

**招待論文**

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# PLANNING IN THE PRESENCE OF UNCERTAINTY : PRINCIPLES AND PRACTICE

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### ABSTRACT

In Britain as in Japan, decision-making in the field of public planning poses challenges which are as much political as technical. This paper begins by analysing the difficulties that arise in situations where planners, engineers, administrators, politicians and others must work together to make interrelated decisions in the face of uncertainty. It then describes how these difficulties are addressed in a collaborative approach known as SCA—standing for Strategic Choice Approach.

In this approach, people with different perspectives to offer meet to work intensively together in informal group “workshops”, which are organised in a structured yet flexible way under the guidance of an experienced facilitator.

In this process, flip charts are arranged around the walls of the room, and a range of graphical methods are used to help the group to agree on a shared view of the nature of the decisions which they face; the linkages among these; the range of possible strategies for moving forward; and their differing impacts on the various interests which will be affected.

One of the main distinctive features of this approach is that it enables people to manage uncertainty in a strategic way, and to make steady progress towards agreement on the actions to be taken, both in the shorter and the longer term. Recently, computer software has been developed in order to make the same principles of incremental planning more accessible to individuals and to small groups of colleagues meeting in their own workplaces in their own time.

The paper ends with some discussion of the relationship of this approach to other planning methods, and the prospects for further development and wider application in the urban and transportation planning field.

SCAの概念および手法については「社会計画のための戦略的選択アプローチ」(技報堂出版)に詳細に紹介されている。

## INTRODUCTION : PLANNING WITH UNCERTAINTY

Traditionally, most planners and engineers have tended to view uncertainty as something which provides an unfortunate obstacle to good professional practice. However, there are many situations of public planning which are surrounded by so many different forms of uncertainty that it becomes hard even to know where to begin in approaching the planning task.

In such situations, it may no longer be enough to respond to uncertainty by calling for more accurate forecasts or costings, and then sitting back and awaiting the results. For such a response to uncertainty can be time-consuming and expensive in terms of skills and other resources; furthermore, when the results come through, it is

sometimes found that they make less contribution than expected on the level of confidence with which important decisions can be made. One reason for this is that there may still be disagreements about values and priorities among the participants in the planning process; often, indeed, there will be dispute about the very nature of the issues to be addressed.

My thesis is that, in urban and transportation planning, it is possible to deal with such difficulties by learning to *manage uncertainty in a strategic way*. This means considering carefully which areas of uncertainty are most significant in any particular planning context, and what possible forms of action might be initiated in response. Such actions may range from well-defined forms of technical investigation to informal consultations with organisations or community groups

whose interests are affected; they might also include various forms of liaison or joint planning with other agencies working in related areas of policy.

The judgement as to which kinds of response to uncertainty are likely to be most "resource-effective" in supporting the decisions to be made is one which will vary from one planning situation to another. Judgements of this kind will often influence the direct outcomes of the planning process, in terms of the decisions which are reached about land uses, transport networks and investment projects. Also, however, these judgements about how to manage uncertainty can have a profound effect on the future course of the process itself; for they can determine who becomes involved in the planning process, and at what stage, and through what formal or informal channels.

Most methods of planning which are taught in universities do not give explicit consideration to these judgements about how to manage uncertainty; yet any practising urban or transportation planner has to find some way of addressing them in practice. The more far-reaching the issues with which the planners are concerned, the more challenging these judgements become. Also, the less likely it becomes that any one decision maker will be in a position to make these judgements alone, without some kind of negotiation or interaction with other participants in the process.

### THE DEVELOPMENT OF A NEW APPROACH

The approach to planning in the face of uncertainty that has become known as the Strategic Choice Approach — often now abbreviated to SCA — originated in the late 1960's in a research project concerned with understanding the processes of strategic decision making in city government. This project was located in the English City of Coventry, with about 330,000 inhabitants; it was conducted by a mixed team of operational research scientists and social scientists from the Tavistock Institute in London, with the support of a four-year grant from the Nuffield Foundation (Friend and Jessop, 1969).

Over this period, the team had many opportunities to attend meetings of committees, of departmental officials, of working parties and of political groups. Through these meetings, they were able to follow the often laborious progress of such issues as the redesign of the city's road network; the finance of public transport; the development of housing land; the renewal of inner areas; and policy for the expansion of shopping centres. From this experience, four general con-

clusions emerged;

—the decision-makers held differing and continually changing views about the "shape" of the strategic issues which they faced, and they found it hard to agree how broadly or how tightly the boundaries of their current area of concern should be drawn;

—however committed the decision-makers might be to the ideal of taking a comprehensive view of the problems ahead of them, they were under continuing pressure to make decisions in a piecemeal, incremental way;

—the decision-makers faced a persistent challenge in striking a balance between a concern to make decisive commitments and a concern to retain flexibility of choice in the face of the various uncertainties surrounding them;

—the decision-makers encountered persistent difficulties in distinguishing the political aspects from the technical and administrative aspects of the planning process, even though the organisational structure of the Council was explicitly based on a separation of political, administrative and technical roles.

### FOUNDATIONS OF THE STRATEGIC CHOICE APPROACH

It was the totality of this experience that led the research team to question the relevance of the idealised view of comprehensive long-range planning which was at that time being promoted by most US and British planning schools. Instead, a view emerged of planning as a continuous "process of strategic choice", in which many people played interlocking roles. The emphases of this view differed from that of the rational comprehensive approach in the following four respects :

—an emphasis on decisions, rather than on systems;

—an emphasis on the planned management of uncertainty, rather than on methodical collection and analysis of information;

—an emphasis on the making of incremental progress, rather than the production of a comprehensive end-state plan;

—an emphasis on collaboration between people with many different perspectives, rather than reliance on professional expertise.

In essence, this view of planning set out to be a realistic one, as opposed to an idealistic one. For its roots lay in the experience of many hours spent in watching planners, engineers, administrators, politicians and other decision-makers working together in formal and informal decision-making groups; in talking with these people as in-

dividuals; in following the debates on planning issues within the wider urban community; and in analysing the content of formal policy planning documents. It was particularly revealing to analyse the many different kinds of assumption on which major policy proposals were based, and then to identify which of these assumptions subsequently came under challenge, either within the Council or within the community at large.

### THREE TYPES OF UNCERTAINTY IN PLANNING

In this view of planning, it was the emphasis on the planned management of uncertainty which marked the most radical departure from established planning theory. For the concept of uncertainty which emerged from the Coventry project was a wide-ranging one, extending well beyond those forms of uncertainty that can be addressed through the orderly collection and analysis of data. From this broader perspective, three primary categories of uncertainty were identified, each of them calling for a different type of response. The three categories are as follows :

—*Uncertainties in the working Environment* (UE for short).

Uncertainties of this kind lead to calls for various forms of investigation (research, survey, analysis, forecasting, estimation of costs, mathematical modelling, consultations with experts...)

—*Uncertainties about guiding Values* (UV for short).

Uncertainties of this kind lead to calls for some kind of policy-clarifying activity (meetings to reconcile opposing interests, formulation of clearer goals or objectives, consultation with politicians or representatives of other stakeholder interests...)

—*Uncertainties about Related choices*, outside the boundaries of the problem which is currently being addressed (UR for short).

Uncertainties of this kind lead to calls for some kind of negotiation, collaboration or joint planning—often involving interactions with other decision makers who are not directly involved in the current decision process.

In Fig.1, these three types of uncertainty are viewed from a common decision-centred perspective. When faced with a state of difficulty in agreeing on important decisions, it is easy for decision-makers to argue that all three types of uncertainty are important and therefore ought to be addressed : that it is necessary to carry out deeper investigations, while at the same time seeking to agree clearer objectives and to collaborate more closely with other decision makers.

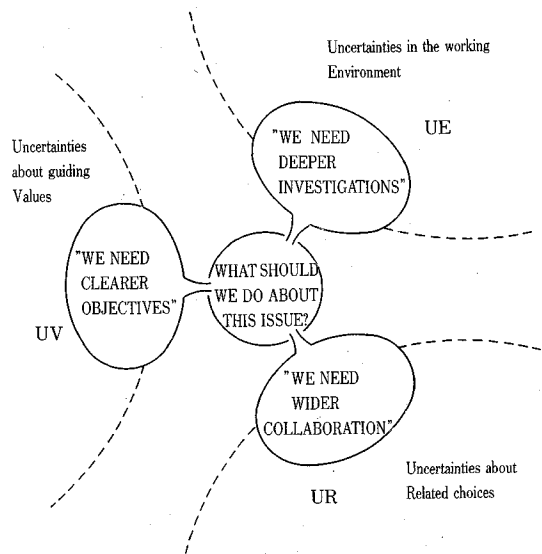


Fig.1 Three Types of Uncertainty in Planning

However, where there are pressures to make early decisions, and where time and resources are limited, it is inevitable that compromises must be made. The question that must then be asked is as follows :

Which kinds of investment in reducing uncertainty—whether by investigation, policy consultation or negotiation with other decision-makers—are likely to produce the best return on the investment of resources, in terms of increasing the level of confidence with which decisions can be made?

In one situation, for example, detailed traffic forecasts may be agreed to be a worthwhile investment, but in other situations not. Similarly, surveys of the views of local residents, or negotiations with a rail transport corporation, might be a good investment in some circumstances, yet in others not so “resource effective” as a means of increased confidence in decision-making.

### FOUR MODES OF STRATEGIC CHOICE

In the Strategic Choice Approach, these ideas about the strategic management of uncertainty have become embedded within a dynamic view of a continuing process of strategic choice. This is seen as involving the interplay of four complementary “modes” of decision making—labelled SHAPING, DESIGNING, COMPARING and CHOOSING—as illustrated in Fig.2 below.

The two modes in the lower part of the diagram—designing and comparing—represent the relatively familiar activities of generating possible courses of action and evaluating these against

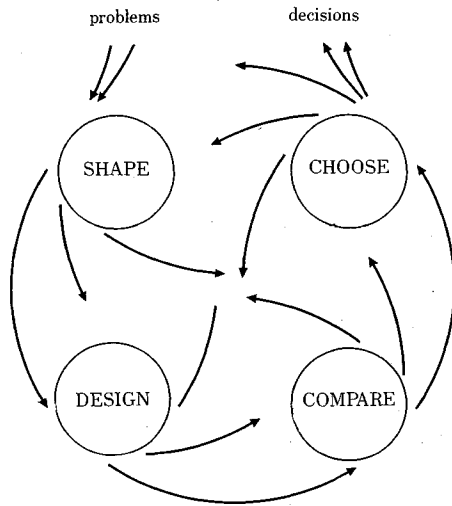


Fig.2 Four Modes of Strategic Choice

each other. In a well-defined decision situation, it is these two modes that are the most important; and these are the types of activity that have so far attracted the most attention from developers of formal planning methods.

The other two modes—shaping and choosing—become more and more important and challenging as a planning situation becomes more complex and ill-defined. For the shaping mode involves reaching agreement on what is the structure of the problem, and on where those involved should focus their attention; while the choosing mode involves agreeing how to move ahead incrementally in the face of uncertainty. This in turn means judging which urgent decisions should be made at this time; which decisions should be left open until later; and what actions should be taken to deal with important areas of uncertainty in the meantime.

Within the strategic choice approach, a set of methods has been developed which is appropriate to each of the four basic modes of Fig.2; “appropriate” in the sense that they can be used to guide discussion in a group of people with different interests and skills. These methods are described in full in the book *Planning under Pressure* (Friend and Hickling, 1987; Japanese translation, Gihodo, 1991). Together, they offer a “toolbox” from which particular tools can be selected in a flexible way. Indeed, there are many situations in which it is appropriate to use particular SCA methods in combination with other more traditional or specialised planning methods.

As a means of *shaping* complex problems, simple graphical methods are normally used. The aim is to help members of a group to identify the

main areas of choice or *decision areas* before them; and the patterns of interconnection between these decision areas. This “decision graph” provides a picture of the complexity of their current situation, within which they can be helped to identify a strategic focus for closer examination. The decision areas which they face may be quite diverse in terms of content, time scale and level: for example, the set of decision areas concerning a new section of metropolitan ring road may cover such matters as choice of alignment; methods of river crossing; methods of noise insulation; and policy for compensating local residents.

As a means of *designing* possible ways forward in an SCA workshop, the systematic design method known as Analysis of Interconnected Decision Areas (AIDA) is normally used. In this, it is necessary first to specify a representative range of options within each decision area, then to make a series of assumptions about which options in each decision area are not compatible with particular options in other decision areas. These assumptions enable a range of available strategies or “decision schemes” to be generated. The result of this process is often to generate a much wider range of possibilities than would otherwise be considered.

As a means of *comparing* possible ways forward, a method is usually adopted whereby hard quantitative criteria and “softer” judgemental criteria are brought together within a common evaluative framework. After forming a shortlist of promising “schemes”, pairs of alternatives are selected which can be compared in a more systematic way, drawing out those key sources of uncertainty—of all the three types indicated in Fig.1—which get in the way of the expression of a preference between them.

As a means of *choosing* how to move forward towards decisions, consideration is then given to possible ways of responding to the main areas of uncertainty that have been identified. Among the possible responses may be suggestions for various forms of investigation, consultation or negotiation. Some of these responses are likely to be more informal than others. The question then arises of what responses to uncertainty—formal or informal—are likely to give the best returns in terms of increased confidence in decision-making, in relation to the expenditures of time and resources which may be required. The consideration of this question then leads in to the construction of what is sometimes known as a “progress package”, the general format of which is illustrated in Fig.3 below.

The progress package framework (alternatively

	now		later	
	decisions	uncertainties	decisions	uncertainties
	ACTIONS	EXPLORATIONS	DEFERRED CHOICES	IFS AND BUTS

Fig.3 The Progress Package Framework

known as a “commitment package”) consists of a simple grid, which is divided horizontally into different areas of responsibility and vertically into two main sections headed “now” and “later”. Each of these sections is further subdivided into two columns, the first of them concerned with decision areas and the second with uncertainty areas. The task of the group is to insert in the first column any agreed actions to be taken in respect of some of the more urgent decision areas: and in the second column any agreed set of exploratory actions to be undertaken in respect of some at least of the more important uncertainty areas. The grid may then be completed by entering further information in the two “later” columns relating to any future intentions in respect of other areas of decision and of uncertainty.

### FLEXIBILITY IN THE PLANNING PROCESS

The progress package therefore provides a framework within which a group of decision makers can consider explicitly the choice of balance between early commitment and flexibility of future choice at any stage in a decision process. It is essentially an *incremental* product of the planning process, in that it can provide not only a basis for the implementation of any agreed actions, but also a starting point for future activities of shaping, designing, comparing and choosing, whether soon or later, and whether involving the same participants or others.

Sometimes, work may resume the next day; in other cases, several weeks or even months may pass before the next planning session. In the latter case, the planning situation may have undergone considerable change; new decision areas and areas of uncertainty may have been identified, while others may have either disappeared or declined in importance. The strategic choice approach offers a flexible framework within which it is possible to make continuing adapta-

tions both in the way the structure of the problem situation is represented, and in the degree of depth with which the analysis is pursued.

As suggested in Fig.2, it is possible to make progress through the four modes of strategic choice in a logical anti-clockwise sequence, beginning with an input of perceived problems and proceeding in turn through the four activities of shaping, designing, comparing and choosing, before ending with an output of decisions in relation to some at least of the problem areas that were identified. However, it is also possible to switch from any mode to any other mode in a very flexible and adaptive way, moving either forwards or backwards in the sequence according to a group's judgement as to where there is currently most progress to be made.

A flip chart showing the four modes, as in Fig.2, is often introduced at the beginning of a strategic choice workshop and displayed on the wall throughout. This makes it possible for everyone to see which modes have been visited so far, and to judge whether they are in danger of spending too much time in any one type of planning activity. They can judge too whether there are any of the four modes that have been neglected so far, relative to the others; and this can lead to agreement as to whether they should either move forward in the sequence or move back to review past work in earlier modes. In this respect, the diagram replaces the linear agenda document through which progress is regulated in a more conventional planning meeting.

### EARLY APPLICATIONS TO URBAN AND TRANSPORTATION PLANNING PROBLEMS

SCA methods have now been applied to a wide range of planning situations, in fields ranging from local community development to national environmental policy. One of the earliest successful applications at local level was carried out in 1970, involving a team of planners and other professionals from the former Teesside County Borough Council in north-east England. To give an idea of the type of complex and uncertain situation in which SCA methods can be most helpful, it is worth quoting from the description of this particular problem which appeared in the report produced at the end of this project (Friend et al., 1970):

“South Bank developed as a settlement for workers in nearby iron works and grew rapidly during the second half of the nineteenth century. The current population is about 10,500. The proximity of the township to heavy indus-

try has created a legacy of serious atmospheric pollution, heavy industrial traffic, dirt, land dereliction, and visual domination by industrial structures.

"There is a preponderance of older housing, much of which is now classified as unfit for human habitation, and considerable clearance has already taken place. Over 1,000 out of 3,000 remaining houses will be cleared by 1974 and more subsequently. The remaining older houses unaffected by the clearance programme are potentially capable of improvement and retention for up to 30 years, but public confidence in the area is declining.

"The main shopping streets are within the area where clearance will be carried out, and could be isolated from the rest of South Bank once the clearance was completed. There are now too many shops for the population served, due in part to past housing clearance and in part to a decline in the role of South Bank as a district shopping centre.

"The problems of South Bank are aggravated by a Teesside structure plan proposal for an urban motorway passing through the north of South Bank, linking the heavy industry on the south side of the River Tees with the A19 and, via the A66, the A1. This motorway will not be constructed until about 1980-85. Two alternative routes South Bank through have been considered, a southern alignment passing straight through South Bank and severing the shopping and social facilities from the housing unaffected by housing clearance, and a northern alignment passing to the north of most of the facilities. The uncertainty surrounding the motorway position caused concern among local householders and traders as to their future, and there was considerable pressure for a firm decision.

"In addition, a housing clearance area was programmed for submission to the Minister before the end of 1970, and a decision was therefore required quickly on which adjacent shopping frontages to include in the Compulsory Purchase Order. This in turn required a decision on the future location and extent of the local shopping centre, which depended on the alignment adopted for the motorway".

I have quoted at length from the description of this problem situation because it illustrates most of the features of the type of complex situation where SCA methods are at their most useful. Among these are the need to consider several interlinked decisions, often relating to quite different topics and different time scales; the presence of multiple sources of uncertainty; and the need

to consider a wide range of criteria, ranging in this case from the concerns of local residents and traders to the performance of a regional highway network.

A series of working sessions involving the use of SCA methods — which at the time were at quite an early stage of development — enabled the Teesside Council to make some important incremental steps in tackling the problems of South Bank. Among these steps were a clear recommendation on the road alignment, and a commitment to a programme of public consultation on alternative strategies for the longer-term future of the area.

This application — which formed part of a wider collaborative project involving experimental work with local authorities in six different areas of England — was followed by a series of further applications, some of them at a broader spatial scale. For example, SCA methods were used to guide the choice of land use strategy within quite a large rural area of southern England, which was subject to sustained pressures for growth in employment and population (Bather, Williams and Sutton, 1976).

Meanwhile, in Western Canada, SCA methods were applied to the situation of a long-established riverside community, with an inadequate infrastructure of water supply and sewerage, where the residents were determined to keep their homes despite mounting pressures for industrial development. This application provided the basis for a training exercise which, during the ensuing years, was to be used to introduce the strategic choice approach to large numbers of public officials in the provinces of Alberta and British Columbia.

### APPLICATIONS IN JAPAN

For several years now, I have been aware of a growing interest in the application of SCA methods in Japan. Most of the Japanese applications which have come to my attention suggest that the practical challenges of addressing complex problems of urban and transportation planning are broadly similar in Japan and in Britain in both their technical and political aspects, despite the inevitable differences in the governmental and cultural contexts of our two countries.

I was therefore very pleased to be invited to make my first visit to Japan in October 1991, as a guest of the Japan Society of Civil Engineers. The centrepiece of this visit was a symposium held in Tokyo to mark the publication of a Japanese translation of the book on SCA which I had co-authored with my associate and former colleague Allen Hickling (Friend and Hickling,



Fig.4 An SCA Workshop on Ring Road Planning in Tokyo

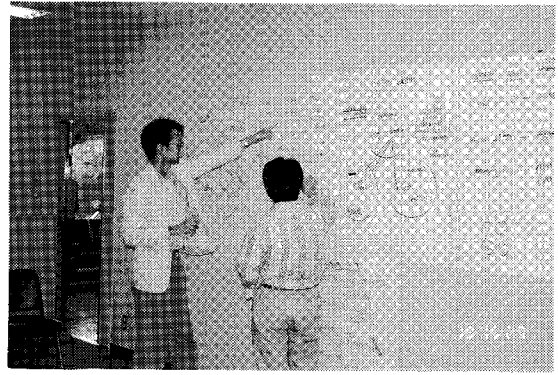


Fig.5 An SCA Workshop on Airport Planning in Sapporo

1987). At this symposium, I had the opportunity to listen to the discussion of four presentations that were made of recent applications to Japanese transportation and community planning issues.

I was particularly interested to hear of the way in which strategic choice methods had been combined with other methods with quite different origins—among them, the Analytical Hierarchy Process of the American Thomas Saaty (1980), and the KJ method of Kawakita Jiro which is widely known and applied in Japan (1988). My associates and I have always encouraged the combined use of SCA methods with other methods which may have a valid contribution to make in supporting strategic decisions, in the hope that a creative synthesis can be achieved.

At the end of this first visit to Japan, I was given the opportunity to conduct a half-day SCA workshop at Nihon University. We took as our topic the issues associated with stimulating the wider use of SCA methods in Japan; and I worked in English with a group of ten Japanese academics and consultants with an interest in this topic.

This workshop served to demonstrate the general style of interactive work on problems that has become characteristic of the use of SCA in a group setting; and it produced some useful conclusions on the issues associated with wider use of SCA in Japan, despite the handicap of working in the English language.

In November 1992, I was again invited to visit Japan as the guest of JSCE. This time, arrangements were made for me to facilitate two further workshops, in both cases working jointly with Japanese co-facilitators. This made it possible for most of the discussion to be conducted in Japanese, even though most of the writing on the flip charts was again done in English.

These two workshops, while still experimental,

both addressed specific local issues of transportation planning which were of current concern to the consultants and academics who took part. The first workshop, in Tokyo, was concerned with the planning of a controversial section of the Tokyo outer ring road; the second, in Sapporo, was concerned with alternative proposals for the city's Okadama Airport, which was unable to accommodate modern jet aircraft because of restricted runway length.

Fig.4 shows a photograph of myself and my co-facilitator, Professor Hirotaka Koike of Utsunomiya University, facilitating the group involved in the Tokyo workshop; several flip charts can be seen on the wall, representing successive stages in the strategic choice cycle of Fig.2. Fig.5 gives a closer view of some of the flip charts drawn up in the Sapporo workshop; two of my associates from Hokkaido University can be seen facilitating the group in comparing two of the leading strategies for the future of the airport.

My experiences in both workshops provided further confirmation that there are close similarities between the planning problems that arise in Japan, the UK and other countries in which I have worked—not least, there is the need to find ways of managing both technical and political uncertainties, through interaction among people with differing perspectives to contribute.

I was impressed by the skills of my co-facilitators in both settings. In Europe, there is now considerable interest in Japanese approaches to participatory decision-making; so I believe there is an exciting potential for international collaboration in this field, if appropriate structures for working together on practical problems can be found.

## OTHER RECENT DEVELOPMENTS

During the last five years, there have been



some promising applications of SCA to fields as varied as rural development planning in third world countries (van Steenberg, 1990), and international policy coordination within the European Community in relation to the disposal of various problematic forms of waste, such as car wrecks and demolition waste. At a more local level in Britain, there have also been some promising experiences in using SCA methods to help local community groups to exercise more influence over their futures (Thunhurst, C. et al., 1992)

The more the strategic choice approach is extended into new fields such as these, the more the approach itself becomes enriched by the infusion of new ideas and methods; and the more varied becomes the overall experience in participatory planning.

For example, some recent applications—such as the European Community programme mentioned above—have involved groups of much larger size than the 10 to 15 participants which is considered ideal for a strategic choice workshop. In such circumstances, much of the work has to be done in subgroups, each working on some part of the overall problem. So one of the first tasks is to work with the full group in order to agree how the overall problem is to be subdivided; and this in itself can present a difficult challenge in methodological terms. Also, it often becomes necessary to accept very limited control over the methodology adopted in the subgroups, because it may be impossible to arrange for every subgroup to be facilitated by someone with the same depth of experience in SCA methods.

### A ROLE FOR COMPUTER SOFTWARE

Another recent development has been the design of computer software which builds on the experience of using strategic choice methods in a workshop setting (Friend, 1992). The first edition of this software—known as Strategic Adviser or STRAD for short—was written for IBM-compatible personal computers running on DOS, and was launched in 1991; a version for the Microsoft Windows environment will be available in 1994.

The primary aim so far in developing the software has been to make the principles and methods of SCA more accessible to people working on strategic issues in their own offices, either alone or in small informal meetings of two, three or four people who can gather around a desktop computer for short periods to make progress together on issues in which they have a shared concern.

This emphasis has emerged because it has become recognised that, although the group “workshop” offers an ideal environment for the use of SCA methods on complex issues which affect many interests, the creation of such an environment can become a formidable task in terms of the level of advance organisation required.

Potential participants must be approached; dates must be reserved in diaries; a suitable room must be located; and the services of an experienced facilitator must be secured.

Therefore, to convene a single workshop, let alone a succession of workshops, calls for quite a high level of commitment on the part of the workshop participants and their sponsors. Although there are many planning situations where this level of commitment exists, it is a requirement that still places limitations on the wider use of SCA methods in the full range of situations where they can be useful.

Since its launch, the STRAD software has already had significant impacts on the development of the overall SCA approach. STRAD has been proving to be an effective tool for consultants, in that it enables them to work interactively with their clients in building a shared view of the issues before them. It has also proved useful in introducing strategic choice methods to students and to mature decision-makers; indeed, there is no better way of demonstrating the principles of SCA to a manager than to spend an hour or two using the software as an interactive means of enquiring into the structure of some set of issues which he or she currently faces, and working towards a clearer view of a preferred strategy of response.

In addition, the use of software provides a means of managing greater complexity in the problem structure than can be comfortably managed in a workshop setting. In particular, it enables people to work with larger numbers of combinations of options in interconnected decision areas, and to compare these in the light of a wider range of criteria, combining quantitative measurements wherever these can be made; but working with qualitative judgements wherever no clear scales exist.

Potentially, therefore, computer methods have a role to play within the workshop setting, as well as in supporting small-group decision making. However, it is clear that the introduction of computers in this kind of setting can have an inhibiting effect on the dynamics of the group process. Therefore, any progress in this direction is likely to require sustained experiment over a period of several years, taking advantage of continuing adv-

ances in human-machine interface technology in order to address the many challenges that will arise.

## PROSPECTS FOR INTERNATIONAL COLLABORATION

The evolution of strategic choice methods over the last 25 years can be seen as a response to the persistence of high levels of uncertainty, complexity and conflict in urban and transportation planning, and in the various other fields of policy to which it has now become applied. As we progress through the last decade of the twentieth century, there are no signs that these levels of uncertainty, complexity and conflict will reduce. So the concern for further development of participatory planning methods can be expected to persist, at all levels from that of the local community group to that of international cooperation in addressing emergent global issues.

It is my belief that the recent experience of developing innovative methods for addressing daunting problems in a cooperative way — not least in Japan and in Britain — offers a firm foundation for further progress in the years ahead. For this reason, I am delighted as well as honoured to have been invited to make this contribution to the annals of the Japan Society of Civil Engineers.

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