Knowledge and Creativity in Urban Development

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Introduction

Innovation is the engine of change. 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 transforming also non-working life leading to new leisure, travel and consumption patterns.

Like any other technology, information technology has developed through successive cycle of innovation, diffusion, market penetration and eventual saturation. It took years for the printing press, the telegraph, the telephone or the fax machine to be accepted in the market, but when then world-wide proliferation was fast starting from the most advanced countries and gradually spilling over to the less developed peripheral ones. The same pattern can be observed with the most recent information technology, the digital computer. As an invention it was around already in the 1940s, but even when it became sufficiently reliable for practical use in the 1960s, it was confined to large business corporations, government agencies and research institutes because of its high cost. It took another decade to make computers, through the microprocessor, affordable to small businesses and households. The innovation with the most profound effect, however, is the Internet which has linked millions of human brains, provided access to a wealth of distributed information and has opened news ways of doing business and pursuing leisure activities.

Many of the impacts of the new information technologies have a spatial dimension. The emergence of a new industry leads to the question where the new manufacturing plants and service firms generated by the new information technologies will locate and how this will change the pattern of economic activities in a system of regions. Even more universal are the impacts of the new technology on businesses operations, logistics, corporate management and public administration. How will the new technology influence work, travel, leisure and consumption patterns and in turn the location preferences and spatial behaviour of private, corporate and public actors?

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The task here is to discuss how the new information techniques will influence *urban development*. The term 'urban development' has two, not always clearly distinguished, meanings.

- One refers to the way an urban region develops, i.e. grows or declines as a function of population movement or economic activities.

- The other refers to the active efforts of public and private actors to 'develop' the region, i.e. to promote and improve its economic success and quality of life, in other words, refers to urban policy making and planning.

The first meaning has received extensive attention in the regional economics literature and will not be treated here. This paper deals with the second meaning, the role of information for urban policy making and planning. Will it benefit from the new information techniques and will the new techniques foster new creative ways of preparing for the future?

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 practised 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:

> 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.l).

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 urban policy making and planning, by remarkable contrast, knowledge was for a long time a subordinate category. In particular urban 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 expensive 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 1950s 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. Today, half a century 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 either been abandoned or are maintained at a disappointingly low level and practically nowhere play a significant role for urban policy making and planning.

At the same time, the volume of information available has steadily increased. As Kunzmann (2002) notes,

> "Information overload has become a serious concern of actors in complex urban decision-making processes. There is a growing mismatch between the availability of knowledge and information and the use of it, and a mismatch between time available for absorbing necessary and available information and the need for fast, informed and yet still democratic decisions. ... There is some evidence from city development processes that trust in selected experts or in information providers replaces serious research, that information and knowledge is withheld or manipulated for profit or political reasons, or even that undesirable information is suppressed."

The paradox, that information overload increases but available tools to harness it are not used, is the point of departure of this paper. Again in the words of Kunzmann:

> "Are there any creative ways to select required information for city development processes, to use globally available, new city information systems, do we need information agents and brokers or ombudsmen (or women) who mediate information flows between actors?"

There are several ways to proceed from here. In the following sections, three scenarios will be presented, each representing one extreme realisation of a particular future option (cf. Wegener, 1987; 1988). Because they are purposely presented as extremes, they should not be accepted or rejected prematurely in isolation. A synthesis and evaluation will be attempted at the end of the chapter.

Scenario 1: The Planning Machine

In this scenario, it is accepted that indeed information processing is a bottleneck factor for successful policy making and 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 computers through telebanking or teleshopping or via computerised point-of-sale accounting systems.

All this information is already now assembled in computerised form. To be sure, most of it had been collected already in manual or even computer files. However, these files, computerised or not, were maintained separately by each agency or firm. The qualitative new feature of the new technology is that it is now possible to link individual computers to local or global networks, and that there are several reasons to do so. Firms install in-house networks to enhance the internal communication and consistency of their operations, even at remote plant locations. Internet connections between firms (B2B) or between firms and private households (B2C) are the prerequisite for electronic mail, teleordering, telebanking or teleshopping or other kinds of electronic communication.

There is no reason to believe that local or regional governments should not in the long run behave like private corporations. With progressive integration of computers into local-government operations, pressure to integrate the various data sources into one comprehensive database, or rather a network of integrated departmental databases, will increase for economic and consistency reasons. As a natural extension, these local database 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 distributed information systems.

Of course there will be opposition to such schemes, as there has been opposition in the past, first in the mid-1960s in the US (cf. Martin and Norman, 1970), later in other countries based on the obvious potential of databases 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 databases 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 consists of the operational records of local government themselves and hence is continuously and automatically updated, would indeed dramatically change the information base of urban policy making and 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. 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, while the players representing local government use policy instruments to maximise the public welfare.

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 any deviance from 'normal' operations, 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 – management by exception.

Creativity would not be needed here –would even be a disturbance interferes with the functioning of the planning machine. As the planning machine determines the optimum solution taking all factors into account, 'creative' solutions yielding better results cannot exist, or if they do, the machine is defective and needs repair.

The role of urban planners would be, of course, to supervise the planning machine, comparable to operators controlling power stations or large automated assembly plants. One imagines planners lolling about in swivel chairs in the Urban Alert Centre 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: Retreat of Planning

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

For this scenario, the failure of early urban information systems is not related to information technology, but to a change in planning paradigm 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. regional or 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. But without explicitly addressing values and preference trade-offs, conflict resolution between adverse group interests is not possible. For these two reasons, advances in information technology would have hardly 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 con-text 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 Mumford's *The Myth of the Machine* (1967), where it is argued that mankind has already now proceeded beyond achieving mastery over nature and is rapidly approaching the point where, like the sorcerer's apprentice, it can no longer control the forces it called upon, with the consequence that it not only destroys the natural environment of the earth, but also deeply alters it own personality. It is what Horkheimer and Adorno (1947) called the 'dialectic of enlightenment'.

Seen from this angle, the computer is no longer the magnificent invention extending man's knowledge in hundreds of beneficial ways, but is associated with police information systems keeping track of innocent people, with secret services' information systems filled with dossiers on political activities, with industrial staff information tightening the control of workers by management, and with the innumerable other public and commercial information systems encroaching on one aspect of private life after the other. 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 staff information systems in industry, form an alliance. Suppose, furthermore, that these groups, including among their members 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, through court decisions or legislation, they succeed in preventing the large-scale application of advanced information technology for policy making and planning by the state. This would, of course, also apply to urban planning information systems.

In that case it is likely that planning authorities, never having been particularly innovative, might readily be content with what they have – and that will not be very much because they do not generate their own data and their access to other agencies' data will be severely restricted and special surveys or censuses, due to their lack of acceptance, will become extremely rare. While public authorities are restrained in their data collection, a commercial market for local and regional spatial-information collection develops. Customers and/or suppliers in this market are firms which in their business operations generate and/or use spatial data such as real-estate agents, developers, mortgage banks marketing companies. Planning authorities wishing to use such privately-collected data have to pay the market price. Moreover, the pri-

vately-collected data are much less systematic than data from published statistics and normally based on samples. This, however, has implications for the kind of models and forecasting techniques that can be applied. Much effort in applied planning work is devoted to patching deficient databases by estimation techniques, and the resulting forecasts are of questionable credibility – not the ideal seedbed for creativity. More importantly, the unequal distribution of information between public authorities and private firms shifts 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 weak 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 paradigm. Planning from below needs an active counterpart representing the more comprehensive, long-range concerns of the community as a whole to mediate 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. 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 policy making and 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 grassroots 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 opposite of each other. But on closer inspection they are remarkably similar. In more general terms, both 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 in Scenario l consists of players refusing to obey the rules: consumers not consuming, landlords not maximising their profits, minorities, protest movements, single-issue groups, i.e. all irregularities that disturb its smooth functioning. External information for the actors in the second scenario comprises the 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, between centre and periphery (Dewey, 1927; 1939; Mumford, 1938; Deutsch, 1963; Habermas, 1963; Etzioni, 1968; Friedmann,

1973; Habermas, 1981; Friedmann, 1981). These authors have in common that they suggest knowledge-informed public debate (discourse) as the basic medium of participatory democratic decision making. 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 l has shown) cannot be extended beyond certain limits without getting 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 are 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 it were 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 in the 1970s to two-way cable television networks or interactive web sites. There have been experiments to increase the efficiency, productivity, and substance of group decision making, from computer gaming, interactive modelling and electronic voting systems to decision support or expert systems. The technological potential is available 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 urban policy making and planning. For example, any individual or group would have access to local spatial databases which would be 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. 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 techniques providing immediate feedback on the public acceptance 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 legislatures.

The creative capacity of such systems could be substantial – they would pool the intelligence, experience and innovative capacity of all members of the community. A recent experiment in which a large group of people was brought together to discuss a complex urban design issue (the redevelopment of the site of the World Trade Center in New York) using computer networks has been reported to be surprisingly successful. It is too early to assess whether the enormous problems of co-ordination, evaluation and selection required for co-operative distributed design and problem-solving can be overcome.

However, the technological potential of instant feedback between political decision makers and the constituency, 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, may at least partly disappear, and this will sooner or later be reflected in the rules and procedures of political decision making. 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 urban policy making and 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 planning machine and stimulating the kind of pluralistic, self-organising planning activity described above and so transform 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.

This kind of planning would require a different type of planner, more mediator and communicator than 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).

Conclusions

Which of the three scenarios will become reality? Most likely some elements of all. Reluctantly, the public may 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. 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 l, the planning machine, will be the ultimate prospect. However, there are countries like the Netherlands and Germany, which 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 (Wegener, 1985). The danger is that such opposition may lead these countries into Scenario 2, the retreat of planning.

Scenario 3 remains the challenge. It offers the only chance to put information technology into the service of planning instead of letting it destroy planning in one way or the other. It is the only scenario in which human creativity has a place without being either suppressed by machine intelligence nor drowned by information overflow.

To accept the challenge requires the joint efforts of urban policy makers and planners, computer scientists 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:

The first assumption is that 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 remain unevenly distributed in society. There will remain groups in society – the very old, the very young and the very poor – which will remain excluded . 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.

The second assumption is that there are no limits to artificial intelligence. This assumption underpins the idea of the planning machine of Scenario l, 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 (cf. Dreyfus, 1979) is that despite impressive achievements in limited, clearly-defined contexts 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.

The third assumption is that 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, 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 urban policy making and planning.

References

Batty, M. (1984): *Information Technology in Planning Education*. Papers in Planning Research 80, Department of Town Planning, University of Wales Institute of Science and Technology, Cardiff.

Campanella, T. (1626): *Civitas Solis (The City of the Sun.* Translation into German, 1955, Berlin: Akademie-Verlag.

Deutsch, K. W. (1963): *The Nerves of Government: Models of Political Communication and Control*. New Yorsk: The Free Press of Glencoe.

Dewey, J. (1927): *The Public and Its Problems*. New York: Henry Holt.

Dewey, J. (1939): *Freedom and Culture*. New York: G.P. Putnam's Sons.

Dreyfus, H. L. (1979): *What Computers Can't Do: The Limits of Artificial Intelligence*. New York: Harper and Row.

Etzioni, A. (1968): *The Active Society: A Theory of Societal and Political* Processes. New York: The Free Press.

Friedmann, J. (1973): *Retracking America: A Theory of Transactive Planning*. New York: Anchor Press.

Friedmann, J. (1981): *Planning as Social Learning*. Working Paper No. 343, Institute of Urban and Regional Development, University of California, Berkeley.

Geddes.P. (1915): *Cities in Evolution*. London: Ernest Benn Ltd (1968 edn).

Habermas, J. (1963): Verwissenschaftlichte Politik und öffentliche Meinung (Scientised Politics and Public Opinion). In: Habermas, J.: *Technik und Wissenschaft als 'Ideologie'*. Frankfurt: Suhrkamp Verlag.

Habermas, J. (1981): *Theorie des kommunikativen Handelns (Theory of Communicative Action)*. Frankfurt: Suhrkamp Verlag.

Hobbes, T. (1651): *Leviathan*. London: *J.* M. Dent and Sons Ltd (1962 edn).

Horkheimer, M., Adorno, T. W. (1947): *Dialektik der Aufklärung (Dialectic of Enlightenment)*. Frankfurt: S. Fischer Verlag (1969 edn).

Kunzmann, K.R. (2002): *Creativity, Culture and Urban Development*. Proposal for a Workshop at Villa Vigoni, Menaggio, Italy. Dortmund: European Spatial Planning, University of Dortmund.

Lindblom, C.E. (1965): *The Intelligence of Democracy: Decision-Making through Mutual Adjustment*. New York: Free Press.

Luhmann, N. (1971) Systemtheoretische Argumentationen (The Systems Theory View). In: Luhmann, N., Habermas, J.: *Theorie der Gesellschaft oder Sozialtechnologie – Was leistet die Systemforschung?* Frankfurt: Suhrkamp Verlag.

Luhmann, N. (1975): Interaktion, Organisation, Gesellschaft (Interaction, Organisation, Society). In: Luhmann, N.: *Soziologische Aufklärung 2*. Opladen: Westdeutscher Verlag.

Mumford, L. (1938): *The Culture of Cities*. London: Secker and Warburg.

Mumford, L. (1967): *The Myth of the Machine: Technics and Human Development*. London: Secker and Warburg.

Plato (387 B.C.): *The Republic*, Translation into English, 1941. Oxford: Oxford University Press.

Wegener, M. (1985): Urban information systems and society. In: Brotchie, J.F., Newton, P., Hall, P., Nijkamp, N. (eds.): *The Future of Urban Form: The Impact of New Technology*. London: Croom Helm.

Wegener, M. (1987): 'Spatial planning in the information age. In: Brotchie, J.F., Hall, P., Newton, P.W. (eds.): *The Spatial Impact of Technological Change*. London: Croom Helm, 375-392.

Wegener, M. (1988): Information technolo gy, society, and the future of planning. In: Giaoutzi, M., Nijkamp, P. (eds.): *Information and Regional Development*. Aldershot: Avebury, 42-55.