Spatial Planning In the Information Age

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Every generation sees itself as being in a state of transition, but today change is so fast and universal that never before has the future of human civilisation been so uncertain. Indeed, for the first time in history, freed from the constraints of immediate need, humanity has the means to choose from among multiple futures ranging from world peace to the apocalyptic nightmare. Unfortunately, nothing guarantees that the forces at work, market mechanisms or political structures, will make the right choices; rather, the converse is more likely. This makes planning in its broadest sense, rational decision-making on the transnational, national, regional and local scale, more important than ever.

The new freedom is the product of technological progress. Just as the industrial age was brought about by the mechano-electrical revolution, the post-industrial era is introduced by accelerating advances in such fields as laser optics, materials, bio-engineering and electronics. In particular, the latter, by its application to information processing, is rapidly pervading human work from research and engineering to manufacturing, construction, transport and communications, and is quietly transforming non-working life, leading to new leisure, travel and consumption patterns. So the post-industrial era may, until better evidence, be tentatively called the information age

If planning is so important in the transition to the information age, will it, too, benefit from its potential? After all, planning is concerned with knowledge, so enhanced information-processing technology might greatly improve the comprehensiveness and reliability of its database and the anticipatory power, precision and timeliness of its results, and thus its overall rationality and usefulness. In other words, will the increased complexity of planning in a time of rapid change be matched by a comparable increase in planning competence through information technology?

This question is the topic of the present chapter: based on the limited available evidence, it will speculate about the future of planning, in particular spatial planning (urban and regional), in the computerised society. As there is not one single such future, it starts with three scenarios, each representing one extreme realisation of a particular future option. Because they are purposely presented as extremes, the reader should not accept or reject any of them prematurely in isolation. A synthesis and evaluation will be attempted at the end of the chapter.

Three Scenarios

That knowledge is the prerequisite of good government, is a fundamental belief of Western political culture dating back to Plato who, in his *Republic* (387 B.C.), required that political leaders be philosophers, people 'who know what is'. So the collection of information became central for efficient government; already the Roman Empire conducted regular censuses, but this was not enough, execution of power required intelligence, not statistics. Campanella, an Italian Black Friar, in his utopian dialogue *Civitas Solis (The City of the Sun,* 1626) described what was practiced in the ecclesiastical principalities of his time and brought to perfection by the Holy Inquisition: a hierarchical system of obligatory confessions, by which the ruling clergy collected information about non-compliance in their territory. Not much later (1651), Hobbes presented the *Leviathan,* or all-encompassing State, a giant information-processing machine:

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> For by Art is created the great LEVIATHAN called a COMMONWEALTH, or STATE, (in latine CIVITAS) which is but an Artificiall Man; though of greater stature and strength than the Naturall, for whose protection it was intended; and in which, the *Soveraignty* is an Artificiall *Soul,* as giving life and motion to the whole body; The *Magistrates,* and other *Officers* of Judicature and Execution, artificiall *Joynts; Reward* and *Punishment* (by which fastned to the seate of the Soveraignty, every joynt and member is moved to perform his duty) are the *Nerves,* that do the same as in the Body Naturall; The *Wealth* and *Riches* of all the particular members, are the *Strength; Salus Populi* (the *peoples safety)* its *Businesse; Consellors,* by whom all things needful for it to know, are suggested unto it, are the *Memory; Equity* and *Lawes,* and artificiall *Reason* and *Will; Concord, Health; Sedition, Sicknesse;* and *Civill War, Death.* (Hobbes, *Leviathan,* The Introduction, p. 1).

Following this model, in the eighteenth and nineteenth centuries the modern state was constructed which, for its proper functioning depended on three sources of information: external (the Statistical Office), internal (the Bureaucracy), and secret (the Intelligence Service). The notion of government as an information-processing machine is still alive, not-withstanding some substantial reinterpretations, in modern political systems theory and policy science as illustrated by titles such as *The Nerves of Government* (Deutsch, 1963) and *The Intelligence of Democracy* (Lindblom, 1965).

In *spatial* planning, by remarkable contrast, knowledge was for a long time a subordinate category. In particular town planning was long held to be an art performed by architects, and it was only in this century that the importance of comprehensive information (including economic and social as well as physical data) for planning became recognised. 'Survey before plan!' (Geddes, 1915) became imperative, although surveys remained ex-pensive and hence restricted in scope, and so rarely played an important role in the actual plan-making process.

That seemed to change when the advent of the digital computer in the fifties promised to make information storage, retrieval and manipulation much more efficient The concept of the urban information system emerged as a dynamic, high-resolution representation of the urban-regional system, in a sense a permanent all-purpose survey, from which all knowledge needed for plan-making could be derived. Moreover, computer-based urban models seemed to be able to bridge the gap between knowledge and plan by identifying the optimal plan, or at least by helping to narrow the choice of plan options. Based on these hopes, first in the US and sooner or later in other countries, considerable amounts of money and talent were spent to establish computerised urban information systems and models. The story of the almost complete failure of these early experiments and the disillusion that followed has been told many times and can be skipped here (see, for instance Boyce *et al.,* 1970; Kraemer, 1973; Lee, 1973). Today, thirty years after computers were used for the first time in the Chicago Area Transportation Study, computerised information systems and models for urban and regional planning have in most countries, with few local exceptions, either been completely abandoned or are maintained and applied at a disappointingly low level and practically nowhere play a significant role for policy making and planning (see, among others, Goldberg, 1983; Pack, 1983; Wegener, 1983; Nijkamp, 1983).

That is the situation from which the three scenarios start. The question is, obviously, why the adoption of information technology for day-to-day spatial planning has been so much slower than for other kinds of planning such as corporate or financial planning. Was it for reasons related to the technology itself, such as non-existence, unavailability or overly high costs? Or was it for other reasons? The three scenarios reflect different answers to that question, and accordingly draw different conclusions from the recent past for the likely future.

Scenario 1: The Planning Machine

In this scenario, it is accepted that indeed Information processing is a bottleneck factor for successful planning and that with increased availability and affordability of advanced Information technology significant changes in the method and process of spatial planning will occur. These changes would be, in the first place, a natural spin-off from the rapid penetration of all departments of local and regional governments by computerisation. Where every administrative transaction is mirrored by a corresponding transaction in a computer, it is easy to organise the records in such a way that they can be made available also for planning purposes. Almost every department of local and regional government produces in its daily routine a continuous stream of data of potential relevance for spatial planning. In addition, there are numerous files maintained by semi-public agencies or by private firms such as utility, transport, telecommunications or housing companies containing detailed client or sales information which, if made available to the public authorities, would provide highly-relevant information on spatial communication and consumption patterns. The same applies to the growing number of private business transactions conducted daily from home terminals through telebanking or teleshopping services or via computerised point-of-sale accounting systems.

All this Information is already now assembled or will be assembled in the near future in computerised form. To be sure, most of it has been collected already in manual or even computer files. However, these files, computerised or not, have been maintained separately by each agency or firm. The qualitative new feature of the information age is that it is now possible to link individual computers to local or universal computer networks, and that there are several reasons to do so. Firms install in-house computer networks to enhance the internal communication and consistency of their operations, even at remote plant locations. Computer networks between firms or between firms and private households are the prerequisite for electronic mail, teleordering, telebanking or teleshopping or other kinds of electronic communication making the paperless office a reality.

There is no reason to believe that local or regional government should not in the long run behave like a private corporation. With progressive integration of computers into local-government operations, pressure to integrate the various data sources into one comprehensive databank, or rather a network of integrated departmental databanks, will increase for economic and consistency reasons. As a natural extension, these local databank networks will be linked to similar networks operated by other territorial bodies such as counties, provinces or States, eventually growing together into a national system of spatially organised Information systems.

Of course there will be opposition to such schemes, as there has been opposition in the past, first in the mid sixties in the US (cf. Martin and Norman, 1970), later in other countries (cf. Bodelle, 1983) based on the obvious potential of databanks containing personal Information to be used for surveillance. But imagine for this scenario that in countries with a reasonably pragmatic political atmosphere and with some safeguards against serious abuse, the legislation necessary to install a national network of spatial databanks will be passed on the grounds that the potential benefits for society are greater than its potential hazards.

The implementation of an urban information system which is not, as earlier urban 'planning' information systems, a collection of data especially assembled for planning purposes, but consists of the operational records of local government themselves and hence is continuously and automatically updated, would indeed dramatically change the information base of spatial planning. With increasing historical depth, that is, more and more transaction records being accumulated over time, ever more sophisticated forecasting and optimising models would become feasible. Forecasting models of hitherto unknown accuracy would probably be of the multistate-cohort type recently developed in demography (Rogers, 1982), either in the aggregate or via microsimulation

based on observed transitions taken as revealed preference or on event histories extracted from accumulated records (Hannan, 1982). Even more popular would be optimisation models organised as multi-player games in which players representing real-world actors such as households, firms, travellers, consumers, etc., seek to maximise group-specific objective functions with choice dispersion, while the player representing local government uses policy instruments to maximise the public welfare (for an example, see Roy and Johansson, 1984).

If several of such models could be linked together and connected to the real-time urban database, they could be routinely used for short-term forecasting as early-warning systems. A similar early-warning system plugged into the real-time, local government information system would not only be immensely more sensitive to detect even subtle signals of potential citizen dissatisfaction, but would also be fully automatic. Moreover, the system could be provided with a set of rules concerning how to respond to minor deviances from 'normal' operations it detects, for instance by issuing appropriate advisory messages to the respective agency. Such a system might be called a planning machine, because it would take care of all routine decisions; only in exceptional, high-conflict situations involving controversial political action or large amounts of money would human intervention be required – the planning equivalent to management by exception.

The role of the planner would be, of course, to supervise the planning machine, comparable to the key operator controlling the smooth functioning of a power station or a large automated assembly plant. One imagines planners lolling about in swivel chairs in the Urban Alert Center (looking like a Strategic Air Command situation room) waiting for sensor lights to flash on a floor-to-ceiling city map at places where trouble is likely to emerge. After a few years of successful operation, the planning machine would more and more become immune to criticism; people would believe in its infallibility or even endow it with superhuman power: a veritable Leviathan.

Scenario 2: The Retreat of Planning

The second scenario recognises the same facts (the failure of the first wave of computer applications in urban and regional planning), but draws the opposite conclusions. It is based on the belief that the kind of rationality underlying the planning machine not only misses what is essential for societal decision making, but is also highly dangerous for the existence of human society.

For this scenario, the lack of success of early urban information systems and models is not related to information technology, but to a change in planning paradigms during the last twenty years from blueprint-planning from above to procedural, incremental, small-scale planning from below. In the latter paradigm, planning is seen as a process of mutual adjustment of conflicting interests, as 'social learning' (Friedmann, 1981), the extreme opposite of the centralised rationality of the planning machine. Social learning means that people want to become subjects rather than objects of planning, that they want to actively participate in the decisions about their life and their environment Therefore, social learning starts at the local, neighbourhood and community level and accordingly focuses on local needs first; only from there does it move on to issues of broader (e.g. national) concern. Hence its primary mode of operation is personal communication.

The kind of information contained in the planning machine is of little value for this kind of planning for two reasons. The first is one of scope. Where the focus is on the problems of a small, local client group, data collection is no real problem, since nobody knows better than the people themselves about their circumstances. More comprehensive information is not only superfluous, it also detracts attention from the problem at hand, in negotiations with other groups it may even weaken their bargaining position and thus prove dysfunctional. The second reason refers to content. As the real-time urban information system is based on transactions, it contains only quantitative or

'objective' information, but no qualitative or 'subjective' information on values, preferences, aspirations, intentions, concerns (this is why the models in Scenario 1 have to rely on revealed preference). But without explicitly addressing values and preference trade-offs, in planning 'from below' conflict resolution between adverse group interests is not possible. For these two reasons, advances in information technology or urban databanks would hardly have any impact on this style of planning.

From the point of view of planning from below, improved information processing and data collection on the part of the State would not only be irrelevant for planning, but would be detrimental, because they would permit the State to extend its power and control over the citizens. The fight against the information monopoly of the State must be seen in a larger context. It is part of the great battle, fought to the end already in a few countries, still going on in some, and not even begun in others, over how society should deal with technology. The critical attitude towards technology is expressed by L. Mumford's 'The Myth of the Machine' (1967), where it is argued that man has already now proceeded beyond the purpose of achieving mastery over nature and is rapidly approaching the point where, like the sorcerer's apprentice, he can no longer control the forces he called upon, with the consequence that he not only destroys the natural environment of the earth, but also deeply alters his own personality. It is what Horkheimer and Adorno (1947) called the 'dialectic of enlightenment': that the achievements of Enlightenment, before they had a chance to bring about, as it was hoped, the great ideas of Enlightenment – freedom, equity, and humanity – turn into destructive forces threatening their very existence and thus pave the way for totalitarianism.

Seen from this angle, the computer is not the magnificent invention capable of extending man's knowledge in hundreds of beneficial ways, but is associated with police information systems keeping track of thousands of innocent people, with secret services' information systems filled with dossiers on perfectly legal political activities, with industrial personnel information systems designed to tighten the control of workers by management, and with the innumerable other public and commercial information systems encroaching upon one aspect of the private domain of the individual after another. All this has to be fought against, and there is no reason to make an exception for urban planning information systems.

Now, to continue with the scenario, imagine that in one or more countries opposition groups fighting against the implications of information technology, such as civil-rights groups or trade unions opposing the introduction of personnel information systems in industry, form an alliance. Suppose, furthermore, that these groups, including among their members many academics, writers, lawyers, etc., are successful in raising the awareness of the general public for their concerns, then it is not at all inconceivable that they, through court decisions or through legislation, may succeed in effectively preventing the large-scale application of advanced information technology for policy making and planning by the State. This would, of course, also apply to spatial planning on the local or regional scale.

In that case it is likely that planning authorities, never having been particularly Innovation oriented, might readily accept this and be content with what they have – and that will not be very much, given the fact that planning departments do not generate their own data, because their access to other agencies' data will be severely restricted, and because special surveys or censuses will become extremely rare because of their lack of acceptance and high costs.

However, if the public authorities will be restrained to engage in data collection for planning, others will not. So it can be anticipated that a commercial market for local and regional spatial-information collection will develop. Customers and/or suppliers in this market will be individuals or firms which, during their business operations, generate and/or use spatial data such as real-

estate agents, developers, mortgage banks or other large corporations having interests in the region. Planning authorities wishing to use such privately-collected data will have to pay the market price. Moreover, the privately-collected data will be much less systematic and more *ad hoc* than data from published statistics and normally will be based on samples. This, however, will have implications for the kind of models and forecasting techniques that can be applied. Much effort in applied planning work will be devoted to patching the deficient database by estimation techniques such as biproportional adjustment, contingency table analysis, or analogy methods, and the resulting forecasts will be of questionable credibility. More importantly, the unequal distribution of information between the public authorities and private firms will inevitably shift the centre of gravity of planning from the public to the private domain. With the retreat of public planning from its information base, public authorities will be in a helplessly disadvantaged position in negotiations with industry with its superior 'intelligence'.

A weak public planning authority, however, is a danger for a planning system in which planning from below is the dominant paradigm. Planning from below needs an active counterpart representing the more comprehensive, long-range concerns of the community as a whole to coordinate between the conflicting interests of local groups and the interests of the community, to suggest compromise solutions, and to protect the rights of minorities which might not be able to express themselves otherwise. Without that co-ordination function, planning from below remains fragmented and partisan and is unable to deal with larger strategic issues.

Scenario 3: Computers and Social Learning

This last scenario attempts to sketch a third path between uncritical submission to and total rejection of information technology for urban and regional planning. To do that requires a recapitulation of the basic assumptions that lead the two first scenarios into their specific blind alleys.

The first scenario, which can be associated with planning from above, assumes that information is the bottleneck of planning and so makes use of advanced information technology, but fails to provide for value articulation from below. The second scenario starts at the grass-roots value-conflict level and accordingly rejects any form of centralised information, but has no mechanisms to integrate its disjointed efforts into a coherent whole.

So the two approaches seem to be the total opposite of each other. But on closer inspection they are remarkably similar. In more general terms, both approaches focus on a particular domain of the planning spectrum and seek to optimise its internal information processing capacity at the expense of its attention for external information. External information for the planning machine of Scenario 1 consists of players refusing to obey the rules: consumers not consuming, landlords not maximising their profits, minorities, protest movements, single-issue groups, that is, all irregularities that disturb its smooth functioning. External information for the actors in the second scenario comprises social costs or externalities of selfish behaviour. Both approaches have in common that the exclusion of dysfunctional information is a prerequisite of their specific performance.

Obviously, the clue to solving this dilemma lies in a combination of both approaches that preserves their internal information processing capacity, but enhances their potential for processing information from outside. By this formulation, the central problem of planning becomes one of communication, not information.

There have been numerous proposals in planning theory for intensifying the communication between above and below, between expert and client or between centre and periphery (Dewey, 1927; 1939; Mumford, 1938; Deutsch, 1963; Habermas, 1963; Etzioni, 1968; Fehl, 1971; Fried-

mann, 1973; Kochen and Deutsch, 1980; Habermas, 1981; Friedmann, 1981). Perhaps the most far reaching, and in some countries most influential, has been the work of Habermas who suggests a scheme of knowledge-informed public debate (discourse) as the basic medium of participatory, democratic decision making, a concept very close to that of the New Humanists' school of American planning theory, for whom planning and social learning in small, cellular, societal organisations are identical (Friedmann). However, these proposals have tended to remain prescriptions without concrete indication of how they might be implemented in practice.

Indeed, the difficulties to be overcome are enormous, as long as communication in planning has to rely solely on pre-industrial forms of face-to-face interaction. Planning by personal communication is characteristic of archaic societies in which interaction system and social system are still identical: the village democracy (Luhmann, 1975). With the increasing complexity of society, public discussion is replaced by more powerful mechanisms to reduce complexity: functional differentiation, representation, and programming by objectives. However, these techniques (as Scenario 1 has shown) cannot be extended beyond certain limits without moving out of democratic control. This is the deeper and absolutely legitimate reason for the re-appearance of the archaic medium of public discussion on the planning scene.

Yet the potential advantages of discursive planning, value-orientation and openness to innovation have to be paid for by serious structural restrictions. Personal communication finds its limits in the scarcity of time and attention: only one theme can be dealt with at a time, arguments have to be processed sequentially, time consumption is high, the complexity that can be handled is small (Luhmann, 1971; 1975). These constraints determine the long-run prospects of participatory planning. If, however, it is possible to extend these limits by some powerful amplifying mechanism, the interaction medium 'discussion' may be reinstated as the constituent vehicle of democratic planning.

The question to be asked in this scenario is whether information technology can provide such amplifying mechanisms. Attempts to use two-way communication media to overcome the fragmentation of local-planning discussions have a long history, from the first phone-ins (cf. de Sola Pool, 1973) to present two-way cable television networks or using various combinations of television and telephone. There have also been experiments to use computers not so much as computing machines, but also as communication media to increase the efficiency, productivity, and substance of group decision making, from computer gaming, interactive modelling and electronic voting systems (for an overview, see Wegener, 1978) to present decision support or expert systems. Before long, the technological potential will be available to combine, first locally, then globally, multi-way television and distributed computing, accessed through nodes in the Integrated Services Digitalised Network (ISDN) providing the infrastructure for networks of electronic town halls from the neighbourhood to the global level.

It still requires speculation to discuss the potential use of this technology. For example, any individual or group would have access to local, regional or national spatial databanks which, for privacy reasons, would not be as comprehensive as those of the planning machine of Scenario 1, but certainly much richer in content than today's published statistics. The system would offer up-to-date tools for manipulating, displaying or analysing data from simple statistics to sophisticated modelling, unless clients wanted to develop their own models and probably come up with different results, which then could be exchanged electronically with other groups, just as today's microcomputer software is exchanged via electronic mailboxes. Groups pursuing a certain issue, alone or pooled with others, might use a public television channel for live discussion, prepared video presentations and on-line, interactive modelling to address a much wider audience than they could ever reach by printed media. Such self-organised events would interact with the audience through remote voting or evaluation techniques providing immediate feedback on the public ac-

ceptance of the issue under debate. Another important application of electronic feedback techniques might be forecasting sessions in which scenarios produced by aggregating audience responses are compared and confronted with model forecasts. In a more organised and controlled way, remote voting systems would be used to formulate recommendations for the actual decision making of local, regional or national legislatures.

The technological potential of almost instant feedback between political decision makers and the constituency on all levels from the neighbourhood to the nation will undoubtedly have deep impacts on the political system of post-industrial democratic societies. It means, in fact, that the historical reasons that forced nations to move away from the grass-roots village democracy to political representation, division of responsibility, hierarchical organisation, etc., in short, the whole complex modern political machinery, are at least partly disappearing, and this will sooner or later be reflected in the rules and procedures of political decision making (cf. Toffler, 1980). That is not to say that government by referendum should become the rule, in particular where emotional or biased judgement is likely. But it implies that the political structures can become less centralised and more responsive to local concerns, minority rights and small-scale innovation and change.

This applies in particular to spatial planning, because it is closer than any other kind of planning to the neighbourhood level, where the first experiments in grass-roots democracy are made. A fast-moving, innovation-oriented planning department might play a vital role in decentralising the local-regional planning machine and stimulating the kind of pluralistic, self-organising planning activity described above, that is, transforming itself from a bureaucracy into an agent of change. An essential task in that transformation would be the implementation of the most advanced public reference spatial information system plus the software tools, education and training necessary for its fullest utilisation by all groups of society (cf. Meier, 1962). Needless to say that this kind of planning would require a different type of planner, more mediator and communicator than, say, engineer or scientist, but at the same time highly competent in the substantial problems of planning as well as in the modalities of the new technology (cf. Batty, 1984).

And certainly it would require a new mix of planning methodologies. In particular, three groups of planning methods seem to be under-developed and under-represented in planning research and education.

Communication with non-experts

The first and most important group comprises methods designed to communicate complex spatial-temporal phenomena, issues and problems to people not trained in planning, that is, to non-experts. The same applies to the design of efficient, user-friendly, man-machine Interfaces for planning software (a topic that has received much attention in other planning fields; see, for instance Sage, 1981; Benbasat and Taylor, 1982, but hardly any in spatial planning research) as well as hardware and software development for group decision making such as teleconferencing, local decision networks, decision room design, large visual-display techniques and the like (see, for instance De Sanctis and Gallupe, 1985).

Stated preference techniques

The second group of methods of obvious importance for the new pluralistic-participatory style of planning in the information age deals with the problem of how to incorporate stated (rather than revealed) preference information into information systems and models. There does exist a large body of literature on multi-attribute utility theory and related concepts in mathematical psychology and decision theory (e.g. Keeney and Raiffa, 1976) as well as on multi-objective decision making

in regional science (see, for instance Nijkamp, 1979; Voogd, 1983; Nijkamp *et al.,* 1984), however, practical experience with such methods for spatial planning is still limited (see Bauer and Wegener, 1977).

Non-numerical planning information

The third group is concerned with the processing of broader classes of knowledge including, besides numerical, also categorical, causal, etc., information on planning issues extracted from documentary data such as reports, papers and books, as well as from expert knowledge. Despite increasing developments of decision support or expert systems for such planning fields as corporate, financial, marketing and product planning, only very few such systems seem to have been developed for spatial planning purposes (among these are Nakamura *et al.,* 1982; White *et al.,* 1985).

Models in the traditional sense, that is, mathematical planning models, will remain important for research and education and training, and may become more important for policy making, if they are embedded into the communicative environment discussed above. Modelling will benefit vastly, as in Scenario 1, by improved data availability and the possibility of being linked to the real-time urban database as learning monitoring systems (see Brotchie, 1984). However, no model will ever be allowed to gain a dominating influence on policy making and planning (as the planning machine in Scenario 1 had it). This will be achieved first, by requiring that all modelling performed for local and regional government be exposed to unrestricted public review and criticism, and second, by always commissioning more than one model coming from different, competing modelling approaches.

Conclusions

What are the chances that Scenarios 1, 2 or 3 will become reality? The answer will be different for each country. For a start, the experiences and attitudes of people in different countries toward the computer are vastly different. For instance, in a survey conducted by major newspapers in nine industrialised countries in early 1985 (Ginsburg, 1985), 37 per cent of the adults interviewed in the US indicated that they had already used some kind of computer, whereas the corresponding percentages for other countries were 28 per cent (Great Britain), 26 per cent (France), 14 per cent (Japan), and 11 per cent (West Germany). However, the countries with the greatest personal experience with computers also had the highest proportion of people concerned about the adverse aspects of a computerised society. When asked if computer databanks are likely to be used to intrude into personal privacy rights, 75 per cent of the respondents in the UK answered yes, 68 per cent in the US, and 71 per cent in France, but only 51 per cent in West Germany and 50 per cent in Japan. Does this mean that the deeper societies move into the information age, the more they resign to the inevitable loss of democratic innocence? Martin and Norman (1970, pp. 534-5), in their early preview of the computerised society, may have discovered a sad truth:

> Reluctantly, the public may have come to realise that the machines have information about them. They cannot prevent it. It is regarded as being for the general good. Most of it is reasonably safeguarded. Their relationship with the data networks is in some ways like that with their confessional. At least the data are accurate now. The earlier years, when embarrassing errors appeared on the files, have gone. Most of the public would now be upset if the machines did not have all their personal details. They might miss out on many of the beneficial aspects of the computerised society.

Knowing the hazard, but accepting it as the price to be paid for the good life – if the attitude practised towards nuclear energy, global pollution, traffic accidents and cigarette smoking is also the post-industrial attitude towards information technology – Scenario 1, the planning machine, will be the ultimate prospect. However, there are countries like the Netherlands and West Germany, which are highly industrialised but relatively less advanced in the application of information technology, and hence have had a chance to experiment with participatory planning before the advent of the information age. In such countries opposition against information technology such as the anti-census battles still can occur (see Wegener, 1985). The danger is that such opposition may lead these countries into Scenario 2, the retreat of (public) planning.

Scenario 3 remains the challenge to be accepted. It offers the only visible chance to put information technology into the service of planning instead of letting it destroy planning in one way or the other. To accept the challenge requires the joint efforts of regional and computer scientists, planners and citizens to transform the potential of information technology into a progressive rather than oppressive force.

The problems to be overcome towards achieving this goal are enormous, and there is no guarantee that it can be achieved. Therefore a few caveats are in order. Throughout this chapter there have been three assumptions implicitly made which are so crucial that if only one of them turns out to be wrong, all efforts will be in vain. The three assumptions are:

The information technology will be present

In an unspecified sense, the assumption is likely to be correct. But it is also likely that access to advanced information technology will be unevenly distributed in society. This is especially true for the ISDN technology which will for a long time be expensive and only affordable by firms and more affluent households. But only with technology open to all members of society, can the pluralistic planning market place develop. Seen from this angle, the three scenarios may not be real options to choose from, but phases each country has to pass through – from early technocratic use, while the technology is still rare – through a period of distrust and refusal, to eventually a more mature, constrained, and responsible Integration into everyday life, when the diffusion process approaches completion.

There are no limits to artificial intelligence

This assumption underpins the idea of the planning machine of Scenario 1, but also the more civilised notion of the learning monitoring system of Scenario 3. However, the issue is far from being settled. The emerging view is (cf. Dreyfus, 1979) that despite impressive achievements in limited, clearly-defined contexts (microworlds), machines will never be able to understand things outside that context (i.e. extend it), because they lack the genetically-inherited and socially-acquired experience that enables humans to do just that. This limitation may not be critical where planning is concerned with clearly-defined issues, but characteristically in planning from below the context cannot be pre-specified from above – it is always changed by the people. If this view is correct, it would not only explain why in the past problems have always outrun models, but it would also suggest that the relationship between people and computers in planning will always remain one of misunderstanding and alienation.

Post-industrial democracy will be grass-roots democracy

Obviously, this assumption is essential for Scenarios 2 and 3, and indeed there is much current evidence of political decentralisation in many countries. But is this evidence sufficient to project it into the future, as many futurists do, as a megatrend (Naisbitt, 1982), or are these projections

merely idealist dreams of their bourgeois authors? Other futures are conceivable. One would be that cities would be the scene of, probably violent, class struggles between the job-possessing class and the jobless victims of computerisation, hardly a place for enlightened discourse. The other, no less depressing vision is much more suggestive: that the freedom of material need and added leisure hours gained through computerisation of work do not lead to increased community involvement and active participation in social life, but, on the contrary, to a loss of solidarity and political interest. A depoliticised public, conditioned by the media to entertainment and consumption, may well be the real client of post-industrial spatial planning.

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