Administrative Informatics and Administrative Reform

by

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1. Administration and Informatics - a Close Connection

The connection can be expressed as:

$$AIS = f(PAS, IT, X)$$

This formula is meant to express a functional relation between

- AIS as the informatic systems as we find them in the public domain, first of all computer hardware, networks, application and operating software as well as data
- PAS as the information needs expressed by the political-administrative system, mainly parliaments, governments and administrations
- IT as the informationtechnological potential and
- X as a general term for further influential factors such as the level of liberalization of the telecommunication market which effects prize structures and the availability of services among others, the acceptance of technology by society, or legal arrangements.

The state of AIS as dependent variable on the left hand side of the formula is the result of the interactions of the independent variables on the right hand side of the „ equals“ sign. The AIS are the result of the demand for information exerted by the PAS, of the information technological potential and of the given circumstances in the fields of economic, educational, legal or socialpolicy.

To integrate these relations in the best possible way, more and more becomes a task of eminent importance. Not least, this is illustrated by the discussions about the location of the traditional industrialized states in the globalized economy of our time. Here, new roles and ways of action are expected from the PAS, ways which must not fail due to insufficient AIS. In other words: the strategies for the development of state and administration and the strategies for the AIS must be integrated, together with the development of the IT-potential and the other influential factors. The strategies for administrative development must include also the AIS. Or, as seen from the other side: the AIS-strategies must be a logical consequence of the strategies for the development of state and administration.

It is doubtful whether these connections have been recognized clear enough, and realized, in the first forty years of electronic data processing in public administration. Probably, quite a

few would argue that public administration and informatics, instead, quite often kept their distance and that the strategies for development of the public sector and development of the AIS had their individual existence.

2. Two Challenges For Administrative Information Systems

Today, the task to close such a gap where it exists, is just as urgent as it is difficult. This is due to two „ revolutions" .

One of them is going on in the IT area. In front of this audience, it will be sufficient to mention a few concepts like networking, client/server systems or multimedia in order to illustrate the truly enormous growth of the potential for computer-based information and communication. Thus, the characteristic of IT to serve as catalyst for administrative reforms is growing accordingly. This, of course, is meant when IT is called an „ enabling technology" .

The other „ revolution" is taking place in the PAS area. Its role and selfimage is changing continuously. Its traditional character of striving for legal authority based on a systematized and formalized law system as well as on a bureacratic administration, more and more is considered as being too narrow because this concept tends to a mainly formalistic responsibility and accountability towards society - public administration acts in accordance with laws and regulations. Today, however, a type of responsibility and accountability is called for which is able to give substantial answers to questions regarding societal needs, priorities, consumption of resources, achievements, financiability and citizen-orientation of public acitivities.

The stronger emphasis of substantial responsibility as compared to formalistic responsibility, of course, has severe consequences for the information systems in the public sector. A quick look at public accounting will confirm this. Resource usage is based on schedules of responsibility and individual titles, with no regard paid to any kind of performance evaluation. As the regulatory framework becomes more complex, the bureaucracy is in danger of letting information about its goals and progress be eclipsed by information about regulations and responsibilities. Accordingly, one consequence of the transition to New Public Management must be the reconstruction of administrative information systems.

Management must also be supported by instruments providing production information: What does an authority produce, what does it sell, and to whom? Cost and performance accounting delivers information about the planned or actual resources used in this process and the performance achieved. These can be grouped into categories such as cost elements, cost centers, products, and processes. Evaluations and surveys provide information about the external impact of public-sector practices.

Contract managment is a form of organized information processing which, in every organizational unit, is directed toward the goals to be achieved in a planning period, the resources which are to be used, and the results. If performance control is typical of a bureaucratic administrative concept, then in this context it is guarantee control: Every administrative body collects and analyzes information about its contributions to the social contract and all subcontracts derived from it. A budgeting function documents these short- to medium-term contracts whith the added bonus that it limits itself to the essential information and leaves considerable discretion to those using it.

A controlling function provides and analyzes the necessary target and actual information, enabling a frequent result and premise control. A reporting function is defined for communication of this information to everyone involved: those carrying it out, agency heads, politicians, and the public, which is demanding more and more accountability.

An administrative information system which combines all these aspects, many of which are new (at least in terms of their weighting), must be characterized by a large degree of openness so that self-regulation, self-organization, and self-responsibility all rest on a firm information base. This system should supply contextual information and enable the innovation potential inherent in New Public Management to be tapped. This also has consequences for the institutional incorporation of information processing into public administration, where high flexibility and a continuing willingness to change has to be ensured, and creative solutions triggered by administration modernization should not founder due to the software used. If an administration concept which meets the current requirements for an efficient public sector is to succeed, it must include administrative information systems. Administrative modernization concepts must be modeled in such information systems and these information systems must be derived from administrative development.

3. Origin and Causes

The reasons why IT has become an „ enabling technology" for administrative reforms will now be considered.

Among the origins, two appear to be equally basic and important. The first is that with today's computers, all the essential forms of communication can be displayed automatically. Whether we are talking with each other, writing numbers and texts, or whether we are looking at stationary or moving pictures, the information transferred can be digitalized with practically no loss, sometimes even with an increase, in the reproduction quality. And that means that, for the first time in the history of humankind, it is possible to store and, in an extremely short time, analyze by machine, speech, writing and pictures as multimedia information.

The other origin is closely related to the first. In the electronic network, information loses a secondary characteristic which, until today, humankind was used to having, namely the characteristic of locality. Over and above its conceptual message, information has always been bound locally to a medium, be it paper or human memory. In the electronic network, locality as an additional characteristic de facto loses all meaning. Information is freed from all physical impediments; it becomes ubiquitous, i.e., all-present. Information becomes independent of space as geometrical distance, hierarchy as organizational distance, and time as chronometrical distance.

Providing that the economic, judicial, educational and other requirements have been fulfilled, it is possible, right here and now, through the pre-conditions of electronic information and communication, for every organization and for every individual to digitalize their information, to organize and to model it and then, as far as it is sensible and desired, to make it available for use globally on the network, either to be used as a passive offer, or as an active change in the supply of information.

This novel situation has a fundamental characteristic whose power has been unknown until today: It challenges us to redesign our present-day organizations, to rethink these organizations with regard to their self-concept, their structure and their procedures. Behind all of this is the fact that, as a result of the digitalization and omnipresence of information, numerous constricting barriers which until now have guided our conceptual design have been abolished. These barriers are, for example, the limitations placed on the mobility of persons, materials, products or files due to the necessary costs of time and transportation. Many of the

walls which held back a flexible adjustment on the part of our organizations have been destroyed. We have a new space for the creation of „ virtual organizations" . We can now realize ideas which up until now have failed because of the restraints placed upon them by physical factors.

Here, under the sign of our times, is a repetition of what Joseph A. Schumpeter meant by the "process of creative destruction" of traditional structures on the part of innovative entrepreneurs. Schumpeter describes the history of economy as a "history of revolutions" of a technical and organizational kind, as the "process of industrial mutation..., which constantly revolutionizes the economic structure from within, which constantly destroys the old structure and constantly creates a new one". Schumpeter sees here a decisive source of competition, "the competition of new products, new technology, ... of new organizational types... - that competition that offers a decisive advantage in cost and quality which strikes the existing firms in their foundations, in their mark."

Today, when we talk about "redesign" or even about "reinventing" our organizations, we are talking about the same context with different words. Indeed, we are always called upon to redefine our role and our possibilities in the context of social and technical change.

Today, a process like the „ process of creative destruction" is seen in the paradigmatic transformation from the industrial society to the information society. It is expressed not only in the dramatic change in the international division of labor in the economy, with opportunities and risks for business and employees in the traditional locations. On the contrary, it encompasses whole areas of life, such as how we transport people and goods, how we educate and entertain ourselves, or how we organize the health-care system and environmental protection. In order for this process to proceed in a truly „ creative manner" , the state - but not only the state - is taken to task to a special degree as a development agency. The state must organize the social dialogue concerning the macroeconomic and legal-political framework, and, at the same time, remove all obstacles, create incentives, and contain risks.

However, I will restrict myself in the following parts of this paper to public-sector informatization.

4. Trends for the Development of Administrative Information Systems

What would our administrative systems look like if they had been able to react seemlessly and without delay to the „ revolutionary" challenges mentionend above? The direction which becomes visible, can be sketched from five points of view.

In most of the traditional industrial states public budgets suffer from the serious problem of excessive expenditures. Among the reasons for this are that those benefiting from current programmes defend their interests, and the standards of performance expected from the various service-offering departments are aimed at permanent perfection. How can the state regain free scope for new up-to-date service functions? One may safely assume that the decisive factors in this regard include the availability of information on the grounds for and consequences of public action as well as the political willingness to turn such information to use. Here, IT can bring its capacities to bear as an "enabling technology" in the build-up of information systems, opening up sources of information not accessible in the past, such as product and programme budgeting, costs and results accounting, comparisons between

authorities, public opinion polls, project evaluation, accounting, controlling and many other approaches. Greater transparency of the effects of and specific interests in the allocation of resources may well be expected to lead to corresponding demands and support from the public, then enabling politicians to take action in conformity with the system. Instituting administrative information systems of this type is a task, the major part of which still lies ahead of us. This task must be mastered, if public administration is ever to be enabled again - beyond formalistic responsibility in the sense of adherence to bureaucratic competencies and regulations - the better to assume substantive responsibility towards society in the sense of an efficient provision of the necessary public goods.

A second trend in present developments in administration lies in the fractal organization approach. By uniting professional competence and responsibility for resources and delegating most of them, more self-determination is to be attained for every individual organizational unit. The purport of this is to achieve greater scope of action and better motivation for a speedy adaptation of administrative action to changed conditions, simultaneously ensuring personal responsibility for the consequences of decision-making. Here again, it is the information systems - this time with a view to the internal relations in public administration - that allow such guidance to be exercised by means of contracts, assigning resources against performance promises and performance control, aided by appropriate information and communications equipment. Further support for the administrative strategy of organizational disentanglement comes from the IT trend to client/server systems. These allow administrative information systems to be dimensioned precisely as is considered appropriate by any organizational unit. Thus, the greater freedom of public administrations as aimed at by fractal organization in order to admit more responsibility for results and better results through a faster pace of innovation has its counterpart in an information and communications infrastructure compatible with this.

In the third place, viewed horizontally, the networking of public administrations and their clients is an impetus to uncover and optimize the working connexions that have developed. It is assumed that there are considerable potentials for improving the quality of administration as well as for minimizing processing times and costs and also the shifting of bureaucracy from the public sector to private economy. First approaches based on IT include workflow management systems considering administrative procedures from launch to result as process chains and reorganizing them on the basis of common updated data and in compliance with the applicable responsibilities and cooperations; and they also include telecooperation among several authorities, meeting commitments with a certain division of labour, or the intermeshing of the authorities' and clients' systems of information by electronic data exchange.

Fourthly, the creation of challenging up-to-date working environments benefits from IT. For, this technology allows functions to be fulfilled in a more integral and responsible way, permits the necessary open communication as digitized information, is accessible from the workplaces, and it grants greater sovereignty in the individual modes of working since it improves flexibility in terms of both space and time (teleworking; part-time jobs; telepresence; telecooperation; and further modes of working which are rendered possible by the mobility of IT working materials, by the mobility of work results or the traceability of individual contributions to workflow-aided administrative procedures).

Last but not least, the matter should be considered from the viewpoint of the general public. Here, too, IT meanwhile has a potential to offer that is capable of assisting up-to-date administrative action. In this regard, mention should be made of an improved transparency of

the services offered and sovereign functions fulfilled by the administration, including normative premises and responsibilities, of the numerous opportunities to facilitate access to the authorities in line with the trend to "virtual administration" (such as distributed administration in branch offices close to the citizens, concentrating formerly dispersed services in one place, self-service or mobile administration visiting those concerned, as required), as well as of new ways and means for opening administration to the public by electronic record keeping and new opportunities for IT-aided community participation (even including virtual realities presented with the aid of graphic information systems).

5. Characteristics of Contemporary Public Sector Information Systems

Obviously, often the reality of information systems in the public sector does not match today's technological potential and necessities.

The rapid technical progress in the information and communications sector is a continual formidable challenge to public administration and its EDP equipment. It was in particular during the last decade that trends changed severely, the following changes becoming visible:

- from mainframes via departmental computers, workstation computers and primarily local networking to client/server systems;
- from isolated applications in line with the administration's hierarchical structure to problem-related cooperation and networking of all concerned;
- from separate large-scale applications (like fiscal administration, residents' registration or personnel management), individual special-purpose applications and office communication to integrated user systems with a uniform user interface;
- from rigid text masks to graphic interfaces, allowing the use of computers with a certain degree of intuition;
- from procedural to object-oriented programmes;
- from hierarchical to relational databases;
- from self-developed to standard software based on generally applicable reference models and allowing adaptation to individual requirements;
- from proprietary to open systems and, accordingly, from a sellers' to a buyers' market;
- from local and single-medium data to ubiquitous and multi-media data, merging written, pictured and audible forms of communication;
- from a "patchwork" of administrative data to systematic administrative knowledge graded with the aid of data models and accessible via networks to the most varied users;
- from semi-skilled EDP staff doing the programming and software services for the applications in their respective branch of administration to highly qualified experts able to recognize correlations between various applications and to ensure an all-embracing configuration management;
- from expert-oriented methods of software development to modeling methods safeguarding communication between information and communications experts and users, thus ensuring that their intentions are put into effect;

- from special-purpose EDP authorities to an information and communications infrastructure integrated into administrative development via information management by the political and administrative directors;
- from computing centres and computer regions to system houses and consulting firms subject to competition;
- from EDP utilities financed by adjustable contributions to service units having to earn most of their budget;
- from application software requiring a lot of maintenance and tending to resist amendments, to IT capable of responding flexibly to changed user requirements.

The changes behind these trends must be considered as really drastic. Have public administration, on the one hand, and the EDP sector, on the other, mastered these shifts? The scene is not uniform; yet, broadly speaking, it does not so far really look like it. Externally, this manifests itself in the "productivity paradox", in as far as investments in information and communications equipment have not been followed by adequate benefits, as well as in a crisis of confidence in EDP, since it has left behind a legacy of former decisions, by some people considered as burdens that will have to be remedied in the years to come.

On account of ever new generations of information and communications equipment, an orderly change in the administrative information systems proper would have been necessary. A clear course would have had to be pursued from the monolithic mainframes, which initially fitted perfectly into the rule-governed world of administrative bureaucracies (conditionally programmed administrative procedures running smoothly in programmed EDP machines), to the client/server systems available today, capable of supporting cooperative networks instead of hierarchies, such networks fitting well into modern administrative conceptions. But to reach this aim, EDP would have had to be freed from isolation and integrated into the processes of decision-making in the user administrations; in addition, EDP itself would have had to be debureaucratized, delegating greater responsibility to the specialized administrations, also including responsibility for information and communications equipment, and centralized management and service divisions would have to be set up to this end.

Maybe this idea was too ambitious. Anyhow, it was not often implemented. Instead, the mainframes of the seventies were followed by ever new layers of IT, comprising the PC in the eighties and LAN-based electronic processing in the nineties, all of them intended to remedy the previous stage's shortcomings, but involving new shortcomings whenever they failed to be integrated into existing systems.

This led to attachments instead of new designs and thus to a multiplicity of information and communications equipment and applications; so the potential inherent in the new electronic techniques could not be fully utilized, just the thing to provoke the reproach of leaving behind a "productivity paradox" and burdens for the future.

The way out seems to be obvious: the isolated existence of EDP equipment and the lack of interest in EDP on the part of the political and administrative leaders must be ended. The EDP users' legitimate interests may not be rejected by those responsible for EDP, but, on the other hand, must fit into centrally formulated skeleton plans. The administrative information systems must be integrated into the strategies of administrative development.

6. Necessary Measures

It seems to me that the key for this is true and effective leadership in each of the three areas which appear as independent variables in our formula. Politicians and leaders in public administration should no longer avoid to take on their responsibility to manage. Let me outline this briefly, at the end.

In the field of public administration it seems to be adequate to extend the concept of delegation of responsibility for resources also to IT. If the selfimage and the structure of each agency is to be adapted again and again according to the notion of „ creative destruction" , making capital out of the potential of IT as being an „ enabling technology" than such efforts should not fail because the necessary application software turns out to be as inflexible as conrete and does not grant the necessary elbowroom for change. Of course, at the same time it is necessary to strengthen the central IT-units in order to guarantee the necessary frame of general regulations as well as adaquate user service. The management of an agency must include an effective management of these central IT-units. And this means contract management, budgeting, compulsory competitive tendering instead of forcing agencies to rely on „ their" IT-unit alone, financing of IT-units on the basis of actual employment and not of fixed grants, as well as controlling. Utilizing real or simulated competition as concepts of the market economy, a better alignement of the interests of the agency and its IT-area must be realized. I presume that this kind of leadership and management in public administration requires considerable qualification endeavors, above all on the echelons of the senior civil service. Especially they must be made aware of the potential which modern information technology has for shaping public administration in view of the challenges which lie in front of us.

Secondly, as far as leadership and management in the IT-units such as computer centers is concerced, the task is to master the severe change of role - from a central monopoly which the users have to utilize, to a market-dependent service provider. This change of role involves several new tasks like preparing and monitoring standards and frameworks; user service; data modelling; process modelling; procurement, verification and integration of standard software; procurement, installation, maintenance and back-up of local IT-systems; or improving the communication between users and IT-specialists. This list illustrates also that qualification of IT-personnel is a predominant management task because functions and qualifications of IT-specialists have changed as well. In the first decades of EDP, quite often employees educated in public administration were retrained in order to enable them to programme and maintain IT-applications in their familiar field of public administration (so called „ dog-hut applications"). Today, more highly qualified experts are needed who are able to recognize and to organize the relations between complex applications and who are able to master an overall configuration management.

As far as political leadership is concerned, quite a few measures are urgent in the field of educational, economical, legal,or social policy, among others. This is because the public sector is not only a user of the possibilities of IT but rather must also create and control the necessary framework so that the potential which is inherent in IT as an „ enabling technology" is allowed to come to full bloom, and if at all possible, without any thorns. Therefore, government and administration must level off obstacles which block a sensible use of IT. On the other hand they must build up restrictions in order to restrain the undesirable consequences. Some of the necessary actions are: guaranteeing an efficient infrastructure for IT, preventing criminal missuse of communication facilities by passing and enforcing the appropriate legal regulations, guaranteeing equal opportunity so that the gap between information-rich and information-poor is kept as small as possible, protecting consumers in economic transactions, or protecting intellectual property in a world of ubiquitous information

through the further development of copyright laws, and last but not least guaranteeing a sufficient number of employment opportunities by charting the proper course at the proper time in areas of research, development, economic, employment and education policy.

7. Conclusion

With the foregoing I tried to point out that the strategies of administrative development must be worked out with due reference to the administrative information systems, which in turn are derived from the administrative strategy. Information technology and administration may not live separate lives, they must be integrated from the view point of political and administrative leadership. Discussion on this subject has begun in the public sector of many countries. Strengthening this trend may well be the principal task of the years ahead.