The informatics of public administration: introducing a new academic discipline

JON BING

1. INTRODUCTION AND DEDICATION

This paper is offered in tribute to professor Vittorio Frosini as a colleague and friend. The contact with him and his department at the University of Rome – Istituto di teoria dell’interpretazione e di informatica giuridica dell’Università di Roma «La Sapienza» – has been rewarding. Professor Frosini has honoured us in Oslo by visiting the Faculty of Law and my own department, the Norwegian Research Center for Computers and Law as a guest lecturer, dedicating one of his lectures to the theories of Alf Ross, a Danish legal philosopher who strongly has influenced legal reasoning in the Nordic countries, and which professor Frosini has introduced in Italy. A large group of students from Oslo also visited Rome, and attended lectures organised by professor Frosini at his department.

In this way, there has been communication on several issues related to computers and law based on the role of professor Frosini. But it will be allowed, I hope, to introduce also a more personal note. I am indebted to professor Frosini in many ways. In 1983 I spent some months in Italy, most of the time in the flat at Marina Velcha which professor Frosini generously made available to me. While enjoying the ancient cultural landscape of the Etruskan, I there finished writing a science fiction novel of the politics of artificial intelligence and the challenge it represents for man’s image of himself, what Frosini calls «the new man» in his «Human rights in the computer age».

1 It should have been presented at the conference in his honour in March 1992. However, the night before the plane left from Oslo, a burglar broke into my home while we alla were asleep and stole the luggage (including travel documents) conveniently placed by the door. In this way, I was cheated from honouring my friend professor Frosini, and I am pleased that this to some extent may be put right by this written version.

2 Published as Dobbetsgengere, Gyldendal, Oslo 1984.

This is appropriately one of the ingredients for this modest paper, but it is combined with another ingredient also elaborated by professor Frosini, that of the computerization or informatization of the public administration.

It is no secret that the author is fascinated by Italy. This is, of course, partly due to her superb wines, her generous kitchen, her beaches and the many bars. But it is mainly due to her people. Therefore this paper is dedicated professor Vittorio Frosini who is so much more than a lawyer; also a politician, a philosopher, a humanist and - above all these: A friend.

2. THE DANGER OF PROPHESYING

The background of this paper make the use of a science fiction extract justified. The extract is from Edward D Hoch's short-story «Computer Cops»4. This story is the first in a series about an elite corps of computer security agents known as «computer cops». It was written in 1969, which was the same year that I graduated from Oslo university and went on to co-found the department I still am working for at the Faculty of Law. In some respect, the image of computers in these stories represent the commonly held view of the future of computing at that time.

Hoch is not a major author, but he has in this story accomplished a rare feat: In the second of the two opening sentences of the story, he makes three grave mistakes in predicting the near future:

«Crader’s office was on the top floor of the World Trade Center, overlooking all of New York City and a good deal of New Jersey. On a clear day he could see the atomic liners gliding silently through the Narrows, or the mail rocket landing at Nixon International Airport far to the west».

Hoch was mistaken in believing that social policy would allow ships powered by nuclear reactors to be allowed into the harbour of large cities like New York. He was also mistaken in the reputation the current president of the United States of America was making for himself: After the impeachment of Richard Nixon, airports would hardly be named after him5. An in out context, Hoch was gravely mistaken in believing that there would be a place for rocket mail («r-mail») in an age where global computer networks

5 In later version of the story, the name of the airport has been changed and is named after president Ronald Regan.
was embracing the world. An E-mail message would have hit the west coast of America before the rocket could clear the gantry tower.

In this way, the story also is a useful reminder. We know that it is difficult to make accurate predictions, even for the near future. But we should also realize that it is difficult to comprehend the potential in the technology of today when the exploitation of this potential still is in the future. This is a characteristic of information technology: Even if no new inventions are made in the next decade, we will go on exploiting and exploring the possibilities already opened by this new and potent technology.

In order to introduce a perspective, we precariously offer in the next section a brief history of the trade in information.

3. A LEGAL EXPLANATION OF THE INFORMATION AGE

In his essay, Frosini surveys the whole of human history – indicating three elements which I suggest create «the image of a 'new' man living in the computer age». This three elements are (1) AI – dialogue between computers and humans, (2) space travel, and (3) telecommunications and telematics.

This grand view has made me dare also to offer the sketch of a history, characterising in legal terms the development of the trade in information. And surprisingly, there are only three basic forms of contract.

First, there is the employment or consultant contract. As language appeared in the dawn of history, it became possible for one person to communicate with another. Knowledge could be shared, and a price could be taken for this: If you will give me a leg of mammoth, I will tell you where there is good hunting.

This is still a major way for trade in information. Most persons today are employed for what they know, their background knowledge or methodological knowledge. Few are employed due to their strength, physical agility or their beauty.

The main restriction to this form for trade is that it has to take place in real time. Originally, it also had to take place within speaking distance of the knowledgeable person.

Second, there is the sales contract. This required a further development, a written language. When the city civilization of Sumer emerged, it became necessary to keep accounts for the vegetables, meat and other goods brought into the city. And it practically impossible to keep accurate and certain
accounts orally. This need led to the development of a system of recording information by wedges of tree which were pressed into clay tablets.

In this, two of the major limitations of transactions based on orally rendered information were overcome. The tablets could be carried away a long distance, and still convey information to the reader. They could also convey information over time—a long time after the writers are gone, we still share the information on the markets of the cities of Sumer.

The imprinting of information on physical objects are still a popular practice: Obvious examples are books and phonograms. The trade takes the form of a sales transaction—the fact that the value of a book and a cheese is derived from different qualities in the traded object has little importance for the contractual form.

The story of information technology is to a large extent the story of the perfection of the underlying technology which made these two forms of transactions possible: Employment and the sales of goods.

Technology has been developed to overcome the need for physical proximity in real time between the person whose knowledge is to be exploited, and the purchaser (employer, contractor). This development really started by the development of telegraphs last century, and continued with the development of the telephone, the wireless broadcasting systems for sound, and later for images. This made it possible to communicate in real time across long distances.

The object on which to imprint signs conveying information has an even longer history of radical development. The physical object was transformed from clay tablets through papyrus to paper. The process of imprinting signs was made more efficient. Handwriting yielded to the printing process, and in the 1860s the rotary press was invented, creating a market for popular literature as the popular daily newspapers and the dime novels. At the same time, photography was invented, making it possible to imprint images of the real world—like kings or animals—to pictures printed on paper and subject to trade. Sound recordings were made possible, the information imprinted on gramophone records as a spiral groove—sound was transformed into a physical object. The photographs become movies—action and drama was transformed into a physical object of celluloid film.

These indications also teach us that something very radical happened to

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6 In our broad context, it becomes a detail that the book is not only subject to property rights like the cheese, but also to copyright, consequently the acquired «object» (the bundle of physical objects and related rights for the owner) is not identical for the two examples.
information technology in the latter part of last and the first decades of this century. While printed paper illustrated by engravings had been dominant as the physical object conveying information, new forms of representing information was invented, as well as more efficient ways of reproducing this representation. Sound recordings and cinematographic film was combined with the new communication technology, and through the telephone information delivered from something different than a person could be purchased (what we today would call an audiotex service), or a film could be broadcasted by television. This development was augmented by increasing efficient transport technology (steam boats, trains, and automobiles) which made distribution more efficient. The development is reflected in the changes in the legal infrastructure, perhaps the most typical was the adoption of the Berne convention on copyright which is the legal response to a booming international market for information.

While appreciating the changing technology, we may still observe that in legal terms the information is still traded in much the same way – by employment of persons, or by the purchase of a physical object: Though the signs of this object could be communicated to persons not in its proximity by telephone or broadcasts, though this communication process left the listener or viewer without any permanent copy of the signs or the object.

This leaves us with the third way of trading information – a trade in the signs themselves. Using for instance the Italgiuere service, an Italian lawyer may easily purchase the information of court decisions. This takes place without any person communicating that information, and without any physical object being transferred. It is a type of contract different from the two mentioned above, and it is novel to this century. Data base publishing and on-line information services are typically examples of a new way of trading information.

If we want to make a syllogistic argument, we could propose to state as the first two sentences that the development of language – the premise for trading information by the way of the employment contract – is related with the emergence of man as such, and that the development of writing – the premise for trading information by the selling a physical object – is related with the emergence of cities and our civilisation. This makes us wonder what really fundamental changes this new way of trading information will bring about in our society and in the history of mankind.

7 It is, perhaps, somewhat older than computer technology. One might see a parallel in somebody making a sound recording of a broadcast – but this type of transactions never reached any volume or was organised successfully commercially.
We are too close in time to the emergence of information technology really to assess the social impacts. But the analogues makes it easier to argue that there will be major changes and major effects. And this is important for emphasising that the legal policies of information law are important social issues.

We have briefly discussed the trade in information. But we have not mentioned why we are willing to pay for information – why does information have purchase value? This question has more than one answer – the reason we are willing to pay for a phonogram will typically be different from why we are willing to pay for a word processing program.

But one answer traces the relation between a decision and the information on which that decision is made. And there are typically two reasons for the purchaser to be willing to pay for the information basic to the decision.

One is that the information may save the decision maker time, and if it in this way saves more costs than its price, a rational choice would be to purchase this piece of information.

The second is that the information may improve the quality of the decision in one way or the other, and that this improvement is worth the purchase price. There are, again, at least two ways in which a decision may be improved:

First, the information may increase the probability of the decision being commercially successful, and the increased earnings compares favourable with the price of the information.

Second, the information may increase the probability of the decision to be formally correct, measured against some sort of standard. In law, this standard may be – for instance – the rule of law of due process. Or on a more operative level, the information may increase the probability of the decisions to comply with the rules of procedure in public administration – and we are willing to pay for this enhanced quality.

This also provides us with the necessary stepping-stone to the next part of the paper.

4. USE OF INFORMATION TECHNOLOGY IN PUBLIC ADMINISTRATION

4.1 Sourced of factual information

Scandinavian public administrations have been heavy users of computerized solutions for a long time. There are fully automated decisions systems pre-dating knowledge based technology – well documented example is the
Housing Aid system, which decides whether a person is eligible to a specific social benefit without requiring more information than the unique personal identification number assigned to each Norwegian citizen. Using this as the key, the data bases of other administrative agencies are accessed, a decision made whether the applicant is to be paid housing aid. If this is the case, a postal cheque is printed out; if the decision is negative, a form letter explaining exactly why the applicant failed to meet the requirements.

We may consider the sources of factual information for a decision within the public administration. It is suggested that there are two major sources — facts which have been collected prior to the current case has been initialized (and which we will call «pre-collected facts») and facts collected as part of the current case (and which we will call «case-related facts»).

The case related facts may be produced by at least three different methods. One may have the person who is the party to the case, produce the facts — for instance using a form to collect the facts specified by the names of the different fields of the form. One may request information of third parties who have a knowledge of the case or the party to the case — such third parties may be a medical doctor who has examined the party to the case, the employer, relatives, etc. And finally, one may initiate

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investigations in the form of police inquiries, a medical examination, a report from a social worker on the conditions at the home of the party to the case, etc.

The pre-collected facts may be organised by a different scheme, using two general distinctions. One may distinguish between facts collected by the agency handling the case prior to its initiation (and which we will call «internal facts»), and facts collected by another agency (and which we will call «external facts»). One may also distinguish between facts stored in an unstructured form, like for instance the files of the correspondent, the document produce by a word processor, etc.; and facts stored in a structured form, typically in a data base where the facts are entered into fields associated with a definition, like «date of birth» or «date of marriage».

4.2 A change of policy

This simplified review of the sources of factual information may be used to propose that a development is currently taking place within public administration, which also is a change in policy. Case-related facts can only be collected by heavy expenditure in terms of time and human resources. The process will also contribute to prolong the time it takes from the initiation of a case to the decision, making the system less responsive. Case-related facts must also be assessed by a human case handler, which also implies costs and delays.

Unstructured, pre-collected information must also be processed by a human case-handler extracting those facts from documents which are relevant for the case at hand. If the facts are external, the communication with the other agency will also contribute to further costs and delays.

Structured facts, however, may be slotted directly into a computerized system, offering decision support – or even a fully computerization of the decisions like exemplified by the Housing Aid system. Whether the structured facts are available internally or externally, has little importance and little impact on both costs and the time necessary to collect and process the information.

It may therefore be argued that the pragmatics created by information technology for decision making in public administration encourages the use of structured, pre-collected facts. The policy makers will start hunting for data bases which may contain facts relevant not only for the original purpose, but also for a wide range of secondary purposes, linking systems and data bases together.
4.3 Some implication of the change in policy

Such a development would have many consequences. A major con­sequence would be that regulations would have to be amended in order to make it possible to take advantage of the precollected information. The rules must be changes to reduce the dependency on a human case handler. Rules must be designed to exclude legal expert judgements -- which cannot be computerized according to current belief, unspecified exceptions («in general», «etc.» and so on) must be eliminated. It may be argued that examples of such changes are available, and strenghtens the hypothesis suggested above.

One minor example of the development will serve to make the point. In the application form for old age pension there was before a box asking the applicant whether he or she supported his or her spouse. The notion of «support» is rather relative -- a person with a small income may respond regatively, a person with a very high income may respond positively, and both responses may be legally correct, though the two spouses had identical income. Today, one only asks for the income figure of the spouse, and has added a fixed rule comparing this figure with a threshold -- is the figure above the threshold, the spouse is not supported. We see that a vague criteria has been replaced by a quantitative criteria and a fixed rule.

Actually, this also is an example of collecting case-related facts, as the question appears on the application form. But this is only a matter of courtesy, obviously the income figures for the spouse may more easily be communicated to the social benefit office from the data base of the tax authority. Even the fact that the applicant is married, is available from the Central Personal Register. Obviously, rules have been amended to allow this whole process to be computerized.

A further consequence is that the exchange of data between public agencies will increase sharply. At the same time, the public administration will take a hard look at the data bases available within the private sector, and consider whether any of these may contain data relevant for the tasks the public sector sees as candidates for computerization. Typical examples will be the files to banks, insurance companies and other financial institutions which will be used for the administration of tax and tariffs.

There will also be paid more attention to the establishment of appropriate data bases. Today, data bases are typically established to support a certain activity, but there is a tendency for data bases to be maintained as a separate task, independent of the decisions drawing upon tha data from the base -- an example is the Norwegian Central Personal Register which contains the names, current and former addresses, birth dates, personal numbers,
parent-child and spouse relations, etc. To maintain this data base is a primary function, not secondary to any of the many decision systems which rely on data from the CPR.

This increased communication between data bases obviously also will imply that data to a higher degree is being utilised for a purpose different from for what it originally was collected – or collected without any specific purpose in mind. As there is a close relation between interpretation, classification and quality of data and the purpose the data is to serve, we see that the issue of data quality is becoming critical.

4.4 Data quality

This issue is data quality rather than data protection. The development typically concerns trivial decisions, and the problems of data quality may have small impact on the individual decision. Some of the data may in deviate from the true or correct facts, but typically these deviations will have limited impacts on the result. One should, however, appreciate that the aggregated effects may be major. Even a deviation resulting in each decisions deviating by a few kroner of the correct amount to be paid out will represent a considerable sum if multiplied with a factor corresponding to the number of individual decisions made – ten or hundred thousands, even millions.

The problem is that we today lack knowledge of data quality. There are, however, international examples. An infamous example was initiated by the Office of Technology Assessment on the introduction of a proposal of a higher integration between federal and state police authorities by the Regan administration. Samples from criminal history records were examined to decide whether the data was «complete, accurate and unambiguous» – the traditional formulation of quality standards in data protection. The examination showed that in the state of Minnesota, 49.5 per cent of the records satisfied the standard – and this was the highest figure measures – in North Carolina, the figure was 12.5 per cent.

Another example is the Swedish Kungsbacka incident. A municipality wanted to disclose social benefit fraud, and matched data from several files. They identified 1,000 suspected for such fraud. These were reported to the police. After a preliminary investigation, the police could discard 250 of them. Further investigations resulted in some of the remaining brought before the court, and altogether 10-20 persons were convicted.

9 David Burnham The Rise of the Computer State, Weidenfeld and Nicolson, London, 1983:74. The research was conducted by Dr Kenneth C Laudon.
There is an amazing difference between the 1,000 original suspects and the 0.01-0.02 per cent convictions. The main reason was simply that Swedish law knows more than 25 different income concepts, and comparing files using different concepts would, of course, demonstrate corresponding differences without there being any cause for fraudulent activity\textsuperscript{10}.

In the Nordic Council – an inter-governmental organisation for the Nordic countries – there was a proposal discussed at the session in Copenhagen in February 1991 to take common action for quality assurance of large data bases, including legality control and audit routines. The proposal failed to be passed by the narrowest possible margin – but it still is interesting to note that the Nordic Council discussed an issue which is not yet on the agenda of the national parliaments of the member countries\textsuperscript{11}.

It can be argued rather forcefully that in order to preserve the rule of law and due process at the traditional level, one need to take an initiative with respect to computerized systems in public administration. This initiative should include measures for assuring that data quality is appropriate, that the rules of the decision-related programs are within the boundaries of the law they are supposed to reflect (legality control), and which mechanisms should be introduced to review systems periodically as an alternative to individual control (audit mechanisms). Without such initiative, the rule of law may deorient as we introduce information technology in public administration.

5. CONCLUSION

Our concern for information is related to its nature. Until now, information could be controlled either by controlling individuals (who had the information), or the physical objects (representing the information). Persons could be imprisoned, physical objects could be confiscated.

But information traded in the global telecommunication networks cannot be controlled in this way. When the Chinese clamped down on the students, the fax receivers printed out the political reaction from other countries. It was like having illegal newspapers printed locally all over the country, and it gives us a glimpse of the liberation of information achieved by modern technology – and the severe political implication of this process.


\textsuperscript{11} Cf *Lov & data* 29/1992:7.
It also demonstrates that the new way of trading information already is straining the fabric of international relations. It is often maintained that law is fossilized politics – but currently many of the animals which rightly should have been fossils, are roaming as predators, leaving their footprints across the legal landscape.

As professor Frosini has put it\textsuperscript{12}:

«We cannot think, decide and consequently take action by pretending to be in an abstract or imaginary and, therefore, different situation from the one in which we actually live with its spring of emotion and sometimes with its contradictory complexity but always with its strict adherence to us. And it is from this awareness of reality, from putting into focus the conflict between desire and difficulty, from placing ourselves in life’s animated context that we must begin and not from the search for an ossified rule. Likewise, no ethical rule, regulatory principle or criterion for judgement exists which ought not to be compared in a concrete sense with the present, \textit{hic et nunc}, thereby ceasing to be merely empty words to become an element for evaluation, namely, to be obeyed or revolted against». 

\textsuperscript{12} «Human rights in the computer age», \textit{Informatica e diritto} 1/1989:11-12.