Abort or Retry – A Role for Legal Knowledge Based Systems in Electronic Service Delivery?

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Abstract. Electronic service delivery is closely tied to legal decision making. Legal decision making is by nature complicated. It involves the (strict) application of rules, but it also inevitably leaves room for discretion. If the ambition of electronic service delivery is taken seriously, this means that (some) legal decisions have to be taken by computers. Legal knowledge based systems (LKBSs) capable of performing this task have been around since the early nineteen nineties. These systems, although successful, never really broke through and are somewhat forgotten. With the advent of e-Government and its focus on electronic service delivery, legal decision making systems are desperately needed. This paper argues that legal knowledge based system technology is neglected undeserved and that it offers opportunities for serious electronic service delivery.

1 Introduction

One of the central elements of electronic government is electronic service delivery. Governments aim to make their services more accessible to the public by removing time and space limitations, and by tailoring services to the needs of the public. ICT plays an important role in this respect because it enables services to be offered 24x7, independent of the location of the user. Furthermore, IT systems could cater for the needs of citizens and businesses by offering intelligent access to information and by helping them to apply for particular services. They could also play a role further on in the process by making decisions and by actually delivering the decisions electronically.

This all sounds familiar. It is the mantra that has been recited ever since the first steps towards electronic government were set in the middle of the nineties. Since then, progress with actual electronic service delivery has been relatively slow. Most governments are online nowadays and many offer fairly adequate information services. Some provide the electronic intake of services, although this often only means that citizens can fill in 'dumb' online forms. That is, static forms without real time checks on the input. True transaction services, where the user is guided through the application process, the decision is taken without human intervention and where the result is presented either by electronic means or by ordinary mail, is few and far between. This begs the question: why?

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This simple question has, of course, many dimensions since there are many dimensions to electronic government and electronic service delivery. We also have partial answers. To name but a few: the development of electronic services is an organisational problem more than a technical one (Bellamy and Taylor, 1998), there is hardly any political pressure to implement service delivery reforms (Hoogwout, 2001) and development is very fragmented in the sense that the wheel is reinvented in many places (Leenes and Svensson, 2002).

But apart from these context factors, also the nature of electronic service delivery in the public sector itself is non-trivial. By service delivery in the public sector we mean: The performance by government of its basic legal functions (providing documents, orders and permits), of its welfare functions (providing benefits, subsidies and services) and the provision of information about these functions (Raad voor het Openbaar Bestuur, 1998). These functions are legal in nature because they relate to decisions taken by public bodies on rights or obligations of citizens and businesses. In making these decisions, government is ultimately bound by law. Therefore, (most) service delivery involves legal decision making. Legal decision making is considered to be difficult because it involves both flexibility and rigidity. Flexibility is required because rules and facts have to be interpreted and interests have to be balanced. Rigidity is required because of standards such as the principles of legal certainty and the legality principle (the Rule of Law).

The development of electronic services implies the development of computer applications capable of making legal decisions. This brings about questions about the possibilities of automated legal decision making and the role these systems can play in electronic service delivery. These topics are addressed in this paper.

The outline of the paper is as follows. In the next section I discuss the nature of legal decision making in some detail. Section three will discuss a technology aimed at legal decision making that may be suitable for electronic service delivery: rule-based legal knowledge based system technology. In section four the issues raised in the discussion on legal decision making will be discussed in relation to two relevant domains for electronic service delivery. Section 6 discusses the role legal knowledge based system can play in electronic service delivery and section 7 draws some conclusions.

2 Legal Decision Making in Public Administration

When a citizen applies for a public service such as a benefit, a permit, or a grant, the administration has to decide on this request on the basis of legal rules and the facts of the case. Usually these decisions are taken by so-called *street level bureaucrats* (Lipsky, 1980) who work in what is coined *human service organisation* by Hasenfeld (1983). The combination of legal decision making by street level bureaucrats in human service organisations presents a particular kind of decision making procedure. To understand the possible role for computer applications in electronic service delivery, we have to look at this particular setting in more detail. I will briefly address the organisational setting, legal decision making and the legal context.

Hasenfeld describes human service organisations as organisations that deal with people. These organisations have a number of features in common. The fact that they deal with people inevitably implies a moral dimension in decision making. They

usually operate in a turbulent environment where the organisational goals are vague, ambigious and problematic. Effectiveness by objective measures is hard to establish and the measures taken by these organisations are often not undisputed. The picture sketched here applies to many organisations in the welfare sector. In other sectors, such as the building and housing sector, or taxation, these features are less prominent. But even here, some of the characteristics of the human service organisations are present. Most agencies involved in public service delivery are *selection bureaucracies* (Gastelaars, 1997). This type of organisation is focussed on rules and regulations. Authorities and powers are outlined in more or less detailed procedures. Selection bureaucracies are focussed inwards and the employees are strongly attached to their organisation. Application of rules and procedures to individual cases often leads to problems because, no matter how strict the rules are defined, there are always cases that do not fit the rules. The street level bureaucrat therefore has to have a certain room for discretion to decide individual cases as she sees fit.

Part of the discretion attributed to street level bureaucrats derives from the moral dimension innate in human service organisations. Another, although intertwined, source is the legal material the street level bureaucrats have to apply in their decisions. Rules and regulations are drafted in natural language, which introduces specific problems. Three types of problems are particularly relevant in the light of electronic service delivery: vagueness of concepts, open texture and the overall problem of (legal) interpretation. Legal concepts are often vague or evaluative. Article 24 of the Dutch Unemployment Act, for instance, stated that an unemployed person should avoid staying unemployed as a result of "insufficiently trying to obtain commensurate work". The concepts of "sufficiently trying" and "commensurate work" are vague and open to discussion among experts in the field. What amounts to appropriate work in a particular case, depends on all sorts of fuzzy factors that have to be weighed in order to reach a decision. Usually part of the vagueness is reduced by policy guidelines for the street level bureaucrats, but inevitably discretion remains.

The second source of problems is the open texture of concepts. The meaning of a concept may be clear at a specific point in time. But for every concept a moment may arise when a case presents itself that clearly falls within the borders of the concept, while there is reason to exclude the case as an instance of the concept in question. Or, a case may fall outside the borders of a concept, while there is reason to mark it as an instance of the concept. A classical example in the Netherlands arose when a windsurfboard collided with a yacht. The question arose whether a windsurfboard was to be considered to be a vessel, in which case the Water Traffic Act (Vaarwet) applied and the windsurfboard was to be held liable for the accident. Otherwise, it would not be liable. This decision was in a way arbitrary, because one could argue either way. All things considered, a decision has to be made and from that moment on there again is clarity with respect to the borders of the concept. When problems relating to the open texture of concepts arise, there clearly is room for discretion.

Both problems arise in the process of legal interpretation. Every rule and every concept has to be interpreted in the light of the case at hand. The same goes for the facts of the case. The interpretation of rules and concepts not only involves linguistic factors, but also the purpose of the rule, the context in which the rule is embedded, the history of the rule and the domain in which the rule functions and other factors. These factors make legal decision making a process in which flexibility has to be incorporated.

A third important dimension that makes legal decision making special is the constitutional context in which it takes place. Government agencies are ultimately bound by law as a consequence of the legality principle (the rule of law)[1], although the law in some instances only states policy goals as Lenk *et al.* (2002) note. Their decisions have to be based on legal grounds and decisions have to be justified by referring to the proper legal grounds and the appropriate facts of the case in the (written) decision itself. Furthermore, legal principles such as legal certainty and equity before the law aim to make the legal consequences of actions predictable. Citizens should be able to determine their rights and obligations on the basis of the appropriate legal sources (legislation and secondary material) and base their actions on this knowledge. These factors aim to keep the discretion of legal decision makers within bounds.

As will be clear from this short introduction, legal decision making by street level bureaucrats is finding a proper balance between the mechanistic application of legal rules and doing justice to truly special cases. This is the field in which electronic service delivery has to be embedded.

In most cases handled by street level bureaucrats, the problems sketched above play no role at all. Most cases are simple in the sense that it is clear that they fall within the scope of the applicable rules and that there is no room for discretion, because this would be unjust to the other cases. These are called the 'clear cases' in legal theory. Briefly stated, clear cases are the cases where: the rules are clear, the facts are clear, the rules and facts match and the decision is acceptable (Leenes, 1998;Smith, 1994). The others are called 'hard cases'. In hard cases, experts may argue over the rules, facts, the applicability of rules to the facts and/or the acceptability of the outcome. Stated in different terms, in hard cases two experts may arrive at different decisions.

The distinction between clear and hard cases is important for electronic service delivery. It seems plausible that computer applications can be built to handle clear cases. But what about the hard cases? How is a computer application going to handle cases that have no indisputable outcome?

3 Legal Knowledge Based Systems

The idea that computer applications could be developed to perform legal tasks stems from the 1950s. But only in the second half of the 1980s, real progress was made in the development of these applications, commonly denoted as legal expert systems.

These systems embody a representation of legal knowledge. They are capable of reasoning with this representation to derive legally valid conclusions. This makes them suitable for legal decision making. What sets them apart from traditional computer applications is that there is a separation between the knowledge base and the inference engine (and the user interface). The knowledge base contains a representation of the legal knowledge relevant to the system's domain of operation. In one of the prominent subclasses of legal expert system, the rule based systems, the legal knowledge is represented as a (large) set of if-then rules and text segments. The if-then rules may embody both legal and practical knowledge necessary for decision

[1] In the Netherlands at least, but the same, no doubt, holds for most (European) countries.

making in a particular domain. The inference engine is a general (re-usable) component that operates on the if-then rules. It can check whether the conditions of rules are met, and if so, conclude that the consequent of the rule is valid. It traverses the if-then rules to carry out its reasoning tasks. It will request the interface component to ask for user input by means of questions whenever necessary to proceed, and it will present its conclusions to the interface component. The interface component takes care of the actual question and answer 'game' between system and user. Inference engine and interface component together are also capable of producing justification of the results reached by presenting the applicable rules together with the relevant user input (Why and How functions).

Expert systems can be built on the basis of expert knowledge. But in legal domains it turned out to be possible to turn to the legal sources underlying a particular domain. The legal sources, primary legislation, can be represented in the form of if-then rules closely following the organisation and formulation of these sources. This kind of isomorphic representation of legislation in rule based knowledge systems appeared to have important advantages over other forms of knowledge representation (Bench-Capon and Coenen, 1992). The close correspondence between the sources of legal decision making and the representation in machine usable form eases the construction of knowledge bases, but also the validation, maintenance and use of the resulting system.

One of the first mayor experiments with the construction of a large isomorphic legal knowledge based systems (LKBS) was the Tessec system (Twente Expert System for Social sECurity), a system for the adjudication of social security legislation by case workers in Social Welfare offices. Various evaluations of Tessec and a similar system of a later date, the MR-Systems, show that the quality of the decisions made by these systems to be higher than that of the street level bureaucrats in the field of social security (see Svensson, 2001 for an overview of these studies). Johnson and Sutherland (1996) report similar improvements in decision making by legal expert systems in Australia.

Legal knowledge based systems are capable of making legal decisions by applying legislation to the facts as provided by the user. But what about the distinction between clear and hard cases and the need for discretion in decision making? The relative success of Tessec and similar systems, relates to the context in which they operate (Svensson, 2001). The social security domain is well structured. It contains concise and extensive rules that determine the legal consequences of most situations that can arise in the field. The legislator went at great length to completely regulate the field. Most lacunae left by the legislator are filled in by lower legislation (by-laws and policy guidelines). The resulting set of rules is binding upon the street level bureaucrats, which make them authoritative sources suitable for implementation in a LKBS. And, finally, the field is complex, which makes it difficult for the street level bureaucrat to administer. The same complexity makes it relatively easy for a machine to outperform the street level bureaucrat. Much of the problems ascribed to legal decision making in the previous section are tackled, either by the legislator or by the administrations. This does not mean that all cases are treated as clear cases. In this particular domain decisions are made by a case worker who uses the legal expert system. The case worker has the option to ignore or alter the expert system's advice, and indeed appears to do so when the need arises (Linden-Smith, 2001). Linden-Smith also observes that if hard cases in this domain do not receive the attention they deserve, this is not the result of IT systems, but much more of a trend towards more

standardisation and rationalisation in the domain. This trend may in effect be enhanced by the use of ICT. This finding seems to be in line with observations that the powers of the street level bureaucrat diminish over time and through the introduction of ICT in the work processes as Snellen (2002) observes.

How do legal knowledge base systems handle vagueness, open texture and discretion? Legal knowledge based systems operate on a model of the domain within which they operate. They use pre-formulated rules and can do no better than the rules they have at their disposal. They are closed systems and therefore incapable of detecting new (and therefore possibly hard) cases and making weighed judgements not perceived at the time of construction of the system. Vague concepts are problematic for legal expert systems because it is often not possible to construct computational models to determine their applicability to actual cases. Humans are better in making decisions in these cases. They are more suited to use fuzzy and incomplete decision models. For instance, in the Dutch social security there is a concept "common household", which includes married couples, but also all sorts of arrangements of people sharing a household, such as students sharing a flat. Determining whether a particular case is an instance of a common household is not too difficult once one gets the gist of the idea of a common household. But the construction of a (rule based) model for this concept is a different story. It may therefore be easier to ask the user of the system whether the subject is part of a common household by providing some information about what this is supposed to mean, than to design a rule based model that can be evaluated by the expert system. The lesson here is that a balance has to be struck between reasoning by the expert system and reasoning by the user.

The bottom line is that legal expert systems are useful in domains where the risk of processing a hard case as clear one is low (Smith, 1994).

Although the technology to build legal decision making system has been around for quite some time now, and these systems turn out to perform relatively well, there are relatively few systems in use or in development. Worse, there is even mention of an AI-winter that also touches on legal knowledge based systems (Svensson, 2001). Why? Are most domains dominated by hard cases, or is it a mere unfamiliarity with the technology that prevents public administrations from using it?

4 A Field Trip

To start with the latter question, there indeed appears to be an unawareness of LKBS technology among the people involved in the development of electronic service delivery. While doing a study for the Dutch Ministry of housing, urban planning and the environment (VROM) on tools for electronic service delivery (Leenes, et al., 2002), we discovered that LKBS technology was unknown to most people involved at the ministry. At a conference on tools for electronic service delivery organised by the same ministry in November 2002, only one of the projects on display made use of advanced technology to implement electronic service delivery. The rest of the 30 projects mainly used hard coded 'dumb' online forms. These projects represented the forerunners in the domain of building and housing and were sponsored by the

ministry. Among them was the city of Enschede[2], which is also largely unaware of the possibilities LKBS technology offers. The development of electronic service delivery primarily takes place at the local level in the Netherlands (Leenes and Svensson, 2002). This makes the chances that smaller projects with less resources than the Enschede project make use of advanced tools, is remote. Although these observations are nowhere near systematic or complete, it is my impression that there is a knowledge gap between those involved in LKBS development - traditionally the universities in the Netherlands - and the developers of electronic services - mainly the municipalities and software developers. A notable exception is the Dutch Tax and Customs Administration (DTCA) (Engers, et al., 2001) which has a research program (POWER) aimed at developing legal knowledge based systems for Tax legislation.

With respect to the question of the applicability of LKBS technology in real legal domains relevant to electronic service delivery there is little data. In the aforementioned study for the Ministry of VROM (Leenes, et al., 2002), we have performed a quick scan for two domains: "building and housing" and "living and care". The first domain contains a large number of services relating to the construction of private houses, home improvement, the acquisition of a (both private and rented) house, and services such as logging permits and housing permits. The second domain overlaps the first one, but the principal services are primarily aimed at the elderly and disabled. This includes services such as meals-on-wheels, home care, adaptations in the house to cope with a handicap, wheelchairs and other tools for the physically challenged. If we compare the two domains we see notably differences. The first domain largely builds on objective measures and quantities, such as income, age, price of the house, physical dimensions of a design for a building and type of tree to be felled. There appears to be little vagueness in the terms involved in the rules in this domain. In the latter domain, much more vague concepts exist. Many services depend on the level of inadequacy of the house of the citizen involved or the severity of a handicap. Consequently, vagueness and discretion play a much larger role here than in the former domain. The street level bureaucrat in this domain has to make an assessment of these evaluative concepts in interaction with the citizen.

Although these two domains are different in nature, they both contain many services that have a clear foundation in legislation that can be implemented in legal knowledge based systems. There seem to be few principal obstacles for LKBS use in 'hard' domains such as "building and housing", whereas the use in 'soft' domains such as "living and care" seems more troublesome.

5 Levels of Service Delivery

In the previous sections, I have discussed some of the problems involved in legal decision making. The background of the discussion so far has been decision making by street level bureaucrats about rights and duties of clients (citizens, businesses). Discretion in the application of rules to cases, and language related aspects of rules and regulation turn out to be obstacles to system development. Building systems that

[2] One of the three SuperPilots sponsored by both the Ministry of the Interior and the Ministry of housing, urban planning and the environment, to boost the development of electronic services.

correctly decide cases on domains where these factors play a decisive role, may be hard to almost impossible. That is, unless we are willing to sacrifice that hard cases are treated properly. If all cases are treated as clear cases, as is done in some domains such as speed limit violations in the Netherlands, then automated legal decision making is possible for many domains. Legal rule based system technology in these cases is a promising technology for the development of electronic services. But, since we are probably not willing to sacrifice legal principles, such as proper consideration, for the sake of introducing IT in decision making, the problems discussed come to play in implementing electronic service delivery in the public sector since many public services inevitably involve legal decision making. The role for legal knowledge based system technology in electronic service delivery may therefore, at first sight, be limited.

If we take a broader perspective the picture changes a bit. There is much more to electronic service delivery than legal decision making. This, in fact, is just one of the last steps in a process. Also in the stages before and after legal decision making there is room for support by electronic means.

It is useful to break down the interaction between citizen and public administration in phases to see where support by IT systems can be given. Chronologically the following steps can be distinguished:

1. Search: This phase consists of an iterative process of browsing general information to select possible relevant services and matching services to one's case by consulting the conditions and requirements listed for the service.
2. Intake: Once the citizen thinks she may be eligible for a service, the actual formal application has to be filled in and submitted to the administration.
3. Decision making: The application is processed by the proper administration and a decision is made on the basis of the application of rules and procedures of the service to the applicant's data.
4. Explanation: The decision is presented to the citizen in a way described by law. This may or may not include stating the relevant facts and grounds on which the decision rests.
5. Objection and appeal: Finally, the citizen can object to the decision at the administrative authority that took the decision or file court appeal to the decision.

The implementation of electronic service delivery at present in most cases focuses on steps 1 and 2. The concepts of 'life event' and 'care pathways' are generally used to guide the citizen in selecting relevant services. Often the user has to do the matching of her situation to the requirements of the various services herself. The intake often consists of 'digitally remastered'[3] paper forms. That is, relatively dumb forms the applicant has to fill in. Since the user often has to decide for herself that application for a service may be useful, she also has few clues about the relevance of the forms or the outcome of the process. The user has to do most of the thinking in the process. This seems odd to me. One of the reasons to develop e-government in the first place, is the notion that lay-people have trouble in effectuating their rights and meeting their obligations. IT was thought to be one means to improve on this situation.

The technology discussed in this paper can play a role in this respect. Even if legal knowledge based system are incapable of making legally binding decisions, they still may be able to assist the users in the steps before and after decision making.

[3] To use a nothing-new term from the CD industry.

Legal expert systems can, for instance, be developed to help people decide whether it makes sense to apply for certain services, such as benefits or subsidies. This allows for tailor-made advice applications, instead of one-size fits all systems we see nowadays. Or, systems can be built to help people fill in forms. These systems can explain why questions are asked (the standard why function available in most expert system shells) and intelligently select relevant questions. Even the construction of complaint assistants by means of LKBS technology is feasible.

The essence of these systems is not that they offer legally binding decisions, but that they can give reasoned legal advice that is valid within a margin. How broad or small this margin is depends on the particular domain, the effort put into the construction the system and the legal status the government involved is willing to attribute to the advice.

6 Conclusion

Electronic service delivery does not meet the goals set in many policy documents. This has many reasons, most not related to IT at all. In this paper I have discussed one of the core aspects of e-government, and hence of electronic service delivery, legal decision making. Legal decision making is generally difficult. This is precisely the reason why qualified personnel is used to make these decisions. One of the implications of e-government seems to be that IT systems will take over legal decision making in part. I have discussed some of the difficulties this will pose. I have also tried to show that, apart from legal decision making, there are other stages in the interaction process between citizen and government that can be supported by IT systems. At present the accomplishments on this terrain are not satisfactory. A reason for this in my view is that there is a knowledge gap in the field of electronic service delivery development with respect to useful tools and techniques. Legal knowledge based system technology is neglected as a promising tool to realise the full potential of electronic service delivery. A necessary first step in bridging this knowledge gap is raising the awareness of the possibilities of legal knowledge based systems among the people involved in the development of electronic services. This paper aims to be step on this path.

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