTA leaves only little room for "collaborative decision-making". OTA's main function in view of participation is "informing decision-makers". This result is confirmed by the survey dealing with participation at the project level. Participation takes part mostly at the stages of fact finding and value considerations. Citizen can participate less in the processes of problem definition and formulation of policy options, where they would influence the policy making process to a higher degree.

In view of the other dimension of participation, selection of participants, OTA involves experts and representatives of powerful interest groups much more in its projects than participants from non-organized publics. This bias is also reflected in the use of techniques. Consultation with experts and representatives of interest groups are strongly favored over surveys of affected publics and direct interaction which would allow for more participation.

The objectives for having people participate complete this pattern. Participation is sought to provide additional factual information to the project staff and to provide decision-makers with a broad range of opinions. In the view of the respondents, it is less important to give less powerful interests a chance to influence the policy formulation process.

However, it is remarkable that high or low scoring in regard to the latter objective appears to be the one variable which is best suited to explain differences in the conduct of participation. Those who scored high also achieved high scores in view of the two dimensions of participation. Other variables such as political ideology or experience in the field of technology assessment were not significant.

This leads to the conclusion that the degree of participation at OTA is at least partly influenced by the objectives individual analysts have in regard to participation. It therefore appears

that there is room for expanding participation at OTA. However, the stablishment of OTA as an instrument of policy advice to Congress limits the possible degree of participation. More participation could lead OTA into a situation where it acts as decision-making supplement and thereby contradicts goals and functions of Congress. Nevertheless, it would be useful to examine how Congress reacts to variations of participation at OTA. For instance, it could be analyzed whether utilization of studies is affected by the degree of participation.

The close connection between OTA and Congress and the relatively strong role of Congress within the U.S. decision-making process limits possible generalizations from results of this study. Other institutions for conducting technology assessment which operate in different political environments (for instance the emerging institutions in Europe) might take a different stance toward participation. This calls for comparative analysis of different institutions which might lead to valid hypothesis about the relationship between political environment and degree of participation within an institution.

There are other important questions this small, exploratory study could not address. Confirming theoretical considerations, the results of this analysis indicate that there is a relationship between the degree of participation and the techniques used. Higher degrees of participation correlate with the use of more direct interaction techniques. It therefore might be useful to look at these techniques in more detail in order to analyze whether all or some of them foster public participation.

In addition, this study approached the analysis of public participation at OTA by focusing on the institutional framework and self-evalution of OTA staff members. Another useful approach would be to abandon this institutionally oriented strategy and examine the perception of affected publics. However, these features could not be incorporated into the narrow limits of this small, exploratory analysis.

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8. Appendix

Tables

internal function of participation for decision-making / characteristics of participants		advice	affected publics		
			organized		non-organized
		scientific experts	powerful	less powerful	
collaborative decision-making	citizen power				
	delegated power				
	partnership				
informing decision-makers					
obstructive participation	judicial appeal				
	admin. appeal				
informing the public	access to information				
	information on the decision-making process				
	education				
legitimation through outcome					

QUESTIONNAIRE ON PUBLIC PARTICIPATION IN TECHNOLOGY ASSESSMENT

Student Survey of OTA Staff Members

The following survey is being conducted by two West German students from George Washington University's Program in Science, Technology, and Public Policy, Mr. Manfred Redelfs and Mr. Michael Stanke. They are presently undertaking an internship at OTA with guidance of Dr. Franklin Zweig, OTA visiting scholar, by arrangement with Professor John Logsdon, GWU Faculty Supervisor.

The purpose of the survey is to obtain information about the role of public participation in OTA's assessments. OTA's Annual Report to Congress notes that:

> "The private sector is heavily involved in OTA studies as a source of expertise and perspectives. Contractors and consultants are drawn from industry, universities, private research organizations, and public interest groups.
>
> OTA works to ensure that the views of the public are fairly reflected in its assessments. OTA involves the public in many ways - through advisory panels, workshops, and formal and informal public meetings. These interactions provide citizens with access to information and help OTA to remain sensitive to the full array of perspectives, not only of the recognized stakeholders, but also of technically trained and lay persons."
> (Annual Report to the Congress, Fiscal Year 1986, p. 56).

Our study will identify and quantify public participation techniques from the perspective of OTA research and managerial staff. The results of the survey will be included in a research paper Mr. Redelfs and Mr. Stanke will complete in May 1987. Copies of the paper will be available upon request at the end of the Spring Semester.

When filling out this survey, please note, that the questions, if no exception is indicated, refer to your most recently completed assessment project. The term "affected publics" is used in destinction to "affected groups". It means potential, not yet organized constituencies on whom technology might have an impact as well as organized affected groups (interest groups).

Please return this questionnaire to "GWU interns", room 305. We would appreciate its return by April 10.

Thank you very much for your consideration. If questions arise, please contact us or Dr. Zweig, 6-2031.

When answering the following questions please evaluate the given choices for an answer by circling a number. The following key is used for scaling:
0 – not at all; 1 – very low degree; 2 – low degree; 3 – average degree; 4 – high degree; 5 – very high degree; X – no opinion

A. In your opinion, to what degree does OTA generally achieve the following objectives frequently mentioned in the technology assessment literature? (Please circle the answers)

    1. Providing decision-makers with sound objective information based on a high level of expertise ... 0 1 2 3 4 5 X
    2. Presenting a broad range of views on the problem under assessment, both by experts and affected groups .... 0 1 2 3 4 5 X
    3. Seeking to create consensus among different groups of stakeholders .... 0 1 2 3 4 5 X
    4. Drawing attention to the needs of yet unorganized, poorly represented, possibly affected, parts of the public .... 0 1 2 3 4 5 X

B. To what degree did you use the following techniques to obtain information about affected publics in your most recently completed project? (Please circle the answers)

    1. Literature study .... 0 1 2 3 4 5 X
    2. Consultation with experts .... 0 1 2 3 4 5 X
  -3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
    4. Consultation with advisory panel .... 0 1 2 3 4 5 X
    5. Consultation with representatives of identified interest groups .... 0 1 2 3 4 5 X
    6. Survey or public opinion poll drawn from a sample of affected publics .... 0 1 2 3 4 5 X
    7. Direct interaction with parts of affected publics (for instance public hearings in communities, workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
    8. Others (please specify) .... 0 1 2 3 4 5 X

C. To what extent were the following groups solicited for descriptive and factual matter? (Please circle the answers)

    1. Representatives of non-organized possibly affected publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your judgement have great influence on the policy formulation process .... 0 1 2 3 4 5 X.

D. To what extent were the following groups solicited for opinions or viewpoints?
    1. Representatives of non-organized possibly affected publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your judgement have great influence on the policy formulation process .... 0 1 2 3 4 5 X

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

G. What degree of importance was assigned to the fol-
   lowing objectives for having the public participate
   in your most recently completed project? (Please circle the answers)

   1. Providing additional factual information to
      your project's staff team .... 0 1 2 3 4 5 X
   2. Providing decision-makers with a broad range of
      opinions .... 0 1 2 3 4 5 X
   3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
   4. Providing a chance for less powerful interests
      to influence the policy formulation process ..... 0 1 2 3 4 5 X
   5. Helping to build support for policy decisions
      based on your analysis .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

H. To what extent was the role public participation
   played in your most recently completed project de-
   termined by the following factors? (Please circle the answers)

   1. Characteristics of the technology
      under assessment .... 0 1 2 3 4 5 X
   2. Decision of superior .... 0 1 2 3 4 5 X
   3. Influence of advisory panel .... 0 1 2 3 4 5 X
   4. Budget constraints .... 0 1 2 3 4 5 X
   5. Time limits .... 0 1 2 3 4 5 X
   6. Your personal evaluation of the usefulness of
      participation .... 0 1 2 3 4 5 X
   7. Characteristics of affected publics (level of
      organization, willingness to cooperate, diver-
      sity of interests, etc.) .... 0 1 2 3 4 5 X
   8. Others (please specify) _____

I. Please name the most recently completed assessment
   project used as the exemplar for your answer:

   _____

   _____

   IF YOU COMPARE this project(s) with others you worked on at
   OTA, how would you best descibe it in relation to
   those considering the aspect of participation? (check one)
   1. Exeptional because it focused on participation
      more strongly than usual .... __
   2. Exeptional because it focused on participation
      less strongly than usual .... __
   3. Fairly representative .... __

   In order that we may compare views about benefits
   and risks in science and technology with views of
   the general public, please complete the following
   questions.

J. How much benefit do you expect you and your family
   to get from developments in science and technology
   in the next twenty years? (Check one)
   1. A lot of benefit .... __
   2. Some benefit .... __
   3. Little benefit .... __
   4. No benefit .... __
   5. Not sure .... __
   6. No answer .... __

K. How much risk to you and your family do you think
   developments in science and technology will cause
   in the next twenty years? (Check one)
   1. A lot of risk .... __
   2. Some risk .... __
   3. Little risk .... __
   4. No risk .... __
   5. Not sure .... __
   6. No answer .... __

STATISTICAL INFORMATION

So that the information you so kindly shared is statistically useful,
we ask that you complete the following information. From it, we may
be able to determine patterns and trends. Such information is not
attributable to individuals.

   1. Highest earned academic or professional degree _____
   2. Number of years you have practice technology assessment _____
   3. The term you use when describing your profession or discipline
      you were trained to others _____
   4. In terms of political ideology, would you describe yourself as
         Conservative____ Moderate____ Liberal ____
         Other (please specify) _____
                  THANK YOU FOR YOUR ASSISTANCE

Table 3: Answers to Question A

A. In your opinion, to what degree does OTA generally achieve
   the following objectives frequently mentioned in the technology
   assessment literature? (Please circle the answers)

   1. Providing decision-makers with sound objective
      information based on a high level of expertise ... 0 1 2 3 4 5 X
   2. Presenting a broad range of views on the problem
      under assessment, both by experts and affected
      groups .... 0 1 2 3 4 5 X
   3. Seeking to create consensus among different
      groups of stakeholders .... 0 1 2 3 4 5 X
   4. Drawing attention to the needs of yet unorganized,
      poorly represented, possibly affected, parts of
      the public .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average
degree; 4 - high degree; 5 - very high degree; X - no opinion

Percentage of respondents (total number in brackets)

scores / answer	0	1	2	3	4	5	X	total	average score
A. 1.	0 (0)	0 (0)	0 (0)	0 (0)	51.2 (22)	48.8 (21)	0 (0)	43	4.5
A. 2.	0 (0)	0 (0)	0 (0)	9.3 (4)	46.5 (20)	44.2 (19)	0 (0)	43	4.3
A. 3.	16.3 (7)	16.3 (7)	25.6 (11)	27.9 (12)	11.6 (5)	2.3 (1)	0 (0)	43	2.1
A. 4.	0 (0)	2.3 (1)	9.3 (4)	41.9 (18)	30.2 (13)	11.6 (5)	4.7 (2)	43	3.3

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify)* .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	2.4 (1)	2.4 (1)	0 (0)	2.4 (1)	50 (21)	40.5 (17)	2.4 (1)	42	4.2
B. 2.	2.4 (1)	0 (0)	0 (0)	4.8 (2)	14.3 (6)	76.2 (32)	2.4 (1)	42	4.6
B. 3.	47.6 (20)	23.8 (10)	16.7 (7)	2.4 (1)	0 (0)	7.1 (3)	2.4 (1)	42	1.0
B. 4.	2.4 (1)	0 (0)	9.5 (4)	23.8 (10)	26.2 (11)	35.7 (15)	2.4 (1)	42	3.8
B. 5.	4.8 (2)	2.4 (1)	2.4 (1)	21.4 (9)	40.5 (17)	26.2 (11)	2.4 (1)	42	3.7
B. 6.	54.8 (23)	4.8 (2)	4.8 (2)	7.1 (3)	14.3 (6)	11.9 (5)	2.4 (1)	42	1.6
B. 7.	28.6 (12)	19 (8)	9.5 (4)	9.5 (4)	11.9 (5)	16.7 (7)	2.4 (1)	42	2.0
B. 8.	(0)	(0)	(1)	(1)	(1)	(3)	(6)	12	

* - direct mail soliciting of info; exchange of news
  - correspondence
  - direct feedback of congressional staff and press

Table 5: Answers to Question C

C. To what extent were the following groups solicited
   for descriptive and factual matter? (Please circle the answers)

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	26.8 (11)	11.9 (5)	11.9 (5)	19.5 (8)	24.4 (10)	4.9 (2)	0 (0)	41	2.2
C. 2.	2.4 (1)	2.4 (1)	4.9 (2)	19.5 (8)	36.6 (15)	34.1 (15)	0 (0)	41	3.9

Table 6: Answers to Question D

D. To what extent were the following groups solicited
   for opinions or viewpoints?
   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	22 (9)	14.6 (6)	14.6 (6)	14.6 (6)	24.4 (10)	7.3 (3)	2.4 (1)	41	2.3
D. 2.	2.4 (1)	4.9 (2)	7.3 (3)	11.9 (5)	36.6 (15)	36.6 (15)	0 (0)	41	3.9

Table 7: Answers to Question E

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	20 (8)	22.5 (9)	5 (2)	22.5 (9)	27.5 (11)	0 (0)	2.5 (1)	40	2.2
E. 2.	2.5 (1)	10 (4)	2.5 (1)	15 (6)	45 (18)	22.5 (9)	2.5 (1)	40	3.6

Table 8: Answers to Question F

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project?

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding*................................... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify)⊛...................... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	10 (4)	10 (4)	10 (4)	27.5 (11)	27.5 (11)	12.5 (5)	2.5 (1)	40	2.9
F. 2.	15 (6)	7.5 (3)	12.5 (5)	20 (8)	20 (8)	25 (10)	0 (0)	40	3.0
F. 3.	20 (8)	0 (0)	2.5 (1)	30 (12)	25 (10)	20 (8)	2.5 (1)	40	3.0
F. 4.	7.5 (3)	12.5 (5)	17.5 (7)	30 (12)	20 (8)	7.5 (3)	5 (2)	40	2.7
F. 5.	10 (4)	2.5 (1)	10 (4)	15 (6)	22.5 (9)	40 (16)	0 (0)	40	3.6
F. 6.	(2)	(0)	(0)	(0)	(0)	(4)	(3)	9	

* - fact finding: what people believe they need

⊛ - ensuring all interested parties are identified early in the assessment

Table 9: Answers to Question G

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for·less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify)*......................... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	15 (6)	7.5 (3)	2.5 (1)	37.5 (15)	10 (4)	27.5 (11)	0 (0)	40	3.0
G. 2.	10 (4)	7.5 (3)	7.5 (3)	27.5 (11)	25 (10)	22.5 (9)	0 (0)	40	3.2
G. 3.	42.5 (17)	27.5 (11)	7.5 (3)	10 (4)	10 (4)	2.5 (1)	0 (0)	40	1.3
G. 4.	22.5 (9)	12.5 (5)	12.5 (5)	12.5 (5)	30 (12)	10 (4)	0 (0)	40	2.5
G. 5.	22.5 (9)	25 (10)	22.5 (9)	12.5 (5)	12.5 (5)	5 (2)	0 (0)	40	1.8
G. 6.	(2)	(0)	(0)	(0)	(1)	(0)	(4)	7	

* - getting new emerging ideas

H. To what extent was the role public participation
played in your most recently completed project de-
termined by the following factors? (Please circle the answers)

1. Characteristics of the technology
   under assessment .... 0 1 2 3 4 5 X
2. Decision of superior .... 0 1 2 3 4 5 X
3. Influence of advisory panel .... 0 1 2 3 4 5 X
4. Budget constraints .... 0 1 2 3 4 5 X
5. Time limits .... 0 1 2 3 4 5 X
6. Your personal evaluation of the usefulness of
   participation .... 0 1 2 3 4 5 X
7. Characteristics of affected publics (level of
   organization, willingness to cooperate, diver-
   sity of interests, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	7.7 (3)	2.6 (1)	5.1 (2)	10.3 (4)	30.8 (12)	43.6 (17)	0 (0)	39	3.8
H. 2.	32.4 (12)	32.4 (12)	5.4 (2)	10.8 (4)	13.5 (5)	2.7 (1)	2.7 (1)	37	1.5
H. 3.	24.3 (9)	18.9 (7)	21.6 (8)	21.6 (8)	13.5 (5)	0 (0)	0 (0)	37	1.8
H. 4.	18.9 (7)	29.7 (11)	13.5 (5)	16.2 (6)	18.9 (7)	0 (0)	2.7 (1)	37	1.9
H. 5.	13.5 (5)	27 (10)	8.1 (3)	18.9 (7)	24.3 (9)	8.1 (3)	0 (0)	37	2.4
H. 6.	8.3 (3)	5.6 (2)	0 (0)	30.6 (11)	38.9 (14)	16.7 (6)	0 (0)	36	3.4
H. 7.	7.9 (3)	7.9 (3)	2.6 (1)	21 (8)	42 (16)	18.4 (7)	0 (0)	38	3.4
H. 8.								3	

* - committee request

- relevance of public opinion

- OTA ambience

Table 11: Answers to Question I

I. IF YOU COMPARE this project(s) with others you worked on at
   OTA, how would you best descibe it in relation to
   those considering the aspect of participation? (check one)
   1. Exeptional because it focused on participation
      more strongly than usual .... __
   2. Exeptional because it focused on participation
      less strongly than usual .... __
   3. Fairly representative .... __

scores answer	1	2	3	total
I	35.5(11)	16.1 (5)	48.4 (15)	31

Table 12: Answers to Question J

J. How much benefit do you expect you and your family
   to get from developments in science and technology
   in the next twenty years? (Check one)
   1. A lot of benefit .... __
   2. Some benefit .... __
   3. Little benefit .... __
   4. No benefit .... __
   5. Not sure .... __
   6. No answer .... __

scores answer	1	2	3	4	5	6	total
J.	66.7 (28)	31 (13)	2.4 (1)	0 (0)	0 (0)	0 (0)	42

Table 13: Answers to Question K

K. How much risk to you and your family do you think
   developments in science and technology will cause
   in the next twenty years? (Check one)
   1. A lot of risk .... __
   2. Some risk .... __
   3. Little risk .... __
   4. No risk .... __
   5. Not sure .... __
   6. No answer .... __

scores / answer	1	2	3	4	5	6	total
K	31 (13)	61.9 (26)	7.1 (3)	0 (0)	0 (0)	0 (0)	42

Table 14: Highest Earned Academic or Professional Degree

PhD	17
MA	7
MEng	1
MD	2
MS	5
MSc	1
MPP	1
JD	2
JD/MA	1
SM	1
BA	4
4 year college	1

Table 15: Experience in the Field of Technology Assessment

years of practice	number of respondents	in %
<1	4	9.3
1	5	11.6
2	5	11.6
3	8	18.6
4	2	4.7
5	3	7.0
6	4	9.3
7	1	2.3
8	2	4.7
9	1	2.3
10	2	4.7
11	1	2.3
12	1	2.3
13	1	2.3
14	0	0
15	2	4.7
.	.	.
.	.	.
.	.	.
26	1	2.3

Table 16: Professional Training

number	term
2	physician
1	geneticist
1	human genetics
1	botanist
1	biology / physiological psychology
1	research psychologist
1	natural resource management
1	physics
1	scientist
1	scientific analyst
1	mechanical engineer
2	science policy
1	history of science
2	technology policy analyst
7	policy analyst
1	sociologist
1	political science
1	economist / political science
1	economist
1	applied economics
1	resource economist
1	systems analyst
1	international relations
1	environmental policy analyst
1	research analyst
2	analyst
1	law
1	attorney
1	research assistant
1	public administrator
1	administrative assistant
1	editor
1	liberal art

Table 17: Political Ideology

category	number of respondents	in %
conservative	0	0
moderate	16	37.2
liberal	19	44.2
others		
moderate/liberal	1	2.3
social democrat	1	2.3
independent	2	4.7
depends on issue	1	2.3
appropriate	1	2.3
fiscal conservative/ social liberal	1	2.3
free thinking sceptic	1	2.3

Table 18: Distribution by Program

number of respondents	program
2	energy and materials
5	industry, technology, and employment
1	international security and commerce
2	biological applications
4	food and renewable resources
8	health
3	communication and information technologies
4	oceans and environment
2	science, education and transportation
1	several
11	no response

Table 19: Political Ideology as Explanatory Variable

A. Liberals

A. In your opinion, to what degree does OTA generally achieve the following objectives frequently mentioned in the technology assessment literature? (Please circle the answers)

    1. Providing decision-makers with sound objective
       information based on a high level of expertise ... 0 1 2 3 4 5 X
    2. Presenting a broad range of views on the problem
       under assessment, both by experts and affected
       groups .... 0 1 2 3 4 5 X
    3. Seeking to create consensus among different
       groups of stakeholders .... 0 1 2 3 4 5 X
    4. Drawing attention to the needs of yet unorganized,
       poorly represented, possibly affected, parts of
       the public .... 0 1 2 3 4 5 X

0 — not at all; 1 — very low degree; 2 — low degree; 3 — average degree; 4 — high degree; 5 — very high degree; X — no opinion

scores answer	0	1	2	3	4	5	X	total	average score
A. 1.	0 (0)	0 (0)	0 (0)	0 (0)	55.6 (10)	44.4 (8)	0 (0)	18	4.4
A. 2.	0 (0)	0 (0)	0 (0)	16.7 (3)	50 (9)	33.3 (6)	0 (0)	18	4.2
A. 3.	16.7 (3)	38.9 (7)	27.8 (5)	11.1 (2)	5.6 (1)	0 (0)	0 (0)	18	1.5
A. 4.	0 (0)	5.6 (1)	5.6 (1)	55.6 (10)	22.2 (4)	5.6 (1)	5.6 (1)	18	3.2

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	0 (0)	0 (0)	0 (0)	5.6 (1)	72.2 (13)	22.2 (4)	0 (0)	18	4.2
B. 2.	0 (0)	0 (0)	0 (0)	0 (0)	22.2 (4)	77.8 (14)	0 (0)	18	4.8
B. 3.	44.4 (8)	33.3 (6)	11.1 (2)	0 (0)	0 (0)	11.1 (2)	0 (0)	18	1.1
B. 4.	0 (0)	0 (0)	5.6 (1)	27.8 (5)	33.3 (6)	33.3 (6)	0 (0)	18	3.9
B. 5.	5.6 (1)	0 (0)	0 (0)	22.2 (4)	55.6 (10)	16.7 (3)	0 (0)	18	3.7
B. 6.	66.7 (12)	11.1 (2)	5.6 (1)	5.6 (1)	11.1 (2)	0 (0)	0 (0)	18	0.8
B. 7.	38.9 (7)	16.7 (3)	11.1 (2)	11.1 (2)	11.1 (2)	11.1 (2)	0 (0)	18	1.7
B. 8.	(0)	(0)	(0)	(0)	(0)	(1)	(1)	2	

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

    1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

    2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X.

scores answer	0	1	2	3	4	5	X	total	average score
C. 1.	38.9 (7)	11.1 (2)	11.1 (2)	16.7 (3)	16.7 (3)	5.6 (1)	0 (0)	18	1.8
C. 2.	5.6 (1)	5.6 (1)	5.6 (1)	22.2 (4)	38.9 (7)	22.2 (4)	0 (0)	18	3.5

D. To what extent were the following groups solicited
for opinions or viewpoints?
    1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X

scores answer	0	1	2	3	4	5	X	total	average score
D. 1.	33.3 (6)	11.1 (2)	22.2 (4)	5.6 (1)	16.7 (3)	5.6 (1)	5.6 (1)	18	1.8
D. 2.	5.6 (1)	5.6 (1)	11.1 (2)	11.1 (2)	44.4 (9)	16.7 (3)	0 (0)	18	3.4

E. To what extent were the following groups enlisted in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affected publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your judgement have great influence on the policy formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	27.8 (5)	16.7 (3)	5.6 (1)	11.1 (2)	38.9 (7)	0 (0)	0 (0)	18	2.2
E. 2.	0 (0)	16.7 (3)	5.6 (1)	11.1 (2)	55.6 (10)	11.1 (2)	0 (0)	18	3.4

F. To what degree was public participation a part of your analysis at the different stages of your most recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values for impact assessment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	16.7 (3)	5.6 (1)	11.1 (2)	27.8 (5)	33.3 (6)	5.6 (1)	0 (0)	18	2.7
F. 2.	17.7 (3)	11.8 (2)	5.9 (1)	35.3 (6)	17.7 (3)	11.8 (2)	0 (0)	17	2.6
F. 3.	16.7 (3)	5.6 (1)	11.1 (2)	27.8 (5)	22.2 (4)	11.1 (2)	5.6 (1)	18	2.7
F. 4.	11.1 (2)	16.7 (3)	11.1 (2)	38.9 (7)	5.6 (1)	5.6 (1)	11.1 (2)	18	2.4
F. 5.	5.6 (1)	5.6 (1)	16.7 (3)	16.7 (3)	22.2 (4)	27.8 (5)	0 (0)	18	3.2
F. 6.	(3)						(1)	4	

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for·less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	16.7 (3)	5.6 (1)	5.6 (1)	38.9 (7)	16.7 (3)	16.7 (3)	0 (0)	18	2.8
G. 2.	11.1 (2)	11.1 (2)	5.6 (1)	27.8 (5)	33.3 (6)	11.1 (2)	0 (0)	18	2.9
G. 3.	61.1 (11)	33.3 (6)	0 (0)	5.6 (1)	0 (0)	0 (0)	0 (0)	18	0.5
G. 4.	27.8 (5)	11.1 (2)	5.6 (1)	11.1 (2)	33.3 (6)	11.1 (2)	0 (0)	18	2.4
G. 5.	38.9 (7)	11.1 (2)	22.2 (4)	16.7 (3)	5.6 (1)	5.6 (1)	0 (0)	18	1.6
G. 6.							(2)	2	

H. To what extent was the role public participation
played in your most recently completed project de-
termined by the following factors? (Please circle the answers)

1. Characteristics of the technology
   under assessment .... 0 1 2 3 4 5 X
2. Decision of superior .... 0 1 2 3 4 5 X
3. Influence of advisory panel .... 0 1 2 3 4 5 X
4. Budget constraints .... 0 1 2 3 4 5 X
5. Time limits .... 0 1 2 3 4 5 X
6. Your personal evaluation of the usefulness of
   participation .... 0 1 2 3 4 5 X
7. Characteristics of affected publics (level of
   organization, willingness to cooperate, diver-
   sity of interests, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	5.9 (1)	0 (0)	5.9 (1)	5.9 (1)	29.4 (5)	52.9 (9)	0 (0)	17	4.1
H. 2.	35.3 (6)	29.4 (5)	5.9 (1)	17.7 (3)	11.8 (2)	0 (0)	0 (0)	17	1.4
H. 3.	29.4 (5)	23.5 (4)	23.5 (4)	5.9 (1)	17.7 (3)	0 (0)	0 (0)	17	1.6
H. 4.	17.7 (3)	47.1 (8)	0 (0)	17.7 (3)	17.7 (3)	0 (0)	0 (0)	17	1.7
H. 5.	5.9 (1)	29.4 (5)	0 (0)	29.4 (5)	29.4 (5)	5.9 (1)	0 (0)	17	2.6
H. 6.	12.5 (2)	0 (0)	0 (0)	18.8 (3)	56.3 (9)	12.5 (2)	0 (0)	16	3.4
H. 7.	11.8 (2)	5.9 (1)	0 (0)	29.4 (5)	35.3 (6)	17.7 (3)	0 (0)	17	3.2
H. 8.									

J. How much benefit do you expect you and your family
   to get from developments in science and technology
   in the next twenty years? (Check one)
   1. A lot of benefit .... __
   2. Some benefit .... __
   3. Little benefit .... __
   4. No benefit .... __
   5. Not sure .... __
   6. No answer .... __

scores / answer	1	2	3.	4	5	6	total
J.	52.9 (9)	41.2 (7)	5.9 (1)	0 (0)	0 (0)	0 (0)	17

K. How much risk to you and your family do you think
   developments in science and technology will cause
   in the next twenty years? (Check one)
   1. A lot of risk .... __
   2. Some risk .... __
   3. Little risk .... __
   4. No risk .... __
   5. Not sure .... __
   6. No answer .... __

scores / answer	1	2	3	4	5	6	total
K	41.2 (7)	52.9 (9)	5.9 (1)	0 (0)	0 (0)	0 (0)	17

A. In your opinion, to what degree does OTA generally achieve
the following objectives frequently mentioned in the technology
assessment literature? (Please circle the answers)

1. Providing decision-makers with sound objective
information based on a high level of expertise ... 0 1 2 3 4 5 X
2. Presenting a broad range of views on the problem
under assessment, both by experts and affected
groups .... 0 1 2 3 4 5 X
3. Seeking to create consensus among different
groups of stakeholders .... 0 1 2 3 4 5 X
4. Drawing attention to the needs of yet unorganized,
poorly represented, possibly affected, parts of
the public .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
A. 1.	0 (0)	0 (0)	0 (0)	0 (0)	46.7 (7)	53.3 (8)	0 (0)	15	4.5
A. 2.	0 (0)	0 (0)	0 (0)	6.7 (1)	46.7 (7)	46.7 (7)	0 (0)	15	4.4
A. 3.	6.7 (1)	0 (0)	26.7 (4)	53.3 (8)	6.7 (1)	6.7 (1)	0 (0)	15	2.7
A. 4.	0 (0)	0 (0)	13.3 (2)	46.7 (7)	26.7 (4)	13.3 (2)	0 (0)	15	3.4

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	6.7 (1)	6.7 (1)	0 (0)	0 (0)	53.3 (8)	26.7 (4)	6.7 (1)	15	3.8
B. 2.	6.7 (1)	0 (0)	0 (0)	6.7 (1)	6.7 (1)	73.3 (11)	6.7 (1)	15	4.4
B. 3.	53.3 (8)	6.7 (1)	26.7 (4)	6.7 (1)	0 (0)	0 (0)	6.7 (1)	15	0.8
B. 4.	6.7 (1)	0 (0)	6.7 (1)	6.7 (1)	40 (6)	33.4 (5)	6.7 (1)	15	3.9
B. 5.	6.7 (1)	0 (0)	6.7 (1)	20 (3)	13.3 (2)	46.7 (7)	6.7 (1)	15	3.4
B. 6.	53.3 (8)	13.3 (2)	6.7 (1)	0 (0)	6.7 (1)	13.3 (2)	6.7 (1)	15	1.3
B. 7.	20 (3)	26.7 (4)	0 (0)	6.7 (1)	20 (3)	13.3 (2)	13.3 (2)	15	2.2
B. 8.			(1)	(1)		(1)	(2)	5	

C. To what extent were the following groups solicited
   for descriptive and factual matter? (Please circle the answers)

    1. Representatives of non-organized possibly affec-
   ted publics .... 0 1 2 3 4 5 X

    2. Representatives of interest groups which in your
   judgement have great influence on the policy
   formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	21.4 (3)	14.3 (2)	14.3 (2)	14.3 (2)	35.7 (5)	0 (0)	0 (0)	14	2.3
C. 2.	0 (0)	0 (0)	0 (0)	21.4 (3)	35.7 (5)	42.9 (6)	0 (0)	14	4.2

D. To what extent were the following groups solicited
   for opinions or viewpoints?
    1. Representatives of non-organized possibly affec-
   ted publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your
   judgement have great influence on the policy
   formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	21.4 (3)	7.1 (1)	7.1 (1)	28.6 (4)	35.7 (5)	0 (0)	0 (0)	14	2.5
D. 2.	0 (0)	0 (0)	0 (0)	21.4 (3)	14.3 (2)	64.3 (9)	0 (0)	14	4.4

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	30.8 (4)	15.4 (2)	7.7 (1)	30.8 (4)	15.4 (2)	0 (0)	0 (0)	13	1.8
E. 2.	7.7 (1)	7.7 (1)	0 (0)	15.4 (2)	30.8 (4)	38.5 (5)	0 (0)	13	3.7

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	7.1 (1)	14.3 (2)	7.1 (1)	21.4 (3)	21.4 (3)	21.4 (3)	7.1 (1)	14	3.1
F. 2.	21.4 (3)	0 (0)	14.3 (2)	14.3 (2)	0 (0)	50 (7)	0 (0)	14	3.2
F. 3.	14.3 (2)	0 (0)	14.3 (2)	21.4 (3)	28.6 (4)	21.4 (3)	0 (0)	14	3.1
F. 4.	7.1 (1)	7.1 (1)	28.6 (4)	21.4 (3)	28.6 (4)	7.1 (1)	0 (0)	14	2.8
F. 5.	14.3 (2)	0 (0)	0 (0)	7.1 (1)	21.4 (3)	57.1 (8)	0 (0)	14	3.9
F. 6.	(2)	(0)	(0)	(0)	(0)	(3)	(1)	6	

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	21.4 (3)	14.3 (2)	0 (0)	28.6 (4)	14.3 (2)	21.4 (3)	0 (0)	14	2.6
G. 2.	14.3 (2)	7.1 (1)	14.3 (2)	28.6 (4)	7.1 (1)	28.6 (4)	0 (0)	14	2.9
G. 3.	38.5 (5)	7.7 (1)	15.4 (2)	23.1 (3)	15.4 (2)	0 (0)	0 (0)	13	0.6
G. 4.	21.4 (3)	14.3 (2)	14.3 (2)	14.3 (2)	28.6 (4)	7.1 (1)	0 (0)	14	2.4
G. 5.	14.3 (2)	35.7 (5)	21.4 (3)	7.1 (1)	14.3 (2)	7.1 (1)	0 (0)	14	1.6
G. 6.	(2)	(0)	(0)	(0)	(1)	(0)	(1)	4	

H. To what extent was the role public participation played in your most recently completed project determined by the following factors? (Please circle the answers)

1. Characteristics of the technology
   under assessment .... 0 1 2 3 4 5 X
2. Decision of superior .... 0 1 2 3 4 5 X
3. Influence of advisory panel .... 0 1 2 3 4 5 X
4. Budget constraints .... 0 1 2 3 4 5 X
5. Time limits .... 0 1 2 3 4 5 X
6. Your personal evaluation of the usefulness of
   participation .... 0 1 2 3 4 5 X
7. Characteristics of affected publics (level of
   organization, willingness to cooperate, diversity of interests, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	7.1 (1)	7.1 (1)	7.1 (1)	7.1 (1)	42.9 (6)	28.6 (4)	0 (0)	14	3.6
H. 2.	30.8 (4)	38.5 (5)	0 (0)	0 (0)	23.1 (3)	7.7 (1)	0 (0)	13	1.7
H. 3.	15.4 (2)	15.4 (2)	15.4 (2)	38.5 (5)	15.4 (2)	0 (0)	0 (0)	13	2.2
H. 4.	30.8 (4)	15.4 (2)	38.5 (5)	7.7 (1)	7.7 (1)	0 (0)	0 (0)	13	1.5
H. 5.	30.8 (4)	30.8 (4)	15.4 (2)	15.4 (2)	7.7 (1)	0 (0)	0 (0)	13	1.4
H. 6.	7.7 (1)	15.4 (2)	0 (0)	30.8 (4)	23.1 (3)	23.1 (3)	0 (0)	13	3.2
H. 7.	7.1 (1)	14.3 (2)	0 (0)	7.1 (1)	50 (7)	21.4 (3)	0 (0)	14	3.4
H. 8.									

J. How much benefit do you expect you and your family
   to get from developments in science and technology
   in the next twenty years? (Check one)
   1. A lot of benefit .... __
   2. Some benefit .... __
   3. Little benefit .... __
   4. No benefit .... __
   5. Not sure .... __
   6. No answer .... __

scores answer	1	2	3	4	5	6	total
J.	64.3 (9)	35.7 (5)	0 (0)	0 (0)	0 (0)	0 (0)	14

K. How much risk to you and your family do you think
   developments in science and technology will cause
   in the next twenty years? (Check one)
   1. A lot of risk .... __
   2. Some risk .... __
   3. Little risk .... __
   4. No risk .... __
   5. Not sure .... __
   6. No answer .... __

scores answer	1	2	3	4	5	6	total
K	21.4 (3)	71.4 (10)	7.1 (1)	0 (0)	0 (0)	0 (0)	14

A. Respondents with five and more Years of Experience in Technology Assessment

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average
degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	0 (0)	4.8 (1)	0 (0)	4.8 (1)	47.6 (10)	42.9 (9)	0 (0)	21	4.2
B. 2.	0 (0)	0 (0)	0 (0)	9.5 (2)	19 (4)	71.4 (15)	0 (0)	21	4.6
B. 3.	42.9 (9)	38.1 (8)	19 (4)	0 (0)	0 (0)	0 (0)	0 (0)	21	0.8
B. 4.	0 (0)	0 (0)	9.5 (2)	23.8 (5)	23.8 (5)	42.9 (9)	0 (0)	21	4.0
B. 5.	0 (0)	0 (0)	0 (0)	33.3 (7)	38.1 (8)	28.6 (6)	0 (0)	21	4.0
B. 6.	42.9 (9)	9.5 (2)	9.5 (2)	4.8 (1)	4.8 (1)	19 (4)	14.3 (3)	21	1.8
B. 7.	19 (4)	19 (4)	14.3 (3)	9.5 (2)	9.5 (2)	19 (4)	9.5 (2)	21	2.3
B. 8.						(1)	(3)	4	

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

    1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

    2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	20 (4)	20 (4)	10 (2)	15 (3)	30 (6)	5 (1)	0 (0)	20	2.3
C. 2.	0 (0)	5 (1)	5 (1)	15 (3)	40 (8)	35 (7)	0 (0)	20	4.0

D. To what extent were the following groups solicited
for opinions or viewpoints?

    1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

    2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	15 (3)	25 (5)	10 (2)	10 (2)	25 (5)	10 (2)	5 (1)	20	2.4
D. 2.	5 (1)	0 (0)	10 (2)	15 (3)	45 (9)	25 (5)	0 (0)	20	3.7

E. To what extent were the following groups enlisted in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affected publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your judgement have great influence on the policy formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	10 (2)	35 (7)	0 (0)	25 (5)	25 (5)	0 (0)	5 (1)	20	2.2
E. 2.	0 (0)	10 (2)	5 (1)	15 (3)	45 (9)	20 (4)	5 (1)	20	3.6

F. To what degree was public participation a part of your analysis at the different stages of your most recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values for impact assessment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	5 (1)	15 (3)	15 (3)	25 (5)	30 (6)	5 (1)	5 (1)	20	2.8
F. 2.	10 (2)	10 (2)	15 (3)	35 (7)	10 (2)	20 (4)	0 (0)	20	2.9
F. 3.	15 (3)	0 (0)	5 (1)	30 (6)	30 (6)	15 (3)	5 (1)	20	3.1
F. 4.	0 (0)	20 (4)	20 (4)	30 (6)	20 (4)	0 (0)	10 (2)	20	2.6
F. 5.	5 (1)	5 (1)	10 (2)	10 (2)	30 (6)	40 (8)	0 (0)	20	3.8
F. 6.						(1)	(2)	3	

G. What degree of importance was assigned to the following objectives for having the public participate in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for less powerful interests to influence the policy formulation process ...... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	15 (3)	10 (2)	0 (0)	20 (4)	15 (3)	40 (8)	0 (0)	20	3.3
G. 2.	0 (0)	15 (3)	10 (2)	30 (6)	40 (8)	5 (1)	0 (0)	20	3.1
G. 3.	35 (7)	35 (7)	5 (1)	20 (4)	5 (1)	0 (0)	0 (0)	20	1.3
G. 4.	15 (3)	15 (3)	20 (4)	20 (4)	25 (5)	5 (1)	0 (0)	20	2.4
G. 5.	20 (4)	25 (5)	25 (5)	20 (4)	10 (2)	0 (0)	0 (0)	20	1.8
G. 6.							(3)	3	

H. To what extent was the role public participation
played in your most recently completed project de-
termined by the following factors? (Please circle the answers)

1. Characteristics of the technology
under assessment .... 0 1 2 3 4 5 X
2. Decision of superior .... 0 1 2 3 4 5 X
3. Influence of advisory panel .... 0 1 2 3 4 5 X
4. Budget constraints .... 0 1 2 3 4 5 X
5. Time limits .... 0 1 2 3 4 5 X
6. Your personal evaluation of the usefulness of
participation .... 0 1 2 3 4 5 X
7. Characteristics of affected publics (level of
organization, willingness to cooperate, diver-
sity of interests, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	5.3 (1)	5.3 (1)	5.3 (1)	15.8 (3)	21.1 (4)	47.4 (9)	0 (0)	19	3.8
H. 2.	10.5 (2)	42.1 (8)	10.5 (2)	10.5 (2)	15.8 (3)	5.3 (1)	5.3 (1)	19	1.9
H. 3.	15.8 (3)	26.3 (5)	15.8 (3)	21.1 (4)	21.1 (4)	0 (0)	0 (0)	19	2.1
H. 4.	5.3 (1)	36.8 (7)	15.8 (3)	15.8 (3)	21.1 (4)	0 (0)	5.3 (1)	19	2.1
H. 5.	5.3 (1)	47.4 (9)	10.5 (2)	10.5 (2)	21.1 (4)	5.3 (1)	0 (0)	19	2.1
H. 6.	5.3 (1)	10.5 (2)	0 (0)	26.3 (5)	47.4 (9)	10.5 (2)	0 (0)	19	3.3
H. 7.	5.3 (1)	10.5 (2)	5.3 (1)	26.3 (5)	47.4 (9)	5.3 (1)	0 (0)	19	3.2
H. 8.									

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average
degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	4.8 (1)	0 (0)	0 (0)	0 (0)	53.4 (11)	38.1 (8)	4.8 (1)	21	4.2
B. 2.	4.8 (1)	0 (0)	0 (0)	0 (0)	9.5 (2)	81 (17)	4.8 (1)	21	4.7
B. 3.	53.4 (11)	9.5 (2)	14.3 (3)	4.8 (1)	0 (0)	14.3 (3)	4.8 (1)	21	1.3
B. 4.	4.8 (1)	0 (0)	9.5 (2)	23.8 (5)	28.6 (6)	28.6 (6)	4.8 (1)	21	3.7
B. 5.	9.5 (2)	4.8 (1)	4.8 (1)	9.5 (2)	42.9 (9)	23.8 (5)	4.8 (1)	21	3.5
B. 6.	66.7 (14)	0 (0)	0 (0)	9.5 (2)	9.5 (2)	9.5 (2)	4.8 (1)	21	1.2
B. 7.	38.1 (8)	19 (4)	4.8 (1)	14.3 (3)	14.3 (3)	14.3 (3)	0 (0)	21	2.0
B. 8.			(1)	(1)	(1)	(2)	(3)	8	

C. To what extent were the following groups solicited
   for descriptive and factual matter? (Please circle the answers)

    1. Representatives of non-organized possibly affec-
   ted publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your
   judgement have great influence on the policy
   formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	33.3 (7)	4.8 (1)	14.3 (3)	23.8 (5)	19 (4)	4.8 (1)	0 (0)	21	2.0
C. 2.	4.8 (1)	0 (0)	4.8 (1)	23.8 (5)	33.3 (7)	33.3 (7)	0 (0)	21	3.8

D. To what extent were the following groups solicited
   for opinions or viewpoints?
    1. Representatives of non-organized possibly affec-
   ted publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your
   judgement have great influence on the policy
   formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	28.6 (6)	4.8 (1)	19 (4)	19 (4)	23.8 (5)	4.8 (1)	0 (0)	21	2.2
D. 2.	0 (0)	9.5 (2)	4.8 (1)	9.5 (2)	28.6 (6)	47.6 (10)	0 (0)	21	4.0

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	30 (6)	10 (2)	10 (2)	20 (4)	30 (6)	0 (0)	0 (0)	20	2.1
E. 2.	5 (1)	10 (2)	0 (0)	15 (3)	45 (9)	25 (5)	0 (0)	20	3.9

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	15 (3)	5 (1)	5 (1)	30 (6)	25 (5)	20 (4)	0 (0)	20	3.1
F. 2.	20 (4)	5 (1)	10 (2)	5 (1)	30 (6)	30 (6)	0 (0)	20	3.1
F. 3.	25 (5)	0 (0)	0 (0)	30 (6)	20 (4)	25 (5)	0 (0)	20	3.0
F. 4.	15 (3)	5 (1)	15 (3)	30 (6)	20 (4)	15 (3)	0 (0)	20	2.8
F. 5.	15 (3)	0 (0)	10 (2)	20 (4)	15 (3)	40 (8)	0 (0)	20	3.4
F. 6.	(2)	(0)	(0)	(0)	(0)	(3)	(1)	6	

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for·less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	15 (3)	5 (1)	5 (1)	55 (11)	5 (1)	15 (3)	0 (0)	20	2.8
G. 2.	20 (4)	0 (0)	5 (1)	25 (5)	10 (2)	40 (8)	0 (0)	20	3.3
G. 3.	50 (10)	20 (4)	10 (2)	0 (0)	15 (3)	1 (5)	0 (0)	20	1.8
G. 4.	30 (6)	10 (2)	5 (1)	5 (1)	35 (7)	15 (3)	0 (0)	20	2.5
G. 5.	25 (5)	25 (5)	20 (4)	5 (1)	15 (3)	10 (2)	0 (0)	20	3.0
G. 6.	(2)	(0)	(0)	(0)	(1)	(0)	(1)	4	

H. To what extent was the role public participation
played in your most recently completed project de-
termined by the following factors? (Please circle the answers)

1. Characteristics of the technology
   under assessment .... 0 1 2 3 4 5 X
2. Decision of superior .... 0 1 2 3 4 5 X
3. Influence of advisory panel .... 0 1 2 3 4 5 X
4. Budget constraints .... 0 1 2 3 4 5 X
5. Time limits .... 0 1 2 3 4 5 X
6. Your personal evaluation of the usefulness of
   participation .... 0 1 2 3 4 5 X
7. Characteristics of affected publics (level of
   organization, willingness to cooperate, diver-
   sity of interests, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	10 (2)	0 (0)	5 (1)	5 (1)	40 (8)	40 (8)	0 (0)	20	4.5
H. 2.	55.6 (10)	22.2 (4)	0 (0)	11.1 (2)	11.1 (2)	0 (0)	0 (0)	18	1.0
H. 3.	33.3 (6)	11.1 (2)	27.8 (5)	22.2 (4)	5.6 (1)	0 (0)	0 (0)	18	1.6
H. 4.	33.3 (6)	22.2 (4)	11.1 (2)	16.7 (3)	16.7 (3)	0 (0)	0 (0)	18	1.6
H. 5.	22.2 (4)	5.6 (1)	5.6 (1)	27.8 (5)	27.8 (5)	11.1 (2)	0 (0)	18	2.7
H. 6.	11.1 (2)	0 (0)	0 (0)	33.3 (6)	27.8 (5)	22.2 (4)	0 (0)	18	3.2
H. 7.	10.5 (2)	5.3 (1)	0 (0)	15.8 (3)	36.8 (7)	31.6 (6)	0 (0)	18	3.8
H. 8.							(0)	19	

Table 21: Objective of "Providing a chance for less powerful interests to influence the policy formulation process" as Explanatory Variable

A. Respondents who Scored High (Four or Five) in Regard to the Objective of "Providing a Chance for Less Powerful Interests to Influence the Policy Formulation Process"

B. To what degree did you use the following techniques to obtain information about affected publics in your most recently completed project? (Please circle the answers)

```
   1. Literature study ................................. 0 1 2 3 4 5 X
   2. Consultation with experts ........................ 0 1 2 3 4 5 X
  -3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
   4. Consultation with advisory panel ................. 0 1 2 3 4 5 X
   5. Consultation with representatives of identified
      interest groups ................................. 0 1 2 3 4 5 X
   6. Survey or public opinion poll drawn from a sample
      of affected publics ............................. 0 1 2 3 4 5 X
   7. Direct interaction with parts of affected publics
      (for instance public hearings in communities,
      workshops, focus groups, etc.) .................. 0 1 2 3 4 5 X
   8. Others (please specify) .......................... 0 1 2 3 4 5 X
```

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	0 (0)	6.3 (1)	0 (0)	0 (0)	50 (8)	37.5 (6)	6.3 (1)	16	4.2
B. 2.	0 (0)	0 (0)	0 (0)	6.3 (1)	18.8 (3)	68.8 (11)	6.3 (1)	16	4.7
B. 3.	37.5 (6)	31.3 (5)	12.5 (2)	6.3 (1)	0 (0)	6.3 (1)	6.3 (1)	16	1.1
B. 4.	0 (0)	0 (0)	0 (0)	25 (4)	25 (4)	43.8 (7)	6.3 (1)	16	4.2
B. 5.	0 (0)	0 (0)	0 (0)	6.3 (1)	56.3 (9)	31.3 (5)	6.3 (1)	16	4.3
B. 6.	31.3 (5)	6.3 (1)	6.3 (1)	12.5 (2)	18.8 (3)	18.8 (3)	6.3 (1)	16	2.4
B. 7.	12.5 (2)	6.3 (1)	12.5 (2)	18.8 (3)	18.8 (3)	25 (4)	6.3 (1)	16	3.1
B. 8.				(1)	(1)	(2)	(1)	5	

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X
2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	6.3 (1)	6.3 (1)	12.5 (2)	37.5 (6)	31.3 (5)	6.3 (1)	0 (0)	16	3.0
C. 2.	0 (0)	0 (0)	0 (0)	12.5 (2)	18.8 (3)	68.8 (11)	0 (0)	16	4.6

D. To what extent were the following groups solicited
for opinions or viewpoints?
1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X
2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	0 (0)	6.3 (1)	18.8 (3)	31.3 (5)	37.5 (6)	6.3 (1)	0 (0)	16	3.2
D. 2.	0 (0)	0 (0)	0 (0)	0 (0)	43.8 (7)	56.3 (9)	0 (0)	16	4.6

E. To what extent were the following groups enlisted
in discussions intended to influence the analysis?

    1. Representatives of non-organized possibly affec-
       ted publics .... 0 1 2 3 4 5 X
    2. Representatives of interest groups which in your
       judgement have great influence on the policy
       formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	0 (0)	6.7 (1)	6.7 (1)	46.7 (7)	40 (6)	0 (0)	0 (0)	15	3.2
E. 2.	0 (0)	0 (0)	0 (0)	6.7 (1)	53.3 (8)	40 (6)	0 (0)	15	4.3

F. To what degree was public participation a part of
your analysis at the different stages of your most
recently completed project? (Circle as many as apply)

    1. Problem definition .... 0 1 2 3 4 5 X
    2. Fact finding .... 0 1 2 3 4 5 X
    3. Consideration of ethical and political values
       for impact assesssment .... 0 1 2 3 4 5 X
    4. Formulation of policy option .... 0 1 2 3 4 5 X
    5. Review of study .... 0 1 2 3 4 5 X
    6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	0 (0)	12.5 (2)	0 (0)	25 (4)	43.8 (7)	18.8 (3)	0 (0)	16	3.6
F. 2.	0 (0)	6.3 (1)	6.3 (1)	12.5 (2)	37.5 (6)	37.5 (6)	0 (0)	16	3.9
F. 3.	0 (0)	0 (0)	0 (0)	31.3 (5)	43.8 (7)	25 (4)	0 (0)	16	3.9
F. 4.	0 (0)	0 (0)	12.5 (2)	43.8 (7)	25 (4)	12.5 (2)	6.3 (1)	16	3.4
F. 5.	0 (0)	0 (0)	6.7 (1)	0 (0)	20 (3)	73.3 (11)	0 (0)	15	4.6
F. 6.						(2)		2	

H. To what extent was the role public participation
played in your most recently completed project de-
termined by the following factors? (Please circle the answers)

1. Characteristics of the technology
   under assessment .... 0 1 2 3 4 5 X
2. Decision of superior .... 0 1 2 3 4 5 X
3. Influence of advisory panel .... 0 1 2 3 4 5 X
4. Budget constraints .... 0 1 2 3 4 5 X
5. Time limits .... 0 1 2 3 4 5 X
6. Your personal evaluation of the usefulness of
   participation .... 0 1 2 3 4 5 X
7. Characteristics of affected publics (level of
   organization, willingness to cooperate, diver-
   sity of interests, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	6.7 (1)	0 (0)	6.7 (1)	13.3 (2)	26.7 (4)	46.7 (7)	0 (0)	15	3.9
H. 2.	21.4 (3)	42.9 (6)	7.1 (1)	14.3 (2)	7.1 (1)	7.1 (1)	0 (0)	14	1.7
H. 3.	14.3 (2)	7.1 (1)	35.7 (5)	35.7 (5)	7.1 (1)	0 (0)	0 (0)	14	2.1
H. 4.	7.1 (1)	35.7 (5)	14.3 (2)	21.4 (3)	21.4 (3)	0 (0)	0 (0)	14	2.6
H. 5.	0 (0)	14.3 (2)	0 (0)	35.7 (5)	35.7 (5)	14.3 (2)	0 (0)	14	3.4
H. 6.	0 (0)	7.1 (1)	0 (0)	42.9 (6)	21.4 (3)	28.6 (4)	0 (0)	14	3.6
H. 7.	0 (0)	0 (0)	0 (0)	13.3 (2)	60 (9)	26.7 (4)	0 (0)	15	4.1
H. 8.									

B. Respondents who Scored Less Than High in Regard to the Objective of "Providing a Chance for Less Powerful Interests to Influence the Policy Formulation Process"

B. To what degree did you use the following techniques to obtain information about affected publics in your most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	3.8 (1)	0 (0)	0 (0)	3.8 (1)	50 (13)	42.3 (11)	0 (0)	26	4.2
B. 2.	3.8 (1)	0 (0)	0 (0)	3.8 (1)	11.5 (3)	80.8 (21)	0 (0)	26	4.6
B. 3.	53.8 (14)	19.2 (5)	19.2 (5)	0 (0)	0 (0)	7.7 (2)	0 (0)	26	1.0
B. 4.	3.8 (1)	0 (0)	15.4 (4)	23.1 (6)	26.9 (7)	30.8 (8)	0 (0)	26	3.6
B. 5.	7.7 (2)	3.8 (2)	3.8 (2)	30.8 (8)	30.8 (8)	23.1 (6)	0 (0)	26	3.5
B. 6.	69.2 (18)	3.8 (1)	3.8 (1)	3.8 (1)	11.5 (3)	7.7 (2)	0 (0)	26	1.1
B. 7.	38.5 (10)	26.9 (7)	7.7 (2)	3.8 (1)	7.7 (2)	11.5 (3)	3.8 (1)	26	1.5
B. 8.	(0)	(0)	(1)	(0)	(0)	(1)	(5)	7	

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

    1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

    2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	40 (10)	16 (4)	12 (3)	8 (2)	20 (5)	4 (1)	0 (0)	25	1.7
C. 2.	4 (1)	4 (1)	8 (2)	24 (6)	48 (12)	12 (3)	0 (0)	25	3.4

D. To what extent were the following groups solicited
for opinions or viewpoints?

    1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

    2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	36 (9)	20 (5)	12 (3)	4 (1)	16 (4)	8 (2)	4 (1)	25	1.7
D. 2.	4 (1)	8 (2)	12 (3)	20 (5)	32 (8)	24 (6)	0 (0)	25	3.4

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	32 (8)	32 (8)	4 (1)	8 (2)	20 (5)	0 (0)	4 (1)	25	1.5
E. 2.	4 (1)	16 (4)	4 (1)	20 (5)	40 (10)	12 (3)	4 (1)	25	3.2

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	16.7 (4)	8.3 (2)	16.7 (4)	29.2 (7)	16.7 (4)	8.3 (2)	4.2 (1)	24	2.5
F. 2.	25 (6)	8.3 (2)	16.7 (4)	25 (6)	8.3 (2)	16.7 (4)	0 (0)	24	2.3
F. 3.	33.3 (8)	0 (0)	4.2 (1)	29.2 (7)	12.5 (3)	16.7 (4)	4.2 (1)	24	2.4
F. 4.	12.5 (3)	20.8 (5)	20.8 (5)	20.8 (5)	16.7 (4)	4.2 (1)	4.2 (1)	24	2.2
F. 5.	16 (4)	4 (1)	12 (3)	24 (6)	24 (6)	20 (5)	0 (0)	25	3.0
F. 6.	(2)	(0)	(0)	(0)	(0)	(2)	(3)	7	

H. To what extent was the role public participation
played in your most recently completed project de-
termined by the following factors? (Please circle the answers)

    1. Characteristics of the technology
       under assessment .... 0 1 2 3 4 5 X
    2. Decision of superior .... 0 1 2 3 4 5 X
    3. Influence of advisory panel .... 0 1 2 3 4 5 X
    4. Budget constraints .... 0 1 2 3 4 5 X
    5. Time limits .... 0 1 2 3 4 5 X
    6. Your personal evaluation of the usefulness of
       participation .... 0 1 2 3 4 5 X
    7. Characteristics of affected publics (level of
       organization, willingness to cooperate, diver-
       sity of interests, etc.) .... 0 1 2 3 4 5 X
    8. Others (please specify) _____

scores / answer	0	1	2	3	4	5	X	total	average score
H. 1.	8.3 (2)	4.2 (1)	4.2 (1)	8.3 (2)	33.3 (8)	41.7 (10)	0 (0)	24	3.8
H. 2.	39.1 (9)	26.1 (6)	4.3 (1)	8.7 (2)	17.4 (4)	0 (0)	4.3 (1)	23	1.4
H. 3.	30.4 (7)	26.1 (6)	13 (3)	13 (3)	17.4 (4)	0 (0)	0 (0)	23	1.6
H. 4.	26.1 (6)	26.1 (6)	13 (3)	13 (3)	17.4 (4)	0 (0)	4.3 (1)	23	1.7
H. 5.	21.7 (5)	33.3 (8)	13 (3)	8.7 (2)	17.4 (4)	4.3 (1)	0 (0)	23	1.8
H. 6.	13.6 (3)	4.5 (1)	0 (0)	22.7 (5)	50 (11)	9.1 (2)	0 (0)	22	3.2
H. 7.	13 (3)	13 (3)	4.3 (1)	26.1 (6)	30.4 (7)	13 (3)	0 (0)	23	2.9
H. 8.									

C. Test for Significance

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

 6. Survey or public opinion poll drawn from a sample
 of affected publics .... 0 1 2 3 4 5 X
 7. Direct interaction with parts of affected publics
 (for instance public hearings in communities,
 workshops, focus groups, etc.) .... 0 1 2 3 4 5 X

I.: Respondents who scored high or very high (four or five)

II.: Respondents who scored less than high (zero to three)

B. 6.

group score	I	II
low	7	20
high	6	5

B. 7.

group score	I	II
low	5	19
high	7	5

Scores:

low : 0 - 2

high: 4 + 5

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

C.1.

group score	I	II
low	4	17
high	6	6

D. To what extent were the following groups solicited
for opinions or viewpoints?
1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

D.1.

group score	I	II
low	4	17
high	7	6

E. To what extent were the following groups enlisted
in discussions intended to influence the analysis?

1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

E.1.

group score	I	II
low	2	17
high	6	5

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)   .

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

F. 1.

group score	I	II
low	2	10
high	10	6

F. 2.

group score	I	II
low	2	12
high	12	6

F. 3.

group score	I	II
low	0	9
high	11	7

F. 4.

group score	I	II
low	2	13 ·
high	6	5

F. 5,

group score	I	II
low	1	8
high	14	11

Table 22: Inclusion of Non-organized Publics as Explanatory Variable

A. Respondents who Scored at least Twice High (Four or Five) in Regard to
Inclusion of Non-organized Publics (Questions C.1, D.1, and E.1)

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average
degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	0 (0)	9.1 (1)	0 (0)	0 (0)	54.5 (6)	27.3 (3)	9.1 (1)	11	4
B. 2.	0 (0)	0 (0)	0 (0)	0 (0)	9.1 (1)	81.8 (9)	9.1 (1)	11	4.9
B. 3.	45.5 (5)	18.2 (2)	18.2 (2)	9.1 (1)	0 (0)	0 (0)	9.1 (1)	11	0.9
B. 4.	0 (0)	0 (0)	9.1 (1)	27.3 (3)	18.2 (2)	36.4 (4)	9.1 (1)	11	3.9
B. 5.	0 (0)	0 (0)	9.1 (1)	27.3 (3)	27.3 (3)	27.3 (3)	9.1 (1)	11	3.8
B. 6.	36.4 (4)	9.1 (1)	0 (0)	9.1 (1)	0 (0)	36.4 (4)	9.1 (1)	11	2.4
B. 7.	9.1 (1)	18.2 (2)	0 (0)	18.2 (2)	9.1 (1)	36.4 (4)	9.1 (1)	11	3.2
B. 8.	(0)	(0)	(0)	(0)	(0)	18.2 (2)	9.1 (1)	3	

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

    1. Problem definition .... 0 1 2 3 4 5 X
    2. Fact finding .... 0 1 2 3 4 5 X
    3. Consideration of ethical and political values
       for impact assesssment .... 0 1 2 3 4 5 X
    4. Formulation of policy option .... 0 1 2 3 4 5 X
    5. Review of study .... 0 1 2 3 4 5 X
    6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	0 (0)	9.1 (1)	9.1 (1)	36.4 (4)	27.3 (3)	18.2 (2)	0 (0)	11	3.4
F. 2.	0 (0)	0 (0)	18.2 (2)	9.1 (1)	18.2 (2)	54.5 (6)	0 (0)	11	4.1
F. 3.	9.1 (1)	0 (0)	0 (0)	27.3 (3)	45.5 (5)	18.2 (2)	0 (0)	11	3.5
F. 4.	0 (0)	0 (0)	27.3 (3)	45.5 (5)	18.2 (2)	0 (0)	9.1 (1)	11	2.9
F. 5.	0 (0)	9.1 (1)	0 (0)	9.1 (1)	9.1 (1)	72.7 (8)	0 (0)	11	4.4
F. 6.	(0)	(0)	(0)	(0)	(0)	(1)	(0)	1	

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	0 (0)	0 (0)	0 (0)	36.4 (4)	27.3 (3)	36.4 (4)	0 (0)	11	4
G. 2.	0 (0)	0 (0)	9.1 (1)	18.2 (2)	36.4 (4)	364. (4)	0 (0)	11	4
G. 3.	27.3 (3)	27.3 (3)	18.2 (2)	0 (0)	27.3 (3)	0 (0)	0 (0)	11	1.7
G. 4.	18.2 (2)	0 (0)	18.2 (2)	9.1 (1)	45.5 (5)	9.1 (1)	0 (0)	11	2.9
G. 5.	0 (0)	18.2 (2)	36.4 (4)	18.2 (2)	27.9 (3)	0 (0)	0 (0)	11	2.5
G. 6.	(0)	(0)	(0)	(0)	(0)	(0)	(1)	1	

B. To what degree did you use the following techniques
to obtain information about affected publics in your
most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average
degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	5 (1)	0 (0)	0 (0)	5 (1)	45 (9)	45 (9)	0 (0)	20	4.2
B. 2.	5 (1)	0 (0)	0 (0)	10 (2)	15 (3)	70 (14)	0 (0)	20	4.4
B. 3.	60 (12)	15 (3)	15 (3)	0 (0)	0 (0)	10 (2)	0 (0)	20	1.0
B. 4.	5 (1)	0 (0)	10 (2)	20 (4)	35 (7)	30 (6)	0 (0)	20	3.7
B. 5.	10 (2)	0 (0)	0 (0)	20 (4)	45 (9)	25 (5)	0 (0)	20	3.7
B. 6.	75 (15)	5 (1)	0 (0)	0 (0)	20 (4)	0 (0)	0 (0)	20	0.9
B. 7.	50 (10)	15 (3)	10 (2)	5 (1)	15 (3)	10 (2)	0 (0)	20	1.6
B. 8.	(0)	(0)	(0)	(0)	(0)	(1)	(4)	5	

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
F. 1.	20 (4)	5 (1)	15 (3)	25 (5)	30 (6)	5 (1)	0 (0)	20	2.6
F. 2.	25 (5)	15 (3)	10 (2)	25 (5)	15 (3)	10 (2)	0 (0)	20	2.2
F. 3.	25 (5)	0 (0)	15 (3)	30 (6)	15 (3)	15 (3)	0 (0)	20	2.6
F. 4.	15 (3)	20 (4)	20 (4)	25 (5)	15 (3)	5 (1)	0 (0)	20	2.2
F. 5.	15 (3)	0 (0)	10 (2)	20 (4)	25 (5)	25 (5)	0 (0)	20	3.1
F. 6.	(1)	(0)	(0)	(0)	(0)	(1)	(3)	5	

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for·less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	30 (6)	5 (1)	5 (1)	25 (5)	10 (2)	25 (5)	0 (0)	20	2.6
G. 2.	20 (4)	10 (2)	5 (1)	35 (7)	25 (5)	5 (1)	0 (0)	20	2.5
G. 3.	45 (9)	40 (8)	5 (1)	10 (2)	0 (0)	0 (0)	0 (0)	20	0.8
G. 4.	35 (7)	25 (5)	10 (2)	10 (2)	15 (3)	5 (1)	0 (0)	20	1.6
G. 5.	45 (9)	25 (5)	5 (1)	15 (3)	5 (1)	5 (1)	0 (0)	20	1.3
G. 6.	(1)	(0)	(0)	(0)	(0)	(0)	(3)	4	

C. Test for Significance

B. To what degree did you use the following techniques to obtain information about affected publics in your most recently completed project? (Please circle the answers)

6. Survey or public opinion poll drawn from a sample of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics (for instance public hearings in communities, workshops, focus groups, etc.) .... 0 1 2 3 4 5 X

I.: Respondents who scored at least twice high (four or five)

II.: Respondents who scored at least twice low (zero to two)

B.6.

group / score	I	II
low	7	16
high	4	4

B.7.

group / score	I	II
low	3	15
high	5	5

Scores:

low : 0 - 2

high: 4 + 5

F. To what degree was public participation a part of
   your analysis at the different stages of your most
   recently completed project? (Circle as many as apply)

   1. Problem definition .... 0 1 2 3 4 5 X
   2. Fact finding .... 0 1 2 3 4 5 X
   3. Consideration of ethical and political values
      for impact assesssment .... 0 1 2 3 4 5 X
   4. Formulation of policy option .... 0 1 2 3 4 5 X
   5. Review of study .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

F.1.

group \ score	I	II
low	2	8
high	5	7

F.2.

group \ score	I	II
low	2	10
high	8	5

F.3.

group \ score	I	II
low	1	8
high	7	6

F.4.

group \ score	I	II
low	3	11
high	2	4

F.5.

group \ score	I	II
low	1	5
high	9	10

G. What degree of importance was assigned to the fol-
   lowing objectives for having the public participate
   in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

G.1.

group / score	I	II
low	0	8
high	7	7

G.2.

group / score	I	II
low	1	7
high	8	6

G.3.

group / score	I	II
low	8	18
high	3	0

G.4.

group / score	I	II
low	4	14
high	6	4

G.5.

group / score	I	II
low	6	15
high	3	2

Table 23: Participation in the Formulation of Policy Options as Explanatory

Variable

A. Respondents who Scored High (Four or Five) in Regard to Participation in the Formulation of Policy Options

B. To what degree did you use the following techniques to obtain information about affected publics in your most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	0 (0)	0 (0)	0 (0)	0 (0)	36.4 (4)	54.5 (6)	9.1 (1)	11	4.6
B. 2.	0 (0)	0 (0)	0 (0)	0 (0)	9.1 (1)	81.8 (9)	9.1 (1)	11	4.9
B. 3.	36.4 (4)	36.4 (4)	0 (0)	9.1 (1)	0 (0)	9.1 (1)	9.1 (1)	11	1.2
B. 4.	0 (0)	0 (0)	9.1 (1)	9.1 (1)	27.3 (3)	45.5 (5)	9.1 (1)	11	4.2
B. 5.	0 (0)	0 (0)	0 (0)	0 (0)	45.5 (5)	45.5 (5)	9.1 (1)	11	4.5
B. 6.	36.4 (4)	0 (0)	9.1 (1)	0 (0)	18.2 (2)	27.3 (3)	9.1 (1)	11	2.5
B. 7.	9.1 (1)	9.1 (1)	9.1 (1)	0 (0)	27.3 (3)	36.4 (4)	9.1 (1)	11	3.5
B. 8.	(0)	(0)	(0)	(1)	(0)	(1)	(2)	11	

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

   1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

   2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	27.3 (3)	0 (0)	9.1 (1)	36.4 (4)	18.2 (2)	9.1 (1)	0 (0)	11	2.5
C. 2.	0 (0)	0 (0)	0 (0)	0 (0)	27.3 (3)	72.7 (8)	0 (0)	11	4.7

D. To what extent were the following groups solicited
for opinions or viewpoints?

   1. Representatives of non-organized possibly affec-
ted publics .... 0 1 2 3 4 5 X

   2. Representatives of interest groups which in your
judgement have great influence on the policy
formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	18.2 (2)	9.1 (1)	9.1 (1)	27.3 (3)	27.3 (3)	9.1 (1)	0 (0)	11	2.6
D. 2.	0 (0)	0 (0)	0 (0)	0 (0)	36.4 (4)	63.6 (7)	0 (0)	11	4.6

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	20 (2)	10 (1)	0 (0)	50 (5)	20 (2)	0 (0)	0 (0)	10	2.4
E. 2.	0 (0)	0 (0)	0 (0)	10 (1)	40 (4)	50 (5)	0 (0)	10	4.4

G. What degree of importance was assigned to the fol-
   lowing objectives for having the public participate
   in your most recently completed project? (Please circle the answers)

   1. Providing additional factual information to
      your project's staff team .... 0 1 2 3 4 5 X
   2. Providing decision-makers with a broad range of
      opinions .... 0 1 2 3 4 5 X
   3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
   4. Providing a chance for less powerful interests
      to influence the policy formulation process ..... 0 1 2 3 4 5 X
   5. Helping to build support for policy decisions
      based on your analysis .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	18.2 (2)	0 (0)	9.1 (1)	27.3 (3)	0 (0)	45.5 (5)	0 (0)	11	3.3
G. 2.	9.1 (1)	9.1 (1)	0 (0)	18.2 (2)	27.3 (3)	36.4 (4)	0 (0)	11	3.5
G. 3.	10 (1)	40 (4)	0 (0)	20 (2)	30 (3)	0 (0)	0 (0)	10	2.2
G. 4.	9.1 (1)	18.2 (2)	9.1 (1)	0 (0)	54.5 (6)	9.1 (1)	0 (0)	11	3.0
G. 5.	9.1 (1)	9.1 (1)	36.4 (4)	9.1 (1)	18.2 (2)	18.2 (2)	0 (0)	11	2.7
G. 6.	(0)	(0)	(0)	(0)	(0)	(0)	(1)	1	

B. Respondents who Scored Low (Zero to Two) in Regard to Participation in the Formulation of Policy Options

B. To what degree did you use the following techniques to obtain information about affected publics in your most recently completed project? (Please circle the answers)

1. Literature study .... 0 1 2 3 4 5 X
2. Consultation with experts .... 0 1 2 3 4 5 X
-3. Use of formal decisionmaking or forecasting models 0 1 2 3 4 5 X
4. Consultation with advisory panel .... 0 1 2 3 4 5 X
5. Consultation with representatives of identified
   interest groups .... 0 1 2 3 4 5 X
6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X
8. Others (please specify) .... 0 1 2 3 4 5 X

0 - not at all; 1 - very low degree; 2 - low degree; 3 - average degree; 4 - high degree; 5 - very high degree; X - no opinion

scores / answer	0	1	2	3	4	5	X	total	average score
B. 1.	6.3 (1)	0 (0)	0 (0)	6.3 (1)	56.3 (9)	31.3 (5)	0 (0)	16	4.0
B. 2.	6.3 (1)	0 (0)	0 (0)	6.3 (1)	18.8 (3)	68.8 (11)	0 (0)	16	4.4
B. 3.	43.8 (7)	12.5 (2)	37.5 (6)	0 (0)	0 (0)	6.3 (1)	0 (0)	16	1.3
B. 4.	6.1 (1)	0 (0)	18.8 (3)	31.3 (5)	31.3 (5)	12.5 (2)	0 (0)	16	3.2
B. 5.	12.5 (2)	0 (0)	6.3 (1)	43.8 (7)	31.3 (5)	6.3 (1)	0 (0)	16	3.0
B. 6.	68.8 (9)	12.5 (2)	0 (0)	0 (0)	12.5 (2)	6.3 (1)	0 (0)	16	0.9
B. 7.	43.8 (7)	31.3 (5)	6.3 (1)	0 (0)	12.5 (2)	6.3 (1)	0 (0)	16	1.3
B. 8.	(0)	(0)	(1)	(0)	(0)	(1)	(1)	3	

C. To what extent were the following groups solicited
for descriptive and factual matter? (Please circle the answers)

1. Representatives of non-organized possibly affec-
   ted publics .... 0 1 2 3 4 5 X
2. Representatives of interest groups which in your
   judgement have great influence on the policy
   formulation process .... 0 1 2 3 4 5 X.

scores / answer	0	1	2	3	4	5	X	total	average score
C. 1.	37.5 (6)	18.8 (3)	18.8 (3)	12.5 (2)	12.5 (2)	0 (0)	0 (0)	16	1.4
C. 2.	6.3 (1)	6.3 (1)	12.5 (2)	25 (4)	43.8 (7)	6.3 (1)	0 (0)	16	3.1

D. To what extent were the following groups solicited
for opinions or viewpoints?
1. Representatives of non-organized possibly affec-
   ted publics .... 0 1 2 3 4 5 X
2. Representatives of interest groups which in your
   judgement have great influence on the policy
   formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
D. 1.	31.3 (5)	18.8 (3)	18.8 (3)	12.5 (2)	12.5 (2)	6.3 (1)	0 (0)	16	1.8
D. 2.	6.3 (1)	6.3 (1)	18.8 (3)	25 (4)	31.3 (5)	12.5 (2)	0 (0)	16	3.1

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X
   2. Representatives of interest groups which in your
      judgement have great influence on the policy
      formulation process .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
E. 1.	25 (4)	31.3(5)	12.5(2)	6.3 (1)	25(4)	0 (0)	0 (0)	16	2.1
E. 2.	0 (0)	25 (4)	0 (0)	18.8 (3)	56.3(9)	0 (0)	0 (0)	16	3.1

G. What degree of importance was assigned to the fol-
   lowing objectives for having the public participate
   in your most recently completed project? (Please circle the answers)

   1. Providing additional factual information to
      your project's staff team .... 0 1 2 3 4 5 X
   2. Providing decision-makers with a broad range of
      opinions .... 0 1 2 3 4 5 X
   3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
   4. Providing a chance for less powerful interests
      to influence the policy formulation process ..... 0 1 2 3 4 5 X
   5. Helping to build support for policy decisions
      based on your analysis .... 0 1 2 3 4 5 X
   6. Others (please specify) .... 0 1 2 3 4 5 X

scores / answer	0	1	2	3	4	5	X	total	average score
G. 1.	25 (4)	12.5(2)	0 (0)	31.3 (5)	25 (4)	6.3 (1)	0 (0)	16	2.4
G. 2.	18.8 (3)	6.3 (1)	6.3 (1)	31.3(5)	25 (4)	12.5(2)	0 (0)	16	2.8
G. 3.	50 (8)	25 (4)	12.5 (2)	12.5(2)	0 (0)	0 (0)	0 (0)	16	0.9
G. 4.	37.5(6)	12.5(2)	18.8 (3)	18.8(3)	12.5(2)	0 (0)	0 (0)	16	1.6
G. 5.	37.5(6)	31.3(5)	6.3 (1)	25 (4)	0 (0)	0 (0)	0 (0)	16	1.2
G. 6.	(1)	(0)	(0)	(0)	(1)	(0)	(1)	3	

C. Test for Significance

B. To what degree did you use the following techniques
   to obtain information about affected publics in your
   most recently completed project? (Please circle the answers)

      6. Survey or public opinion poll drawn from a sample
   of affected publics .... 0 1 2 3 4 5 X
      7. Direct interaction with parts of affected publics
   (for instance public hearings in communities,
   workshops, focus groups, etc.) .... 0 1 2 3 4 5 X

I.: Respondents who scored high (four or five)

II.: Respondents who scored low (zero to two)

B. 6.

group / score	I	II
low	5	13
high	5	3

B. 7.

group / score	I	II
low	3	7
high	13	3

Scores:

low : 0 - 2

high: 4 + 5

C. To what extent were the following groups solicited
   for descriptive and factual matter? (Please circle the answers)

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X

C.1.

group / score	I	II
low	4	13
high	3	2

D. To what extent were the following groups solicited
   for opinions or viewpoints?
   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X

D.1

group / score	I	II
low	4	11
high	4	3

E. To what extent were the following groups enlisted
   in discussions intended to influence the analysis?

   1. Representatives of non-organized possibly affec-
      ted publics .... 0 1 2 3 4 5 X

E.1.

group / score	I	II
low	3	11
high	2	4

G. What degree of importance was assigned to the fol-
lowing objectives for having the public participate
in your most recently completed project? (Please circle the answers)

1. Providing additional factual information to
   your project's staff team .... 0 1 2 3 4 5 X
2. Providing decision-makers with a broad range of
   opinions .... 0 1 2 3 4 5 X
3. Seeking consensus among stakeholders .... 0 1 2 3 4 5 X
4. Providing a chance for·less powerful interests
   to influence the policy formulation process ..... 0 1 2 3 4 5 X
5. Helping to build support for policy decisions
   based on your analysis .... 0 1 2 3 4 5 X
6. Others (please specify) .... 0 1 2 3 4 5 X

G.1.

group \ score	I	II
low	3	6
high	5	5

G.2.

group \ score	I	II
low	2	5
high	7	6

G.3.

group \ score	I	II
low	5	14
high	3	0

G.4.

group \ score	I	II
low	4	11
high	7	2

G.5.

group \ score	I	II
low	6	12
high	4	0

A. BENEFITS FROM SCIENCE

Q: How much benefit do you expect you and your family to get from developments in science and technology in the next twenty years — a lot of benefit, some benefit, little benefit, or no benefit?

		A Lot	Some	Little	None	Not Sure
Total	(1273)	41	39	14	5	2
Age						
16-34	(546)	42	40	14	3	1
35-49	(343)	48	38	12	2	1
50-64	(252)	34	37	15	9	5
65+	(127)	33	37	15	11	3
Education						
Less than High School	(165)	28	41	16	12	3
High School Graduate	(458)	39	39	17	4	1
Some College	(300)	45	40	10	3	2
College Graduate	(347)	57	35	6	1	1
Science Understanding						
Very good	(236)	56	31	7	3	3
Adequate	(707)	41	40	14	4	1
Poor	(316)	31	40	17	9	3
Science Orientation						
Attentive	(626)	51	33	10	4	3
Inattentive	(647)	32	44	17	6	1
Party Affiliation						
Republican	(626)	45	40	11	3	1
Independent	(647)	40	39	14	5	1
Democrat	(441)	38	37	16	7	3

B. RISKS FROM SCIENCE

Q: How much <u>risk</u> to you and your family do you think developments in science and technology will cause in the next twenty years -- a lot of risk, some risk, little risk or no risk?

		A Lot	Some	Little	None	Not Sure
<u>Total</u>	(1273)	22	49	20	7	2
Age						
18-34	(546)	21	50	22	6	1
35-49	(343)	20	53	18	7	2
50-64	(252)	22	44	21	11	2
65+	(127)	27	45	15	8	5
Education						
Less than High School	(165)	24	40	24	10	3
High School Graduate	(458)	22	52	17	7	1
Some College	(300)	23	49	21	5	2
College Graduate	(347)	18	53	20	7	2
Science Understanding						
Very good	(236)	22	42	23	10	3
Adequate	(707)	22	50	19	7	1
Poor	(316)	22	49	19	6	4
Science Orientation						
Attentive	(626)	23	46	20	9	2
Inattentive	(647)	21	51	20	6	2
Party Affiliation						
Republican	(626)	17	51	23	7	2
Independent	(647)	23	51	16	8	2
Democrat	(441)	24	46	20	7	2