

Matthias Werner

Institute for Technology Assessment and Systems Analysis (ITAS)

Forschungszentrum Karlsruhe, Germany

E-Mail: matthias.werner@itas.fzk.de

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Effects of Informatization and ICT Networks on Practices of Planning and Decision Making in Local Government. A Micro Analysis of “Electronic Government”

Introduction: ICT networks and the modernisation of public administration

In the last years “Electronic Government” (e-government) has become a very influential concept for the reform of public administration. The bigger part of projects for implementations of e-government concentrated on the automation and distribution of well structured administrative services and have led to “virtual” or “digital” town halls for information, communication and (a few) transactions between citizens and administration. Characteristically these mostly technology-driven implementations aimed at doing what is technologically possible rather than at supporting plans for a strategic organisational development. The experiences with such “first generation“ e-government applications have shown, that the opportunities of e-government and public sector reform are not primarily located in new interfaces (“virtual front office”) for service delivery to citizens or business, but rather in the orientation towards a *back office*-centred concept. Understanding e-government in this sense, e-government shall provide technological support for a “transformation of state and administration” (Hill 2004) that refers to reform concepts like New Public Management (NPM), citizen orientation and the involvement of societal actors in the formation and implementation of public affairs.

In the context of the governance discussions about new definitions of the tasks, functions and roles of local government and administration (cp. exemplarily Benz 2004, Pierre 2000), informatization and ICT networks are a opportunity (as well as a challenge) for the reorganisation of inner-administrative routines of work, processes and structures – which are to be considered as a pre-condition for a change of the relations to the outside world of public administration. In this respect, the new possibilities of ICT networks for a change in the use

of data, information and knowledge become more important for politics and administration. So, if e-government wants to more than a “computer bureaucracy” (Brinckmann/Kuhlmann 1990), it demands and offers new modes of knowledge management and can establish a new order of knowledge in the public administration (Milner 2000, Wimmer 2001, Edeling/Jann/Wagner 2004).

In this paper I present first results of my dissertation project on the impacts of e-government on the way public administration acts. The central questions of the project are:

- What happens to the “inner life”, to work processes inside local government? Which changes of routines and practices, of structures and self-conceptions can be identified in networked administration?
- What are the implications of these changes for the discussions of new modes of governance and public sector reform?

A micro-perspective for the analysis of administrative action

To answer these questions the project concentrates on the widely unstructured policy processes of planning and decision making; these processes are, other than the well-structured processes of service delivery, characteristic for the work of public administration (Lenk/Wengelowski 2004: 155). Conceptualisations of a “Micro-Policy-Analysis” (Nullmeier/Pritzlaff/Wiesner 2003) offer useful approaches for such a perspective and give special attention to the term *political practices* that denotes routines of communication and interaction in the inner life of a policy. By using this concept the analysis attends to the process-dimension of politics and reconstructs the processes of local planning as an interlocking of political practices: If the implementation of ICT into public administration leads to new routines, competencies and hierarchies in the identification of problems and decision making, then these changes can be registered and analysed as changes of political practices.¹ Furthermore, informatization of public administration itself is a complex practice of modernisation with a history of more than 30 years (cp. Brinckmann/Kuhlmann 1990).

Practices and knowledge can only be understood properly as being mutually bound to each other. On the one hand, knowledge and the order of knowledge in organisations are effects of (strategic as well as institutionalised and non deliberate) practices. On the other hand, the set

¹ Political Science offers only a few orientations for the development of a concept of political (micro-)practices. Organisational sciences, that introduced the term “micropolitics“ to describe strategic action in organisations can give some references for this (Ortmann et al. 1990). Proposals for an interpretive understanding of the relationship between knowledge and practice can also be found for example in Nicolini/Gherardi/Yanow 2003. Here, a provisional understanding of practices as knowledge-based routines and patterns of action with a differing complexity will be sufficient.

of options for action, the observable patterns of action, and the conditions under which players act are effects of the organisational knowledge about itself and its environment. Hence, the organisational knowledge can not only be found in form of explicit knowledge that can be stored in databases or other collections of information, but it expressed itself also through its organisational structure, the design of processes, or artefacts. Analogue, the ICT infrastructure turns out to be both, an effect as well as a constraint of knowledge-based practices: It is a result of strategic processes such as the selection of options, implementation, and adoption of the technology; and it builds a general framework that suggests specific possibilities of action and maybe hinders others.

Such a micro approach for the analysis of the process-dimension of politics that focuses on practices and the corresponding knowledge can utilise concepts and methods from qualitative organisational studies and ethnographic research. The empirical work consists of field studies that combine participant observation and field based interviews which make it possible to identify specific practices of the use (or non-use) of ICTs in public administration. These practices are analysed in respect of their technological or non-technological origin, their relationship towards technological properties and potentials, and how they fit the structure and identity of the organisation. So, in the context of the information and knowledge as well as the self-interpretation of the actors it is possible to reach to a interpretive understanding of the micropolitics of e-government.²

Geographic information systems and local e-government

The analysis of effects of informatization and networking focuses on an aspect that has not been discussed broadly in the social sciences' studies of e-government until now: the implementation of geographic information systems (GIS) in public administration. "Public administration is basically an information processing enterprise, not only at its management level but also in its primary processes, at the very production level." (Lenk, K., cited in Snellen 1997: 195). A frequently cited empirical formula says that 80 % of all decisions in local government bear spatial references. This *key role of spatial information* in local government makes network-integrated GIS a critical technologic basis for e-government as a whole.

² The results that are presented in this paper are based on three case studies in local and regional government that have implemented advanced integrated GIS networks. Key aspects of the studies have been: GIS use in urban and environmental planning, GIS use for the managerial steering, regional cooperation and the development of geodata-infrastructures. As the empirical phase of the study has not been completed yet, this paper presents the findings of an interim analysis and focuses on some central aspects.

In a formal-technologic way GIS are usually defined as a set of computer hardware, software, data, and applications for capturing, storing, displaying, manipulating and analysing spatial data. In consideration of the high dynamic of GIS development and their increasing fusion with adjoining technologies like CAD or remote sensing technology, it is adequate to use a more open conception of GIS that aims at the functions of the systems. In this way one can define GIS by pointing out three main properties: „GIS focuses on the cartographic display of complex information“; ...GIS is a sophisticated database system; ... GIS is a set of procedures and tools for fostering spatial analysis.“ (Pickles 1995: 2).

GIS have been introduced into local governments more than 20 years ago, typically in the departments for urban planning, land register or environment. Due to their costs, the required skills and problems with different data formats early GIS have been isolated applications. As the systems became cheaper, easier to use and network-compatible since the mid-nineties, their application was no longer restricted to the “classical” departments and spread to a lot of other departments like finances, business development, or statistics. They can be used in various aspects: for analysis and visualisation in planning activities, for the management of space-related data and information, as well as for mere information purposes and for service provision.

So far, social and political implications of GIS have mostly been discussed under the label of a “Critical Geoinformation Science“. This branch of research has produced useful insights, but as the debates predominantly were restricted to geographers – and lately aimed at the development of geography as a scientific discipline (cp. recapitulating Schuurman 2000) – the impact of the critical GIS discussions on other scientific communities has been limited. So, as an object of the investigation of informatization of public administration, GIS have not appeared prominently in political and administrative sciences yet. The few sporadic mentions do not show a consistent tendency: On the one hand, GIS exemplify for information systems (IS) that expand efficiency and effectiveness of governmental monitoring of society and natural environment – and thereby GIS are seen as a technology that intensifies asymmetries of access to information between state-run institutions and citizens. So they turn out to be a means for the enhancement of administrative power in the interaction with private actors (Donk 2000: 144). On the other hand, there are scholars who point out that GIS can improve transparency of local planning processes. This argument emphasises the possibility to open the systems via internet for external users; they can be used to provide easy access to various information, especially in the form of (interactive) thematic maps or in the form of tables that

are generated from GIS databases. Hence, in order to enhance the possibilities for citizens to participate in local planning processes, GIS can be used within concepts for the internet support of participation processes. (Lenk 1999)

In the course of the growing diffusion of GIS in public administration, their applicability (and need) for e-government-applications has been recognised (Greene 2001), and for about two years the GIS-scene is explicitly trying to catch up with the e-government discussions by introducing the term “geo-government” (Strobl/Griesebner 2003).

Objectives of GIS networks in public administration

The analysis of concepts for GIS in public administration shows wide analogies to the general expectations at e-government. In the context of networked GIS they can be subsumed under the following objectives:

Efficiency and citizen orientation

The first aim of the implementation of GIS networks is to facilitate work through improved data availability on the computer desktop. Especially the navigation via interactive maps is an easy way to retrieve data and information about particular objects one is working on. Due to the digitalization it is no longer necessary to search for paper maps or plans (that may not be at their place), it is easier to assure the up-to-dateness of data and maps, and users can customise thematic maps by adding or removing particular data categories.

Systematic management of meta data can establish transparency about the available data and information and thereby help to avoid multiple data collection. Additional, internet GIS solutions allow to give access to data or maps for external actors and to use the systems for citizen information. Furthermore, GIS applications are increasingly being integrated in various software applications – often without being perceived as “GIS” anymore – that aim at the automatisisation of service delivery processes in the back-office as well as via the internet.

A new quality of planning and decision making

As a planning tool – especially in urban land use planning, where the systems have been established for a comparatively long time – GIS promise increased effectiveness of planning due to the extension and qualitative improvement (up-to-dateness, accuracy) of available data and information. GIS particularly enable the administration to cope with the increased complexity of planning demands (with the same or even fewer staff). Also, the systems are increasingly used for the visualisation of planning alternatives.

Effects that could lead to a more cooperative culture of planning are expected from the opening of the systems in the computer networks. This could bring forward internal cooperation that crosses traditional boundaries of departments, as well as the integration of external actors. By using technological networks to support social networks, a new way to access external information and knowledge for the administration may be opened up, and networked IS are expected to support or even activate societal actors to take over (former) administrative tasks.

But of course, expected changes in planning practices are not necessarily considered to be desirable: Critics of the widening use of (geographic) information systems in planning processes warn of an exclusive strengthening of the administration in the interaction with the municipal council or citizen. Another criticism points out that GIS use can lead to a more technocratic way of planning by a crowding out of kinds of knowledge that are not represented in the systems. This aims especially at such forms of knowledge that are difficult, if not impossible to integrate in the quantifying logic of databases or statistics, like local knowledge of citizens that mostly finds expression in narrative forms.

Organisational change

There are differing views of scholars concerning potential effects of ICT networks towards the development of more information-centred patterns of action. On the one hand, it is expected that a networked information infrastructure will lead to a softening of hierarchies and thus to a strengthening of decentral agencies. On the other, hand there are hints that ICT networks can strengthen central positions of the administrative body because – as an effect of the increased transparency – they provide extended possibilities of control and steering interventions.³ (cp.: Nullmeier 2001: 259 ff.)

As mentioned above, ICT networks are supposed to contribute to changing overall concepts of state and local community action. Especially in the course of a withdrawal of the administration from the production of services – which is more and more to be left to societal self-organisation – the administration will take a changing role. In these concepts, one central task of the administration will be to provide data, information and knowledge that is needed to co-ordinate and moderate the processes of service production taken out by private actors. Accordingly, in e-government-concepts that focus on new modes of governance and the importance of information as a central resource for administrative action, one main function

³ Such expanded options for control can reach down to the level of individual employees. Electronic workflow systems, e.g., do not only give guiding help but also standardise individual routines and allow a better control of individual performance.

of the virtualised administration is characterised as “societal knowledge management” (Priddat/Jansen 2001: 92, own translation).⁴

Patterns of action in networked administrations – two sketches

The case studies identified practices of the adoption and every-day-use of the technology with different grades of complexity. To illustrate the web of practice, knowledge and strategic interests that constitutes specific patterns of action, I will sketch two main forms of GIS utilization. Afterwards I will structure and interpret such practices that proved characteristic for the work in networked administrations.

Monitoring: information gathering and representation of the administration’s outside world

Information gathering and the representation of the (societal) environment are a central purpose of GIS use in local government. In the examined institutions data gathering typically has been carried out in overall activities like land use mapping or inventorying and categorizing biotopes. Usually such work has been given to extra-administrative offices or been carried out as short term work-creation scheme. Hence, often there are no routines for updating of collected data, and consequently datasets became obsolete or got “lost” through the implementation of new computer applications and databases that were not compatible to the old data standards. Also widely missing are strategies for a continuous adding of new data that is achieved as a result of the daily work: Work on the data and information basis is not regarded as belonging to the key-business of the examined operational units of local administration, but as an additional task that is carried out when (or better: if) the “proper” work is done – that being production processes like making plans, deciding applications and so on. As a consequence, the information in the IS is often suspected of being not up to date or deficient. Also lacking are approaches towards a systemised management of other sources of information, such as reports or photos that are produced in various routine processes like handling applications. If there are such directories, they are usually run as personal directories of single employees that are only accessible for them (or even their existence is only known by them).

Snellen (1997) pointed out that ad hoc data gathering is taking place of overall data acquisition. The case studies prove this argument as data and information are in many cases generated and gathered in specific project contexts. Such data typically refers only to a limited

⁴ Service production generates knowledge quasi automatically through its processes. So, withdrawal from service production also implicates that administration has to open up new sources of data, information, knowledge. ICT networks can serve as a technical infrastructure for this.

area – and alike the mentioned isolated sets of information, in the examined cases usually neither finds its way into the IS. Aside this, also the development of data networks with other administrative institutions contributes to a case-related ad hoc acquisition of information. These networks can likely substitute own keeping of data in local administration and are increasingly being used.⁵ In this respect, the lacking of overall data updating can partially be flanked by the ad hoc acquisition of data that is accessible external in networks.

Knowledge sharing and horizontal cooperation

A second example that illustrates practices in networked administrations refers to knowledge sharing and effects of transparency of data and knowledge. The case studies showed that effects of improved availability and transparency of information are limited by the self-interest of individual departments, most notably of those departments that maintain own sets of data. A general release of existing data in an administrative intranet will lead to fewer informal contacts between the departments, and such informal contacts are an important source of information in daily work: To be asked for data or information from the own field of work also means to get information of the activities of other departments at an early stage. So, if data is freely accessible in the local government's network, this information source tends to run dry – and this means to lose options for early interventions.

In reaction to this, actors show specific strategies of information release that shall ensure both, the input of information to the networked systems as well as the protection of information. Such strategies aim at giving exactly as much information input to the systems as is needed to mark the actors' or department's sphere of competence. So, by using the IS, all that an interested actor gets to know is that he or she has to include the department that maintains the data.⁶ In particular, such strategies can be successful if there is no integrating co-ordination of the data sets.⁷

In addition to this motive of ensuring a powerful position in informal processes, there are concerns about the correct interpretation of data by users from other offices that limit the

⁵ Here, rather than being an effect of isolated use of databases and information systems in single local authorities this seems to be an effect of the networking of different administrative levels (cp. Snellen 1997, Zuurmond 1997).

⁶ To illustrate this with an example: In one case study the office for environment only published the boundaries of the local biotopes in the GIS although they had a lot more information in their database (e.g.: on size, vegetation, legal status, ecological value). By publishing only the boundaries they could ensure their sphere of influence without giving free any further information that could weaken their position.

⁷ In the case studies, like in many local authorities, it is left to the data maintaining departments to decide which data they want to release in the intranet – and alternative arrangements had not been seriously proved. Thus, if there is no other mechanism of integration – through a “GIS steering group”, user meetings or a joint project – micropolitical strategies can easily limit potentially integrating effects.

willingness to publish data in the intranet. Last but not least decentral operational units worry about an increased liability to interventions of central departments due to more transparency.⁸

Network practices and administrative knowledge

The practices of GIS use can be categorised in two groups: practices that aim at operational processes, and practices of organisational change.

In regard to GIS use at the operational level, there is a domination of *practices that support, simplify, and accelerate existing processes*: simple queries of plans or maps that provide orientation in administrative processes (and can be carried out without advanced GIS or computer skills), generation of thematic maps, import of maps for CAD-based plan generation, publication of information, integration of GIS applications into electronic workflows.⁹ These practices have in common that they integrate GIS use in existing routines without leading to substantial changes of processes. This especially applies to such practices of the adoption of ICT that explicitly aim at limiting potential effects that could lead to changes of processes or structures.

The analysis of the in GIS collected and communicated data and information points to a shift in the administrative knowledge that can be interpreted as *practices of organisational change*: Spatial objects in GIS are increasingly being interrelated to economic attributes (e.g.: monetary valuations of green corridors and infrastructure, maintenance costs) while existing data sets (e.g.: attributes from habitat maps) are not maintained and become obsolete. Thus, the initial use of GIS as land use- or environmental-information systems – that aimed at interventions in society and natural environment – tends to get re-shaped by demands of a utilisation for administrative self-steering. GIS, in this respect, are adopting the character of managerial steering systems. This development points to an *economisation of administrative knowledge*. If one assumes that data, information and knowledge will become *the* central categories for administrative action and self-conception in the information society (cp. Nullmeier 2001: 264), this narrowing of the administrative view can prove to be problematic (– at least this trend towards an economisation of representations of the administration's outside world indicates recent emphasis of administrative interests).

⁸ While internal administrative fragmentation opposes the development of an internal culture of information and knowledge sharing, external cooperation shows some tendencies towards information sharing. Especially participation in projects with other local authorities often offers special incentives (like money, know-how, or options to purchase hard- and software to favourable prices) that seem to promote the willingness to share data and information.

⁹ In general, rather than the utilisation as advanced tools for spatial analysis GIS in local government are used predominantly for information purposes.

These increasing GIS use for purposes of managerial self-steering can also be regarded as evidence for an administrative development „from bureaucracy to infocracy“ (Zuurmond 1997). According to this, in the information society control and steering in organisations are carried out through the information infrastructure rather than through bureaucratic structures.¹⁰ Thus, GIS that represent society and environment primarily by economic attributes can be regarded as the utilisation of the information infrastructure by currently dominant governmental and administrative techniques such as controlling, monitoring, budgeting or project-oriented work.

Conclusion and Outlook

If the use of networked information systems adapts to existing routines and structures it can lead to an acceleration and simplification of internal processes. Thus, expectations of an increase in *efficiency* can – within the framework of the given structure – partially be fulfilled. In contrast one can identify only a few findings concerning the development of a changed *planning culture*. In this context the opening of information systems to external actors takes a central position. Besides internet-based citizen information and participation, e.g. in urban land use planning, external networks can support cooperative regional planning approaches. The build-up of shared data and information networks indicates appropriate activities. Thus, due to the activation of external knowledge, the enhancement of administrative knowledge currently is the most significant effect regarding new planning practices – and this can by itself contribute to an increase in effectiveness, accuracy, and acceptance of planning.

It has been pointed out that inside the administration GIS are adopted in a way that perpetuates existing routines. So, at the moment one cannot speak of a dominance of technological representations of society and environment in local planning that is crowding out other forms of information or knowledge. Partially this is certainly due to the fact that we are still at the beginning of GIS implementation, and therefore there still is a high potential for further informatization of planning processes. But there is also some evidence that there are fundamental barriers that limit the usability of GIS, as most of the planning staff in local government were aware of limitations of the systems and computer based communication, and emphasized the importance of other forms of information (like meetings, informal contacts, on site visits, direct interaction with stakeholders).

¹⁰ In contrast to bureaucratic structures, Zuurmond points out that infocracy is characterised by increased flexibility, less formalisation and more customer-orientation. But infocracy also implicates a higher level of surveillance, and tends to result in a strengthened position of administration (cp. Zuurmond 1997).

In the observed cases GIS have been implemented without comprehensive organisational concepts for the design of internal information flows and cooperation in (and through) the networks. This enables actors to develop and act out *micropolitical strategies*. These strategies limit the contribution of ICT networks for a flattening of hierarchies and the development of more horizontal structures of communication and cooperation; in tendency they aim at reproducing the existing processes and positions of power. Furthermore, due to the widely missing concepts for (non-technical) information and knowledge management, the selection of the implemented technology and its applications is subject to a high contingency. Thus, antecedent criteria and demands of the established administrative self-conception play a decisive role in the implementation new technology. Accordingly the case studies show that the implementation of ICT networks follows not primary information-centred perceptions of administration. Moreover social (management) techniques which correspond to NPM and customer-orientation align the perception of ICT based opportunities. Following the study of Killian and Wind on ICT networks in German federal administration, also in local government ICT implementations are guided by a “structure-immanent perception of technology” (Killian/Wind 1997: 195, own translation): Integrating effects of technology are limited by organisational fragmentation, existing processes and antecedent organisational concepts.

Data, information, and knowledge can be regarded as central categories for the characterisation of administrative work. ICT networks can – within the limits described above – contribute to increased availability and transparency of required information. But if ICT networks shall lead to changed practices and self-conceptions, that refer to data, information and knowledge as guiding resources for action – and by this transform processes and structures in an information-centred way –, it is necessary to integrate ICT implementations in non-technical (and not primarily economic) concepts for organisational change. This applies especially to state-concepts that focus on activating and cooperative modes of governance: To cope with its new role as moderator of *network governance* processes the administration will have to focus more on information as it has to provide information for private production of former public services (and, of course, for the decision of services that are to produced). How far the use of network technologies will support more citizen orientation, and strengthen or weaken the citizens’ position in local decision making in such webs of governance will indeed be only to a lesser extent a question of technology properties. Rather the organisation of contents and access (e.g.: who decides which kind of information is to maintained; who can

contribute data, information and knowledge; who can use which applications?) will be a critical factor. These decisions effect different representations of topics and interests as well as bargaining positions of actors in planning and decision making processes, that will continue to be primarily processes of social interaction.

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