

*The combined effect of increasing problem complexity and growing demand for participation in decisions has forced policymaking and decision making in organizations to become less an analytic endeavor and more a process of "knowledge management." This requires an intermediary to mediate among conflicting perspectives and integrate the different forms and levels of knowledge. This article describes one such approach to knowledge management that utilizes a third party to create and facilitate a temporary task organization. Following a brief case example, some research results from an evaluation of six past applications of the approach are presented. These results provide insight into the effective structuring and conduct of knowledge management procedures.*

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## ***Managing Knowledge in Policymaking and Decision Making***

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*A significant social trend* over the past few decades has been the resurgence and proliferation of direct participation in social and organizational decisions. From citizen participation in government in the 1960s and 1970s to employee involvement and participatory management in industry in the 1980s, the opportunities and forums for participation have expanded greatly.

Coincidentally, the problems facing public and private organizations seem to have grown in complexity and volatility (Enk and Hart, 1985; Hart, 1986a). In a growing number of cases, scientific and technical

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*Author's Note:* Parts of this article have been excerpted from previous publications. In particular, portions of "Background and Strategy," "Sequence of Activities," "Workshop Approach," and "A Case Example" have appeared in Enk and Hart (1985). Portions of "Criteria for Judging the Outcomes of the Approach" and "Results and Discussion" (including Figure 1) have appeared in Hart (1985).

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uncertainties are complicated by the presence of multiple stakeholders holding conflicting interests and images about a given problem (e.g., industrial innovation, toxic waste). Under such conditions, decision making must necessarily become less an analytic endeavor than a process of mediating among parties with differing levels and types of knowledge. In short, policymaking and decision making have increasingly become an exercise in "knowledge management."

The framework paper for this special issue (van Lohuizen, 1986) introduces and describes the concept of the "knowledge household," which consists of all the knowledge elements (available and unavailable, scientific and ordinary) relevant to a given policy issue. This concept unites several other efforts at describing the relevant knowledge inputs to the policy process. Lindblom and Cohen (1979), for example, contrasted *scientific* knowledge (i.e., empirically derived) and *ordinary* knowledge (i.e., casual empiricism or thoughtful speculation), concluding that seldom can pressing problems wait for the accumulation of conclusive research results. Instead, existing scientific knowledge serves to set the stage for a discussion and debate necessarily dependent upon casual analysis and human judgment.

Hammond et al. (1983) made a related observation concerning the role of scientific experts in emerging policy and decision problems: that such individuals are invariably forced (or succumb to the pressure) to extrapolate beyond what is known scientifically. And in doing so, they resort to cognitive processes that are not significantly different from those of the layperson (Fischhoff, 1985). Allison (1971) recognized that complex problems can be usefully viewed from different perspectives, each involving particular assumptions about the world and human behavior. Linstone et al. (1981) developed this concept further and proposed a "multiple perspectives" approach to decision making; they described a *technical* perspective (rational choice among alternatives), an *organizational* perspective (satisficing and uncertainty reduction), and a *personal* perspective (stakes, interests, power struggles). Persons subscribing to the different perspectives see different phenomena as important, influencing how they formulate questions, where they look for evidence, and what is acceptable as an answer.

It is important to stress that the different perspectives are mutually supportive, not mutually exclusive, and that great care must be taken to include individuals with all three perspectives in problem-solving groups. The perspectives cross-cue one another, resulting in synergies and syntheses that would not be possible with more homogeneous groups. This goes beyond traditional notions of interdisciplinary teams

(which involve only variations of the technical perspective) to inter-paradigmatic teams.

The knowledge household concept explicitly recognizes that there are diverse types and levels of inputs to the policy process, ranging from strongly held individual values and preferences to empirically based knowledge and research results. To manage such diversity of input, an "intermediary function" is required to (1) integrate the different types of information and knowledge elements, and (2) create the necessary opportunity for interaction and learning among key stakeholders (experts, policymakers, citizens, or employees; Jacobs, 1984). In short, the successful management of knowledge in decision and policymaking requires a *systematic process* that minimizes the possibilities of serious cognitive or judgmental bias. To be successful, such a process must facilitate balanced participation of diverse stakeholders, discussion of underlying assumptions, modification of initial positions, and accommodation of conflicting values (Mason and Mitroff, 1981; Hart, 1986b).

This article describes one such intermediary process to policy issues with which I have had experience; it utilizes a third party to create and facilitate a temporary task organization aimed at a particular policy or decision problem. The process consists of a sequence of eight steps: The initial activities are oriented toward expanding the range of information and knowledge available (through literature review, networking, and surveys). Emphasis in the later stages is on narrowing and synthesizing the range of options and strategies through interactive workshops and focused project reports.

The article first provides background and a description of the approach, including a brief case example; it then highlights some research results regarding the effective conduct of the procedure.

### ***Background and Strategy***

Over the past ten years, an approach has been developed and refined for analyzing and shaping complex decisions about critical policy issues.<sup>1</sup> Based upon a number of applications, a nonadversarial, collaborative process has evolved in which those affected by (as well as expert in) a particular issue or decision are considered legitimate participants.

The approach can be envisioned in three stages, beginning with wide involvement through networking and surveys (stage 1) and gradually narrowing to a highly structured workshop with a relatively small (and

therefore manageable) number of people (stage 2). The results of this effort are, in turn, disseminated to a wider audience for review, comment, and implementation or use (stage 3). Warfield (1976) proposed a similar division of the problem-solving process that had three phases: (1) idea generation, (2) structuring, and (3) communication.

The major purpose of the initial stage of the process is to *expand* the range of options operative in the minds of staff and participants, whereas the dominant concern of the later stages is to narrow down and *synthesize* the range of possibilities. Berg et al. (1976) suggested such separation of activities in their discussion of a value-oriented method for technology assessment. They described the identification of technological impacts and generation of relevant policy responses as mainly "fan-out" operations and the evaluation of policy options and consequences as mainly a "fan-in" operation. Diesing (1962) also noted that a rational decision procedure must (1) provide for consideration of a plurality of facts, values, and norms (differentiation), and (2) have the capability of arriving at a unified resolution of the problem (unification). Similarly, Basadur et al. (1982) recently proposed a problem-solving process consisting of two steps—ideation (divergence) and evaluation (convergence).

In the first stage of the process, it is necessary to become familiar with the needs of the sponsor and the nature and scope of the problem. Through networking and surveys, the staff identifies the key issues as well as identifying important perspectives and stakeholders. This enables the staff (in conjunction with the sponsor) to better "bound" the problem for further consideration.

The workshop stage is then used as a tool for focusing attention on a few key questions about the problem identified in the first stage; it is based upon the notion that interaction among diverse yet cooperating individuals can produce creative, integrative solutions that would not be possible by communicating with each participant separately.

The third stage is largely a reporting and dissemination stage; it is geared toward the needs of the sponsor. Depending upon the nature of the particular problem or issue, this may involve the preparation of targeted technical reports solely for the sponsor or it may entail broader publications intended for dissemination to a much wider audience.

The approach, in essence, is a process for facilitating interaction among individuals associated with a decision process who hold multiple perspectives and offer different kinds of knowledge and information about an issue. It is premised upon the realization that experts, functional actors, and laypeople often have very different perceptions

about a given problem. Lindblom (1979) described this mode of problem solving as a combination of analysis and interaction, the former being used to inform the interaction by diverse actors rather than substitute for it. Analysis provides information but does not attempt a comprehensive synthesis, especially of values; synthesis is left to structured interaction among the parties of interest. Thus, the approach attempts to integrate rational-empirical approaches to problem solving with behavioral and group process techniques.

### *Sequence of Activities*

The three stages of the approach described above are actually accomplished through eight sequential but overlapping activities. Each step builds upon the ones that come before. Each step, however, assumes varying degrees of importance depending upon the specific circumstances of the project. Thus, a certain activity could be critical to one application but relatively unimportant in another; such malleability seems to give the approach potential relevance to a wide variety of issues, problems, and situations. A brief description of the eight steps in the process and the activities associated with the workshop follows (see Table 1).

- (1) *Scoping*: a clear, early definition of the dimensions of the problem, as well as the critical questions and issues to be addressed.
- (2) *Networking*: the identification and involvement of stakeholders who are key to finding a solution, including leading analysts and experts.
- (3) *Information search*: summary and analysis of documented knowledge in relevant fields.
- (4) *Discovery of emerging knowledge*: timely, focused research into the latest and emerging developments in the issue area.
- (5) *Surveying*: the use of systematic survey methods to gather information and opinions from potential participants.
- (6) *Results profiling*: analysis of gathered survey information to provide useful interpretation of present needs and future trends.
- (7) *Interactive workshops*: intensive task- and product-oriented activities involving key individuals with relevant resources.
- (8) *Reporting*: interim reports, briefings, and thorough follow-up to effectively transmit accumulating and completed results to the client throughout the decision-making project.

TABLE 1  
Eight-Step Approach Model

Activity	Stage	Purpose
Scoping	Generating	Descriptive and informational
Networking	Generating	Descriptive and informational
Information search	Generating	Descriptive and informational
Discovery of Emerging Knowledge	Generating	Descriptive and informational
Surveying potential participants	Generating	Descriptive and informational
Profiling Survey Results	Structuring	Analytical and evaluative
Interactive workshops*	Structuring	Analytical and evaluative
Reporting and follow-up	Communicating	Prescriptive and advisory

\*The interactive workshop has within it the stages of idea generation, structuring, and communicating.

### ***Workshop Approach***

A survey of participants and sponsors in six past applications of the above approach (Hart, 1985) indicated the importance of the workshop (and, in particular, small group activity) to success. I therefore offer a more detailed description of how such workshops have been designed and conducted before presenting a case example and some of the evaluative results.

The workshop entails bringing representatives of the appropriate perspectives together to develop interactively a consensus response to the central issues or problems that are the focus of the project (e.g., developing a research agenda, evaluating a proposal plan, redesigning an organization). Although both the size of the group and the amount of time necessary for the workshop vary with the situation, such forums are always intensive and structured to meet the particular project needs; they generally involve 15-40 people in a 2-5-day meeting.

The workshop seeks to establish a nonthreatening and creative atmosphere by combining *plenary* (all participants) activities with structured *small group* tasks while still preserving time and opportunity for *individual* reflection. Except for the opening and closing sessions,

plenary activity is generally oriented toward information exchange and usually takes the form of either *presentations* (e.g., invited papers, staff presentations) or *reports* on the small, task group activities. *Field trips* or *site visits* have also been utilized on occasion. Small group task teams usually consist of 6-8 individuals working on specific questions associated with the issue or problem. In an effort to ensure that a large number of diverse ideas are generated by participants for later consideration, structured group process techniques are often used; these include *brainwriting pools* (Geschka et al., 1973), *nominal group technique* (Delbecq et al., 1975), and *consensus mapping* (Hart et al., 1985). These structured techniques not only help to channel diverse points of view but also provide an orientation for collaborative problem solving that carries through into later tasks. Once a wide array of ideas has been generated, a mixture of the approaches noted above is then used to discuss, evaluate, and ultimately arrive at a consolidated package of recommendations.

### *A Case Example*

The approach described above has been applied in numerous project settings. A brief description of one application—A Citizens' Review of Power Plant Siting Procedures in New York State—is provided to give a concrete sense of how such an intermediary process is applied in an actual problem situation.

Power plant siting in New York has been based upon a law that provides for the consideration of two alternate sites. A utility intending to construct a nuclear, coal, or oil-fired power plant has been required to submit an application, which includes complete environmental and engineering information on both a primary and an alternate site, to the New York State Board on Electric Generation Siting and the Environment (Siting Board). After public hearings, the Siting Board has had the option of certifying construction of the facility at either proposed site or denying the application. However, the board has had no assurance that the sites presented for its consideration were systematically selected by a process that reflected a comprehensive and socially acceptable set of siting values.

In response to this shortcoming, the New York Public Service Commission (PSC) ordered the New York Power Pool<sup>2</sup> to develop a clear statement of its decision process and the criteria it used in making

siting decisions. In 1978, after receipt of a description of the process, criteria, and a survey based on stages 1 and 2 of a 4-stage process, the commission ordered the staff of the Department of Public Service (DPS) to initiate a project to obtain public review of the adequacy and weighting of the utilities' proposed criteria. As the project developed, it became obvious that the review of siting criteria could not be separated from a broader public examination of siting policies and procedures.

Due to the complexity of the issues involved and the capacity of those issues to stir emotions and promote conflict, a carefully considered project design was essential. Conventional approaches to public participation—such as adversarial hearings, unstructured workshops, or solicitation of written position papers—were viewed as more likely to promote polarization than consensus. Accordingly, project staff developed a project design centered on a workshop structured to make maximum use of facilitated group decision-making processes. The 8-step approach was divided into 4 project phases: preliminary research, workshop planning, workshop conduct, and follow-up.

In the initial research phase, technical literature dealing with power plant siting, criteria development, and group decision-making techniques was reviewed to ensure that the staff had the benefit of the latest work in these areas. Major interest groups or points of view that would be represented in the project were identified, contacted, and interviewed. A questionnaire designed to identify the values, priorities, and state of knowledge of potential workshop participants was prepared and administered. The results were analyzed and a profile of the potential participant group was prepared based on the questionnaire responses. The profile was used both to select a balanced group of workshop participants and as a primary resource document for phase 2.

The second phase (workshop planning) included the preparation of preworkshop reading materials and their dissemination to the workshop participants, the development of a detailed workshop agenda, the selection of group decision-making techniques to be used during the workshop, training of facilitators in the use of these techniques, and the development of the materials actually used at the workshop.

The Siting Criteria Workshop (phase 3) was the central activity of the project. The 5-day workshop was held in July 1979, at the Conference Center in Rensselaerville, New York. As the Conference Center is in a rural setting and not served by public transportation, most participants were residents for the duration of the workshop. The lack of distractions helped the participants to relax, concentrate, and develop a sense of shared community effort. The setting and the task orientation provide



motivation and engendered a willingness by participants to work long evenings on their task-team reports and recommendations.

Thirty persons participated in the workshop. They were carefully selected from the larger group of 77 initial questionnaire respondents. The resulting profile identified potential participants in terms of geographic origin, vocation, educational background, and institutional or informal group affiliation. The staff then proceeded to recruit a group of workshop participants that was reasonably balanced in terms of all of these characteristics. Participants included representatives of intervenor groups and labor organizations, members of county and regional planning agencies, social scientists, engineers, farmers, housewives, and employees of state agencies, utilities, and consulting firms involved in power plant siting. All travel and lodging expenses were paid through project funds.

The citizens' review of the proposed siting process and criteria resulted in the development of 39 specific recommendations in 6 issue areas (see Enk and Hart, 1985, for details on the workshop deliberations). Many of these recommendations have since been adopted by the state of New York.

### ***Criteria for Judging the Outcomes of the Approach***

As noted above, a survey of participants and clients in 6 past applications of this approach was conducted to determine its effectiveness as an approach to managing knowledge in policymaking and decision making. All 6 projects were funded by public agencies and ranged in topic area from the effort described above to identification of participatory management procedures for use within a State Department of Labor.<sup>3</sup> Mail questionnaires were sent to the 170 workshop participants in the 6 applications; 80 were returned and used in data analysis.

Based upon criteria articulated in a previous paper (Hart, 1985), several evaluative factors were developed. Dimensional analyses were used to reduce and structure a large number of scaled questionnaire items into a manageable set of 9 factors concerning the process aspects of the approach. Table 2 contains a listing of the items from the questionnaire that loaded onto each factor in descending order of importance. These "functional" dimensions add richness to the theoretical constructs that underpinned the design of the questionnaire: It

was expected that participants' *personal experience*, the amount of *information gain and learning*, and the degree to which participants changed or *expanded their initial images* of the problem were the keys to constructing measures for success. The 8 functional dimensions expand and embellish the above a priori constructs.

Participant evaluations of the actual steps and activities involved in the approach were also reduced and structured using dimensional analyses. This resulted in 8 factors corresponding to clusters of activities used in the actual cases. Table 3 contains a listing of the items from the questionnaire that loaded onto each factor. It should be noted that these "structural" dimensions are listed in roughly sequential order (i.e., as they would occur over the course of an actual case). Thus, the survey and information dimensions consist of activities that precede the conduct of the workshop, whereas the next 4 dimensions all reflect various aspects of the workshop itself. The reports dimension describes activities that occur subsequent to the workshop phase. Finally, the minority reports dimension at the bottom of the table was included due to its practical and theoretical relevance.

TABLE 2  
Functional Dimensions

Dimension or Item	Items Included from Questionnaire
Learning	Educated, enlightened, informed, challenged, personal information gain, excited, incorporation of contributions, enjoyable
Collaboration	Cooperative, integration of diverse viewpoints, incorporation of unpopular views, fair
Abusive	Manipulated, coercive, heavy handed, stifled, pressure to conform
Bombarded	Confused, intimidated, overwhelmed
Integration	Effective, sharing of information, shared image, stable solution, efficient, comprehensive, best combination of responses
Image expansion	Uncertainty, what is not known, number of factors involved, alternative theories, decision-making context, needed next steps
Complexity	Scope, complexity of the problem or issue
Synergy	Response greater than the sum of individual contributions
Utilization	Use of the results or recommendations

**TABLE 3**  
**Structural Dimensions**

Dimension or Item	Items Included from Questionnaire
Survey	Questionnaire/profile, interview/profile
Information	Preworkshop material, literature review/bibliography
Presentation	Large group presentations, introductory plenary
Group techniques	Brainwriting, nominal group technique, the workshop
Free time	Informal time, meals, unstructured time
Plenary	Large group discussion, field trip/site visit, final plenary
Reports	Interim reports, final report
Minority report	The filing of dissenting statements

To help ensure validity, two procedures were selected with distinctly different algorithms: smallest space analysis and hierarchical cluster analysis. Details about the methods used in deriving the dimensions, along with associated issues of validity and reliability, have been discussed in previous papers (Hart, 1983, 1985). The relationships among the factors emerging from the two sets of dimensional analyses were then analyzed using single-linkage cluster analysis. The results are presented in the form of a correlogram (see Figure 1).

### ***Results and Discussion***

As Figure 1 shows, there was a strong relationship between participant evaluations of learning, integration, and group techniques. Also highly interrelated with the above three dimensions were participant assessments of collaboration, image expansion, and an appreciation for the complexity of issues. Furthermore, there was a strong inverse relationship between ratings of collaboration and abusiveness, suggesting that those who rated the former highly also tended to feel the least abused.

Group techniques played a particularly important part in the configuration of dimensions presented in the correlogram. Indeed, it appears that structured group procedures facilitated the personal learning and behavioral norms necessary for a creative, integrative

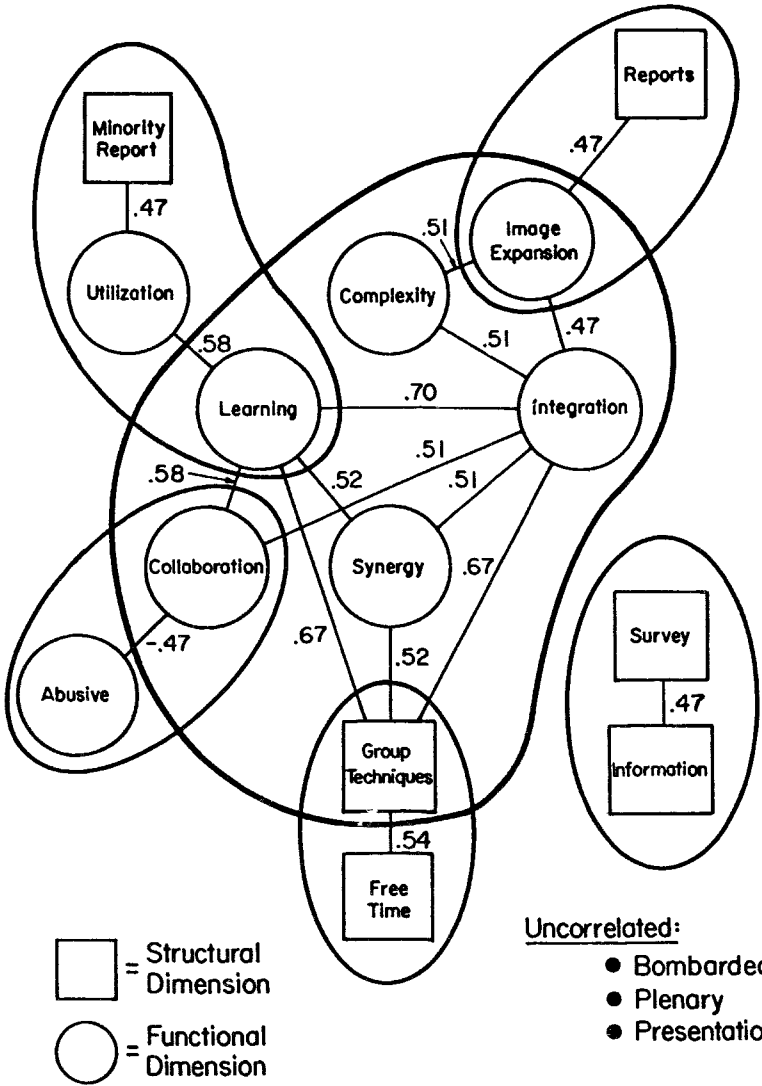


Figure 1: Correlogram of the Dimensions

solution to emerge in the ad hoc groups examined. Although these results would seem to be quite generalizable to other ad hoc group problem-solving situations, they might be quite different for permanent

groups in which problem-solving and behavioral norms have already been established.

The literature on applied group techniques (e.g., van de Ven and Delbecq, 1974; Gustafson et al., 1973) suggests that freely interacting groups tend to inhibit creative thinking, producing fewer problem dimensions and a smaller number of different kinds of solutions than do groups in which members are constrained from verbal interaction during the generation of ideas (nominal groups). The findings here are consistent with this conclusion; ratings for the structured group activities were significantly higher than for any of the other project or workshop activities with the exception of free time (breaks, meals, informal interaction). The importance of free time may derive largely from the opportunity it presents for rest, individual reflection, and informal social interaction in the context of collaborative problem solving. There is no way of knowing, however, whether the lower ratings for the plenary (large) group activities were due to the espoused inhibiting properties of larger groups (e.g., Bales et al., 1951) or to other reasons, such as boredom, fatigue, or reticence.

The results suggest that a successful intermediary process facilitates a shared image of the problem or issue among participants; this is achieved through constructive interaction and mutual reperception of the situation. Through learning and expanding participants' image of the problem, it is then possible to create solutions that are greater than the sum of the initial individual positions. All this must be accomplished through a collaborative process deemed fair and noncoercive by all involved.

## ***Conclusions***

This article has described an approach to managing knowledge in policymaking and decision making that utilizes a third party to create and facilitate a temporary task organization. Through a series of analytical and interactive steps, the approach provides a forum for framing the problem and establishing the appropriate mix of formal analyses, value preferences, and ordinary knowledge to fit a given situation; the information gathered and considered is determined collectively by experts, decision makers, and affected parties. As such, the approach described herein offers a model for managing the knowledge household described in the framework article.

Furthermore, the evaluative data presented here provide some guidance as to how best to conduct such processes. The data indicate the usefulness of workshops and structured small group techniques (e.g., nominal group techniques) in which integration is required among participants with diverse perspectives and types of knowledge. Such techniques seem to be particularly useful in establishing the behavioral norms necessary for effective ad hoc group functioning. Informal interaction among participants (e.g., meals, breaks, evenings) was shown to be an important complement to the structured sessions.

## *Notes*

1. This approach began as an interdisciplinary workshop initiated by Gordon Enk in the early 1970s as a means for training governmental agency staff in the emerging area of environmental impact assessment. This involved taking individuals with particular technical training and exposing them to a wide range of social as well as natural science skills. Through the middle and late 1970s, the approach used in these training courses evolved into a more generalized tool oriented toward problem solving and decision making rather than training. In addition to Enk and Hart, key staff associated with the development and evolution of the 8-step approach include William Hornick, James Jordan, and Eric Huntington.

2. An association of New York State's 7 major investor-owned electric utilities and the Power Authority of the State of New York for the purpose of coordinating the planning and operation of the state's electric system.

3. For a description of the six applications, see Hart (1983).

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