Legal Expert Systems in Adminstrative Organizations

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INTRODUCTION

The term *expert system* comes from the world of artificial intelligence. Originally, it comprised the idea that computer programs can be devised to solve complex problems of decision making, as well as, or even better than human experts. Although in some technical domains this ambitious goal is still valid, it is generally relaxed for applications in legal and administrative domains. Here the term *expert system* – or *knowledge-based system* – refers to a category of computer programs that use coded knowledge to help solve problems of decision making. One simple, everyday example is a computer program that helps a tax payer fill in his tax returns and informs him about the implications his answers will have in terms of the amount of tax to be paid. A second, quite different example is a system which, based on a textual summary of a case at hand, can help a legal professional in finding applicable case law.

BACKGROUND

At the core of an expert system is a so-called knowledge base, a formal model of knowledge that is used to make inferences to arrive at relevant decisions. This knowledge base can have different forms and in general a distinction is made between rule-based and case-based systems. In a rule-based expert system, reasoning is based largely on production rules, that is, hundreds or even thousands of coded rules in the form of IF-THEN statements. For example, IF a client's total capital is below • 10.000 THEN the client is exempted from paying wealth tax. By combining many such rules, very complex inferences can be made. In a case-based system, the knowledge base consists of a larger number of coded case descriptions and the system bases its inferences on automated procedures (usually of a mathematical or statistical kind) to compare the case at hand with the different cases in the knowledge base (e.g., Brüninghaus & Ashley, 2003).

In the early years of legal expert systems, it was assumed that the development of such systems was particularly useful for more complex legal reasoning tasks, in situations where a human expert would be faced with personal limitations in knowledge and skills (Bench-Capon, 1991). Nowadays, however, legal expert systems are more often regarded as important tools to control administrative processes and to enhance administrative efficiency, that is, the use of expert systems in public and private bureaucracies to process large numbers of cases in a standardized and controllable manner.

Four important types of applications of expert systems in administrative organizations can be distinguished:

- Knowledge-based information services for citizens/clients: while in the Internet era many organizations have started to put all kinds of rules and statutes on their Web sites, research shows that most people find it very hard to apply such written rules to their personal situation. In such circumstances expert system technology may help to personalize the information. Banks, for example, may add expert system modules to their Web sites to help the customer understand which of the different mortgage plans is most suitable in his particular situation (Stranieri et al., 2001).
- Knowledge-based acquisition of citizen/client information: in combination with the above application, expert systems may be used to help gather information from citizens and organizations, so that their cases can be processed more easily. An example is the Taxis system in Greece, which helps companies in submitting their VAT declarations in a correct manner (Tsiavos et al., 2002).
- Semi-automated decision making in street-level bureaucracies: in many government agencies, the application of legal statutes is the responsibility of so-called street level bureaucrats, that is, lower-level staff with at most limited legal training. Expert systems can be used to support these bureaucrats in making formally correct decisions. An example is the use of expert systems by the Australian Department of Veterans Affairs in determining individual entitlements to disability pensions (Johnson, 2000).
- Automated application of legal rules in high-volume administrations: some administrative agencies are responsible for the repetitive application of the same regulation to very large numbers of cases.

Here expert systems may be used for fully automated processing of the bulk of these cases. An example is the fully automated fining of speeding offenders in the Netherlands (Zouridis, 2000).

EVALUATION STUDIES

The use of legal expert systems in public administration has been the topic of intense debate between enthusiasts on the one hand and skeptics on the other.

When, in the 1970s and –1980s the idea of expert systems proliferated and the opportunities in the legal domain became evident, scientists and entrepreneurs from very diverse backgrounds started experimenting in this field and built the first examples of legal expert systems – to investigate and demonstrate what could be done. Evaluation studies such as that by Nieuwenhuis (1989) were carried out in carefully controlled laboratory settings and led to a heightened enthusiasm and sometimes to oversimplified claims: the suggestion that expert systems could be designed that were superior to human decision makers and that would solve all existing problems of bureaucratic administration.

This, of course, antagonized many scholars in the fields of law and public administration, who rightly criticized the experiments for their subjectivity and limited validity and who argued that there were serious limits to what machines could and should do in administrative practice. Thus, as the stories of really intelligent expert systems proliferated, this in some cases only fed existing computer *angst*: the Terminator type of vision that we were entering a future in which we would trust machines with decisions of life and death.

In recent years, however, various examples of expert systems have entered the market and the opportunities for administrative and legal scientists to do their own objective and critical research has increased dramatically. As a result of this some interesting case studies have begun to appear (e.g., Groothuis, 2004; Smith, 1994).

These new evaluation studies of real applications used in administrative practice indicate that also among legal scientists and students of public administration, opinion is shifting in favor of the use of such systems. Today, even more skeptical observers acknowledge that legal expert systems are actually being used and in some cases really provide opportunities to improve legal decision making in public administration (both in terms of legal quality and efficiency). Particularly where street level bureaucracies are expected to work with a multitude of formal rules, an expert system can clearly help improve quality and efficiency by systematizing decision making and automating the application of complex tables and calculations.

CRITICAL ISSUES OF LEGAL EXPERT SYSTEMS IN PUBLIC ADMINISTRATION

There are, however, still various practical, ethical and philosophical issues related to the broader introduction of expert systems in public administration, and the most important of these are the following.

Expert Systems Can Contain Errors

When legal expert systems are used to make serious decisions about people's lives, it is essential that they are reliable; that they indeed produce correct decisions that conform to the formal rules and the legal status quo. This, however, may be impossible to guarantee. As legal expert systems are generally used in rather complex domains with ever-changing regulations, the question is if and how these systems can be kept formally correct, reliable and up-to-date. It is clear that the issue of expert system validation requires very serious attention, not in the least because the translation of administrative regulations into formal computer rules is not always as straightforward as it may seem. In addition to this, there is still a need for adequate design methodologies and validation tools.

Garbage in is Garbage Out

Even if expert systems are formally correct, they will produce erroneous results when fed with inappropriate data. As the experiments by Nieuwenhuis (1989) showed, users of expert systems may make unintended errors when entering relevant case data, but they may also try to manipulate such systems intentionally. This incorrect use may, of course, seriously influence the conclusions reached by these systems

Expert Systems Cannot Deal with "Hard Cases"

In legal science, special attention is paid to the distinction between clear and hard cases. Simply put, a clear case is one in which there is not much discussion about what the problem is and what the decision should be. With a hard case, however, there are one or more of the following problems involved: (a) the characteristics of the case are not easily matched to existing rules, (b) the existing rules do not deliver a clear conclusion and/or, (c) application of the existing rules leads to unacceptable results.

Expert systems in principle do nothing more than apply fixed rules to case data provided by the user. They have no real understanding of the case and therefore treat all cases as clear, even if, to any human observer, it is

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