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SCENARIO CONSTRUCTION FOR URBAN PLANNING

Abdul Khakee

ARBETSRAPPORT FRÅN CERUM
CERUM WORKING PAPER
CWP-1989:20

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FOREWORD

Studying the role and functioning of the building sector and the built environment in economic systems and the society at large has remained one of CERUM's core research areas. The nature of built infrastructure with its fixed location and importance for spatial interaction makes this research a central theme in spatial analyses.

In the current paper Khakee presents a method for constructing urban scenarios under conditions of economic and political uncertainty. The method has been applied by the local government in Västerås, a Swedish urban region west of Stockholm. The basic problem addressed is the need to generate alternative scenarios in such a way that a spectrum of scenario variations provide additional knowledge, as compared with a single base-scenario.

Umeå, November 1989

Börje Johansson
Director of CERUM

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SCENARIO CONSTRUCTION FOR URBAN PLANNING

ABSTRACT There exists a substantial amount of literature on visionary urban futures. These scenarios over the urban futures have been interesting attempts to inform professional planners and futurologists as to the rich variety of alternative physical-spatial developments ahead. They have, however, been based on the prospect of large-scale urban growth and are not relevant for the slow or no growth conditions which characterize many cities and towns in Sweden and in other western countries. The paper presents one method for constructing alternative urban scenarios under economic and political uncertainty. The method has been applied by the urban government in Västerås, Sweden.

The paper is divided into five sections. The introductory section includes a very brief discussion of urban visions and their relevance for current urban planning problems. In the second section the author discusses some conceptual and methodological issues in constructing scenarios. The third section contains the Västerås method for constructing scenarios which requires the participation of decision-makers and planners in order to ensure the implementation of development strategies outlined in the scenarios. The fourth section discusses the use of scenarios in urban planning in Västerås. A discussion of the operational and methodological problems and suggestions of key issues for further research are put forward in the concluding section.

1 INTRODUCTION

In the late 1950s and during the 1960s, there was much discussion about visionary urban futures in Sweden as well as in other western countries. It was a time when architects and planners with the prospect of large-scale urban growth, pondered over the grandiose city of tomorrow (1;pp.61-84). Future urban visions varied all the way from exurbia made possible by advanced transportation and multichannel electronic interaction to Doxiadis' Ecumenopolis, see, for example Dahinden(3). Already in the late 1960s there was a growing recognition of options in the form of diverse

physical and social forms for urban development (6;pp.3-11). In a synopsis over urban visions presented during this period, Eldredge presents a catalogue of 15 urban options, ten of which he classifies as "feasible, relatively 'surprise-free'" and the rest as "visionary". The former group is made up of:(1)megapolis, (2)metropolitan central city, (3)smaller central city, (4)small specialised cities or towns, (5)satellite cities, (6)inner suburbs, (7)outer suburbs, (8)exurbia, (9)new towns, and (10)towns or villages with rural/agricultural setting. The visionary environments include (1)megastructures or 'minicities', (2)'the water city', (3)sousterain dwellings, (4)communes and other social experimental communities, and (5)'the wired city'(9; pp.617-635). Eldredge's synopsis shows that urban futurologists and planners put a major emphasis on the physical-spatial framework in their analysis of future urban development.

The stagnation in industrial production and the consequent decline in economic growth since the middle of 1970's has created a considerable amount of uncertainty about future development among Swedish urban planners. This has caused an increased number of plan revisions and urban planning has become more and more like crisis management(13;p.92). Similar development has been observed in other western countries, see, for example, Dluhy and Chen(5), and Isserman (12).

As political and economic uncertainties have increased, so has the awareness among local politicians and planners about the need to develop long-term visions of development. A thorough understanding of different development alternatives would enable the urban authorities to adapt to rapidly changing situations without losing sight of broad societal goals of equity, resource conservation and general well-being of the citizens. Currently there are some fifty urban authorities in Sweden working with some form of futures studies(17;pp.84-91).

A major problem for urban authorities interested in working with futures studies as an integrated component of urban planning is that the existing visions of urban development are hardly relevant for a situation characterized by stagnant or declining population and a great degree of economic and political uncertainty. Under such circumstances, planners are more interested in the problems of supply, scarcity of resources and revamping of the social structure, given constant population and the total stock of housing

undergoing only minor changes. Developing alternative visions of the urban future under these conditions requires a new planning philosophy as well as practical methods to handle uncertainty.

The aim of this paper is to examine one such method for constructing alternative urban scenarios. The method has been applied by the urban government in Västerås, Sweden.

2 TECHNIQUES FOR SCENARIO CONSTRUCTION

Few techniques in futures studies have given rise to so much confusion as scenarios. The literature reveals a large number of different definitions, characteristics and methodological ideas about scenarios. At the same time, it is a technique most frequently used in futures studies.

Various definitions of scenario have been presented. Herman Kahn, who was perhaps the first futurologist to use the term scenario in planning, refers to its hypothetical character. He defines it as a "hypothetical sequence of events constructed for the purpose of focusing attention on causal processes and decision points"(18;p.6). Wilson emphasizes the sketchy nature of the scenario. He defines it as a map of "the key 'branching points' of the future, to highlight the major determinants that might cause the future to evolve from one 'branch' rather than another, and to sketch in the prime consequences of a causal chain(22;p.226). Other futurologists feel that scenarios often give the impression of not being very rigorous. Ducot and Lubben have therefore defined a scenario as "a set of potential occurrences which belong to a certain field of relevance(e g world population, energy or raw materials); relate to a certain time period; and are connected by various kinds of relations(e g temporal succession, causality, effectuality, intentionality, and conditional probability)in such a way that an approximation to the whole set can be derived from a subset by basic hypotheses taken from it"(7;p.51).

These and other definitions imply that in the use of scenario one or several of the following methodological ideas are applied:(1)Scenarios are used to delimit the uncertainty space which needs to be taken into account in studying the problem at hand. (2)Scenarios identify branching points and mechanisms of change so as to find actions which can affect development in a desirable direction. (3)In dealing with a specific system or planning object, scenarios involve making explicit assumptions about the future development of the

environment of the system. (4) As holistic and consistent pictures, scenarios help to synthesize fragmented, dispersed and sometimes vague knowledge particularly when there are considerable cross-impact effects between developments in various fields. (5) Scenarios can be useful in describing a number of hypothetical developments as resulting in part from the decisions and actions of various actors. (6) Scenarios enable us to make preparations which will render future developments less probable or less dangerous (20; pp. 28-29).

The diversity in methodological ideas means that there is no set of rules for constructing scenarios. Approaches for generating scenarios vary all the way from least structured methods based on reasoned judgement and intuition in describing alternative futures to highly structured probabilistic algorithms and causal simulation models. Interested readers are referred to a large number of papers and books reviewing these techniques. See, for example, Kahn and Wiener (18), Durand (8), Diffenbach (4), and Meadow (19). Despite the availability of this wide variety of approaches, there is clearly no developed technique for constructing scenarios for urban future under uncertainty. Such a technique should at least be based on the following methodological requirements:

(1) Scenarios should provide perspectives for policies or proposals in an urban plan. Linking scenarios to urban planning is not only a matter of providing results to serve as inputs in planning but also a question of constructing scenarios in such a way that experience of new ways of thinking can be transferred to planners in the course of scenario preparation. (2) The future images are so presented that the analysis of the development can be phased out in time intervals corresponding to the middle-term planning. The knowledge generated could then be used as input in the planning process. (3) A city or a town represents a system for which changes in the external environment (national and international conditions) are of paramount importance. It is therefore useful to make explicit assumptions about the future development of the environment.

3. THE VÄSTERÅS MODEL FOR SCENARIO CONSTRUCTION

Västerås, like the majority of large towns in Sweden, was in the beginning of 1970's in the midst of planning for urban expansion. The master plan discussed three urban forms for a population of 200 000 by the year 2000: circular plan, sector plan and linear plan. For a description of these forms of city; see Yeates and Garner(23;pp.470-474). The decline in the rate of urbanization and immigration in 1972 came as a shock to most of the politicians and planners. Their support for the futures study arose from a feeling of uncertainty about current and potential problems. Following the oil crisis and the subsequent stagnation in industrial growth, politicians and planners in Västerås became all the more concerned about economic disequilibria with persistent unemployment, unbalanced regional development and uncertain future growth of the non-university towns.

Scenario construction was one of the six major phases of the futures study carried out by the urban government of Västerås. The six phases were:(1)review of current planning and decision-making, (2)examination of methodological issues and their orientation among planners and politicians, (3)problem formulation, (4)backview mirror analysis, (5)scenario-writing based on the analysis of alternative developments of the urban government's environment and (6) evaluation of alternative futures of the urban government. The Västerås model in its entirety is presented in Khakee (14).

The general aims of the scenarios were to improve planning practices and imbibe a new way of thinking among politicians and civil servants. More specially the aims were:(1) to provide a clear understanding of current and future problems, (2)to combine alternative environmental developments into a framework which is relevant to the future of the urban government, (3)to identify potential discontinuities and contingencies which will serve as early warning systems and for which contingency plans can be prepared, and (4)to indicate how long-term issues can enter short and medium term policy.

Figure 1 illustrates the six main stages of scenario construction and the text that follows describes each stage in some detail.

FIGURE 1. The Stages of Scenario Construction

Selection of the environmental variables

It was initially recognised by planners and politicians that the scenarios should provide an assesement of the future context in which the urban government can operate. It was realised that it was not realistic to study every small and specific aspect of the environment. The questions asked were (1) what were the environmental variables that critically affect the urban government? (2) which were the dominant forces operating within each environmental segment? By means of metaplan technique, the politicians and planners selected ten key variables: national and international economic development, labor market, information technology, political structure, regional structure, societal values, commercial services, education, demographic changes and transportation. See figure 2.

FIGURE 2. Urban Government and Its Environment

Metaplan is a brainstorming technique which while allowing controlled face-to-face group interaction, maximizes the participation of all members of the group. It also avoids undue influence of dominant individuals and group pressure for conformity(2).

Several other factors were taken into consideration during this stage of scenario writing. It was agreed that the people working with the preparation of the scenarios should be recruited from within the urban government, A group of fifteen planners(called 'the futures group') interested in the problems of long-term planning were entrusted with the task of preparing the scenarios. In this they were assisted by a futures study unit consisting of two persons: the head of the Planning and Statistics Department who was relieved of his ordinary duties to work full time on the futures study and an externally recruited research adviser(the author of this paper). Moreover, a group of fifteen leading politicians was appointed to comment on all the reports prepared in the course of the study, participate in work-

shops and other activities.

Preparation of special background studies

There were two principal options here: the urban government could try on its own to collect and analyse data about the external environment or it could make use of what was available from various global or national studies. It was decided to use the second approach in order to save time and money. The approach has some shortcomings. Many such studies are divorced from decision-making and do not always address relevant problems. The members of the futures group were 'instructed' to make a balanced use of knowledge so that the resulting analysis was relevant to the urban future.

The background studies about the ten main variables was presented in a report and acted as a means of communicating knowledge between all the participants in the futures study; see report 2 and 4 in the serial "Västerås City in the Future"(21).

Production of the quantitative framework

This work was carried out parallel to the preparation of background studies. Certain quantifiable aspects of the key variables were amenable to trend extrapolations. On the basis of the national forecasts of macroeconomic variables, demographic changes, size of the labor force, working hours, public debt, etc, certain trends were extrapolated for corresponding development at the local level.

In order to avoid the illusion that the future is uniquely determined by past trends, it was stressed that these trends should not be interpreted as forecasts. They were only a means of understanding the long-term consequences of existing or potential trends and for determining incompatibilities when they arise.

Enrichment with material from future biographies

Since the scenarios were to provide a basis for long-term decisions, it was necessary to take political objectives and preferences into account. The position of most politicians is by definition insecure and they depend on quick political success for continuation in office. Therefore they are not inclined to define long-term goals.

In order to overcome this problem, all the members of the municipal assembly(65 persons) were asked to write future biographies. They were asked to imagine that they were living in the year 2010 and write an essay describing their

experiences as a politician in the twenty-five intervening years. The politicians were asked to evaluate the development in the city and in the urban government as well as their personal role in the development.

This method has been developed by Gillespie and Allport(10) and provided remarkable amount of information about the type of progress the leaders foresaw. Most of the discussion dwelt around economic, political and social changes in Västerås. Some of the politicians, however, also provided visions of their personal future.

The information generated in these future biographies was unstructured and it was difficult to delineate a set of future goals. There was, however, a good deal of relationship between the components of individual images and provided some notion of what types of alternative urban future were regarded desirable by politicians belonging to various political parties.

Assessment of trends, events and discontinuities

It was necessary to reduce the total inventory of trends, events and discontinuities to manageable proportions. The futures study unit provided summaries of this knowledge base. Workshops were then arranged for politicians and civil servants separately at which they were asked to comment the summaries and provide their own views about future changes which were either omitted or not given enough attention in the summaries. The participants were also asked to make subjective evaluation of the probability of trends, events and discontinuities and their importance to the urban government. These exercises helped to indicate differences between the values and preferences between politicians and civil servants, between politicians belonging to different political parties; and in the inconsistencies in the strategies of various actors, see further Khakee and Dahlgren(15).

Presentation of alternative urban scenarios

The final phase involved sorting out combinations of discontinuities, events and trends into four scenarios. The analysis in the previous stage had already highlighted political preferences and differences in the assumptions regarding alternative developments from the present or the recent past to the end state. All the participants in the scenario-writing were in agreement that the time horizon till the year 2010 was too short for certain social and physical changes in the urban community. There also existed an agreement that no

description of the end-state images together with the analysis of events leading up to them cover over 70 pages. This excludes, of course all the supporting data and background studies which run into several hundred pages(21).

Scenarios, as presented here, are not very dramatic in the sense that they include many surprises. The politicians and planners tended to choose events which were not far removed from the scene of activity namely Västerås City and Sweden. There was a trade-off between plausibility and surprise with a bias toward the former. However, the scenarios do not lack elements of drama which are necessary in order to force planners and politicians to think into new ways of seeing the present as well as of understanding the future. See Hirschhorn(11) for a discussion about the plausibility-surprise trade-off in scenario-writing. As we shall in see the following section, the disciplined exploration of the future fulfilled the aims presented at the outset of the whole exercise.

4. THE USE OF SCENARIOS IN URBAN PLANNING

As was noted at the outset, exploring alternative urban futures under uncertainty requires new methods as well as a new planning philosophy. Scenarios developed in the manner described in the preceding section helps 'mellowing' planners' and politicians' conventional vision of reality. The very commitment to futures-oriented planning and environmental analysis is persuasive evidence of a belief in a proactive as opposed to reactive behaviour. In the case of Västerås, scenarios have had following implications for planning:(1)delineation of development strategies, (2)identification of areas which are precursors of particular futures, and (3)acquisition of understanding of the underlying processes of change. These together with the knowledge-base in the scenarios have resulted in a major shift in the emphasis in urban planning approach - from 'service-provision' planning based on population projections to 'development-planning' based on the analysis of human capital and social infrastructure(see figure 3).

FIGURE 3 Scenarios in Generative Urban Planning

Key areas

Scenario-writing helped to identify key areas which needed more detailed and specific strategic studies. In traditional planning, decision-makers are so occupied with day-to-day administration of planning legislations and provision of services that they are left with little time for identifying and acquiring knowledge about key areas which are precursors of particular futures. An important result of the scenarios was that they indicated several such key areas: (1) employment problems (specially for youths and others outside the labor-market) in an information society; (2) the renewal of a substantial part of the city's physical infrastructure which would require substantial reinvestments during the 1990's; (3) the impact of increasing use of computers on urban

government and in the provision of urban services; (4)the impact of video, cable-TV and communicating computers on the local culture; and (5)the role of urban government in the post-industrial society. It was proposed that part of the existing administrative resources should be redirected from traditional tasks to an examination of these key areas. Moreover, the departments were instructed by the executive council to make a particular note of these and other key issues in their day-to-day planning.

Development strategies

End-state scenarios involved the choice of policies and actions to reach the alternative futures. Several different strategies were identified for each end-state. In face of the current stagnation in employment, it was not surprising to find that the majority of politicians and planners showed tremendous interest in a strategy which would stimulate the urban growth. The executive council appointed working groups for the following development projects:(1)R & D-institute in co-operation with local industry and the university college, (2)a training-center for different categories of personnel for civil aviation - the first of its kind in Sweden, (3)rapid railway to Stockholm,(4)cultural communication center, and (5)training and information center for small enterprises.

These strategic projects mainly aim to stimulate local industry, make the city more attractive for new investments as well as immigration(for example, one of the aims of the rapid railway to Stockholm is to enable households to reside in Västerås so that they have greater accessibility to different amenities at the same time commute to work in the Stockholm metropolitan region) and to promote long-term viability of the city in face of competition from the university-towns. The projects have been chosen so that they can be most easily integrated into strategic planning acceptable to all the main interest groups and political parties.

Understanding of the underlying processes of change

No aspect of the scenario-writing was as important as the pedagogic one. The active participation of the politicians and planners meant a significant change in their way of thinking. Urban decision-making is 'incremental' in nature and decision-makers are prone to see future in terms of small marginal changes. Planning, under such circumstances, becomes deterministically implementing the most probable future.

fundamental changes were possible in the international scene which would be characterized by the absence of world wide conflict and the absence of any major environmental disaster. There was also a consensus about the continued existence of general characteristics common to every western democratic society.

On the basis of these analyses, four alternative scenarios were prepared for the period from 1985 to 2010:(1)a reference scenario in which it was assumed that the present 'stop-go' development will continue until the year 2010; (2)a scenario which assumed economic expansion on the basis of a strong public intervention in industrial development; (3)another growth scenario which assumed unfettered market forces would be responsible for a new economic boom; and (4)a scenario depicting radical economic rethinking in the face of long-term stagnation and leading toward a co-existence between large-scale high technology and small-scale, ecologically oriented private and public production of goods and services.

Each urban scenario contained an image of the year 2010 i e an end-state scenario as well as the sequence of socio-economic and political transformations and events leading up to it. The end-state images led to a re-examination of certain aspects of the development which were either overlooked or overestimated. They also allowed adjustments in the relative importance of the environmental variables and evaluation of their interrelationship. In order to avoid conscious or unconscious labelling of the scenarios as being good or bad, every scenario was characterised carefully and distinctly, as indicated in table 1.

Table 1 illustrates how political assumptions outlined in futures biographies were used to identify the dominant characteristics of each of the four scenarios. For a detailed presentation of the four scenarios, see Khakee and Ytterberg(16). Since the scenarios were exercises in intuitive imagination, there was some amount of qualitative incompatibility within each scenario. The scenarios were nevertheless useful for examining the implications of environmental changes on urban government. Some of these implications are summarized in table 2.

Both tables illustrate some of the main aspects of the four scenarios. The contents of the tables may give an impression that the arrangement and the level of detail were relatively superficial. This is, however, not the case since the

TABLE 1. Some Main Characteristics of the Scenarios

Environmental Variables Alternative scenarios	Economic structure and development	Labor market	Information technology	Political structure	Regional structure	Societal values	Commercial services	Education	Demographic changes	Transportation
Scenario 1: Stop-go development (reference scenario)	Mixed economy. Stagnation in industrial production	Re-curring high unemployment. Segregation in labor force	Computer based production and distribution of commercial services	Traditional democratic. Reduced central government power	Population in favor of big towns. Regional imbalance	Traditional values. Occasional social conflicts	Continued expansion of large-scale shopping units. Small increase in private consumption	Slow adaption of education system to technological changes	Increase in elderly population in non-university towns. Atomization of family structure	Continued reliance on cars and trucks for human and goods' transportation. Slow growth in personal transports
Scenario 2: Economic expansion with strong public intervention	Business-government partnership. Large public sector. Service society	Full employment. High level of qualification. Flexible opportunities for leave of absence	Controlled use of computer technology in public and private services	Centralized government. National policies' predominance over local politics	Regional policy to counteract regional imbalances	Collectivism. Consensus	Increased share of collective consumption. Mixed development	New techniques in adult and children's education. 12 year comprehensive school	Balanced population growth in central and southern Sweden	New sources of private and public transportation e.g. rapid railway to Stockholm
Scenario 3: Growth scenario in a laissez faire economy	General use of automation in management and production. Reprivatization of public services	Structural unemployment. Extensive use of robots. Increasing leisure orientation	Wide-scale application of computer technology in all walks of life. Home computers in extensive use	Greatly diminished state intervention. Conservative revival	Concentration of population in high growth towns/regions	Individualism. Social conflicts	Computerized delivery of services. High personal consumption	Home education via video and computerized learning. More elements of practical work preparation	Age-wise segregation of population. Small family units	New source of power for ground transportation. Inexpensive world-wide transportation. Rapid growth in personal transports
Scenario 4: Slow-growth scenario with small scale production	New forms of relationship between formal and informal economy. Accelerated environmental production	4-6 hours working day. Informal work in neighborhood housing areas. Conscripted civil duty for all adults	Limited use of computers in production and communications	New forms of political mobilization by local organizations. Federalism: extensive power for local and regional authorities	Redistribution of population in favour of small towns and villages	Counter culture. Anti-materialism. Consensus	High level of self-sufficiency in food products and other necessities	Education in skills needed in informal work	Clustering of people with common ideas and life-styles	Increased use of collective transportation. Extensive neighborhood social interaction

TABLE 2. SUMMARY OF THE SCENARIO IMPLICATIONS

Scenario 1

Tendential reduction in fiscal ability leads to the gradual decrease in urban public expenditure and their reallocation from technical to social and educational services. Urban renewal limited to occasional housing units. Negative trend toward aging population continues. Very small infrastructural changes.

Scenario 2

Increase in tax base as well as central government transferences enables the urban government to embark an extensive program for establishing R & D center in co-operation with local enterprises, centers for recurrent education for adults, rapid railway to Stockholm and major renewal of the housing stock and physical infrastructure.

Scenario 3

Reprivatization of substantial portion of urban public services including child-care centers, pensioners' homes, and recreational facilities. Urban governments' role reduced to master-planning. Renewal of physical infrastructure and housing stock determined by market forces.

Scenario 4

A new role for the urban government to promote small-scale industries, shared facilities like workshops, child-care centers, sport facilities, etc. Large share of local services performed by residents themselves. Housing and infrastructure development policies directed toward local organization to encourage communal forms of action.

Involvement in scenario-writing provided the decision-makers with a profound dimension to appreciate long-term prospects and problems, and to evaluate long run implications of current policy. For the first time, the politicians and planners could recognize the fact that the urban government could be constantly guided with reference to the future. The possibility to act upon present reality by starting from an imagined future was realised to afford them great freedom by providing better controls with which to guide events.

The whole exercise in the futures study has led to the realization that the urban government has a new role in the development process besides the traditional one of providing urban amenities. Planners have developed the concept 'generative planning' as a means of developing strategies for realising basic values. Furthermore, the analysis of the development in the scenarios is phased out in five-year intervals corresponding to the middle-term planning. The planners mean that the knowledge-base can be directly used to formulate alternative, common planning frameworks for all the middle-term plans.

Urban planning in Sweden is controlled by a multitude of legislations, norms and state-subsidy regulations. Planners have tended in the past to adhere more to national government regulations than to act on the basis of local goals. Wishes of the local citizens and of the operational staff in urban employment have not been given due consideration in planning and decision-making. The futures study has speeded up the discussion about using the future ends as the basis for selecting among local objectives which in turn can be used to design policies.

5. CONCLUDING REMARKS

Urban government is conditioned by the society of which it is a part. As the society changes, so must the urban government change if it is to adapt and succeed. A pre-requisite for urban planning must therefore be a sensing of incipient societal changes, whether they be economic, political, social or technological. Scenarios provide synoptic views of the future environmental possibilities. They also offer prospect of reviving visionary and idealist planning. In the 1950's and 60's, the visions dealt with alternative physical-spatial framework for urban growth. Today the visions deal with the goals of long-term welfare

development and resource conservation under political and economic uncertainty.

The four scenarios generated within the context of the Västerås' futures study represent the probable boundaries within which the future context of urban development is likely to lie. The scenarios do not take into account all the important uncertainties. They do not cover all the possible range of futures but they are useful as frameworks for the analysis of current and future problems.

The conclusions from the Västerås' study may be conveniently subdivided into three areas: operational, methodological and perceptual. These also provide a useful subdivision for discussing some key issues for further research.

Operational

Traditionally, the role of politicians in planning is often 'limited' to making a choice among final plan proposals. Politicians feel that their participation in earlier stages of plan preparation would reduce the chances of a political debate when the final proposals are presented; see further Khakee(13). In the case of Västerås' futures study, politicians participated in all phases of scenario-writing. This interplay between politicians and civil servants was something new for both groups. Due to differences in vocational background and the absence of previous traditions, there were obvious difficulties in getting these two groups to interact without any one of them dominating the other. Clearly there is a need to look into the issue of the relationship between different groups of participants in the process of generating scenarios.

Another aspect is the 'internal' recruitment of the participants in scenario-writing. It meant that these people tended to abstain from taking up issues which were 'sensitive' to the urban government and its activities. Moreover, there was an inclination to leave out issues about which the participants did not possess enough knowledge. The absence of 'natural resource conservation' among the environmental factors depends on the fact that urban governments in Sweden have very recently started recruiting ecologists as planners. Ecological issues have up to now received little attention. In case of Västerås, the disadvantages of internal recruitment was mitigated to some extent by organising such activities as brainstorming, workshops and questionnaire surveys. However, there is no satisfactory approach for obtaining a proper trade-off between

internal recruitment and 'intellectual freedom'. The issue of organising a futures study with a view to integrating it with planning and decision-making is a difficult one and needs to be researched further.

On the whole, the involvement of politicians and planners in scenario-writing was very important because it removed impediments of putting images of future into action. It has also enabled the development of a new urban planning approach and has paved way for a new insight in present and future development.

Methodological

The Västerås' study shows that there is a considerable amount of knowledge and ideas among the politicians and planners which is not utilised in day-to-day planning. Future biography, for example, is but one of the numerous subjective methods for extracting such knowledge. The potential of these methods has not yet been fully exploited depending partly on the fact that the unstructured data produced by these techniques represents formidable analysis problems. Further research is needed to delineate a precise set of analytical categories.

The futures study in Västerås combined the use of intuitive techniques(future biography, scenario-writing) and formal techniques(trend extrapolation). The use of these two categories of techniques is not without problems. There are the obvious problems of incompatibility between quantitative and qualitative analysis. Moreover, the use of formal techniques gives an illusion of reality. One problem is that the more precise an image is the more difficult it becomes to say how it is reached. More effort is needed to examine a proper combination of the two categories so that scenarios combine imagination, intuition and tacit knowledge, at the same time incorporate such portions of social statistics which enhance the temporal causality and conditional probability in the future images.

An important premise in the Västerås' scenarios has been that the analysis of the development toward the end-states has been phased out in five year intervals corresponding to the middle term planning. The method applied has been based on the subjective evaluation of the probability of different events and discontinuities occurring at different intervals of time. Scenario construction is an exercise in free imagination and it is impossible to avoid a good deal of arbitrariness. There is a need to examine how computer-based

methods can be useful in improving the phasing approach.

Perceptual

Scenario analysis in Västerås has helped to clarify some of the strengths and weaknesses of the urban government and has led to a general picture of various trends which strengthen or emerge with harmful consequences unless adequate policies are introduced. Scenarios invoke events and ideas to which readers are compelled to react. As noted earlier, there is an obvious trade-off between plausibility and surprise. A good scenario is one that optimally combines the two. There is further necessity to investigate this issue since scenarios should fire the imagination of the decision-makers and spur them to action. If they do not do so, they may experience scenarios as a confirmation of their prior convictions and assumptions.

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