Information Technology for Good Governance

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ABSTRACT

To simplify interactions of citizens and business with public administration, to reduce red tape, to lower bureaucracy costs for business, free up resources which can lead to investments, economic growth and greater employment and improve the transparency, acceptance and legitimacy of government, it will be necessary to modernize and strengthen government. What is needed is not deregulation or the dismantling of government (c.f. Bürokratieabbau), but rather significant investments to modernize the organization and technological infrastructure of government and public administration. This paper compares deregulation with "better regulation" and "good governance" as ways to improve the quality and efficiency of government and discusses the potential of information technology in general, and legal knowledge systems in particular, for helping to realize the ideal of good governance.

1. INTRODUCTION

Which system is simpler, a typewriter or a modern personal computer? Thinking about this question, it becomes clear that simplicity is not always a simple matter. And so it is with simplifying legislation. There is a lot of discussion these days about deregulation and reducing *red tape*. The goal is to reduce undue complexity in government, to lower the costs of doing business, improve competitiveness in a global economy and make it easier for citizens to understand their rights and obligations. But when is one system of regulations or regulatory procedures simpler than another? Here, too, we need to think more deeply about what we mean by simplicity or, conversely, complexity.

Deregulation is an issue because of the alarming growth in the number of laws and regulations and the problems for business and society caused by this growth.[1] To give a

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[1]The differences between laws and regulations are not important for the points we want to make in this paper. We will be using these terms interchangeably.

rough idea of the kind of complexity we are talking about, consider, for example, that the German tax code has about 70,000 sections (Paragraphen). The German Juris online legal database has more than 10 million documents. At the European level, the Euro-Lex database currently has about 320,000 legal documents and is growing at a rate of about 20,000 new documents each year. These examples are only suggestive of the growing complexity of laws and regulations in Germany and Europe. For the US, figures are available which show the growth in the number of pages of Federal Regulations every year since 1960 [6]; 20,000 pages in 1960 grew to 140,000 pages in the year 2000. That's a 700% increase over a period of 40 years.

This increase in the complexity of laws and regulations is simply a fact. But why is this cause for concern? There are at least two problems. The first concerns the corresponding increase in the administrative costs of doing business, especially for small and medium-sized companies. According to [13], bureaucracy costs for businesses have risen in Germany by more than 25% in just 8 years and, in small and medium-sized companies, bureaucracy costs now equal profits. The second problem is more serious. Ordinary people are held responsible for knowing and abiding by the law. As the complexity of the law increases, it becomes more and more unrealistic to expect people to be able to know and understand their legal rights and obligations. If it is not practically feasible for people to met their legal obligations, there is a real risk that people will begin to simply disregard the system and not take it seriously. Perhaps this is already beginning to happen, as indicated by political apathy and low voter turn-out at elections. To the extent the law becomes too complex for people to take into consideration when managing their affairs, government will lose its legitimacy and our democracy will suffer.

When trying to address the problem of the increasing complexity of legislation, the natural reaction is to try to turn back to clock, to return to a time when there were fewer regulations governing our lives. This is the goal of deregulation. But our world today is more complex in many other ways as well and the complexity of laws and regulations is to a large extent a necessary reflection of this. One needs only to think of the risks and hazards of modern products and services from, for example, the chemical, nuclear, pharmaceutical, automobile or aviation industries.

A more comprehensive approach to the problems of bureau-

cracy goes by such names as "better regulation"[16] or "good governance" [18]. Whereas deregulation focuses on just one possible solution, reducing the *quantity* of regulations, good governance considers all ways to improve the *quality* of legislation and government. The goal should not be to reduce bureaucracy, but rather to modernize and strengthen bureaucracy. This is where *eGovernance* becomes important. eGovernance is the use of modern information technology to improve the quality and efficiency of governance processes.

Of course, technology can only be part of a comprehensive solution, which must also address organizational, management and, last but not least, legal and regulatory issues. Nonetheless, our focus in this paper will be on the potential of information technology, in particular legal knowledge systems, for improving the quality of legislation and the efficiency of public administration, in ways which do not preclude but also do not require deregulation.

The rest of this paper is organized as follows. In the next section we continue the discussion begun here on relationships between bureaucracy, deregulation and the concept of good governance. After that, we introduce a cyclic model of governance and outline ways of supporting the various tasks which occur in the processes of this cycle using information technology, including legal knowledge support systems. We end by presenting legal knowledge systems in somewhat more detail and illustrating their potential on the basis of a couple of cases studies.

2. APPROACHES TO REDUCING BUREAUCRACY

The term "bureaucracy" has for most people predominantly negative connotations. Bureaucracy has become synonymous with *red tape*, i.e. overly complex administrative procedures causing undue delay and expense. However, as conceived by Max Weber, the German sociologist, the purpose of bureaucracy is rational, fair and efficient government. Detailed administrative rules and procedures help assure that all citizens are treated equally by public servants. Vague, broad rules would give public servants large amounts of discretion when making decisions about such things as applications for permits or social benefits. Too much discretion would bring with it the risk that public servants would accept bribes in order to reach favorable decisions. Detailed rules help to avoid such corruption. This is also why public servants should have secure and well paid jobs. To promote efficiency, Weber's conception of bureaucracy applies the division of labor principal to public administration. In a nutshell, the positive conception of modern bureaucracy is an efficient organization for faithfully executing the democratic will of the people, as expressed in laws enacted by elected representatives.

So, when discussing ways to reduce bureaucracy (Germans speak of Bürokratieabbau, i.e. "dismantling" bureaucracy) we must be careful to keep in mind that only the pejorative sense of bureaucracy, i.e. red tape, is intended.

As mentioned in the introduction, various proposals are on the table for reducing bureaucracy. One way is deregulation. Deregulation can take several forms, but the most direct is to simply repeal laws and regulations. Typically the intended

effect is to allow persons and, in particular, companies more flexibility in conducting their affairs, by having their behavior be subject to fewer legal restrictions. Although this may be the goal, deregulation may not always have this effect. Fewer sections or paragraphs of legal code do not necessarily mean fewer legal obligations. This is because more general legal principles, such as a general duty of due care, will fill any gaps left by the deleted regulations. Should a dispute arise about whether due care has been exercised, the issue may need to be decided in a court proceeding. Since law suits are typically much more lengthy and expensive than administrative procedures, deregulation itself can cause undue expense and delay, contrary to expectations. And since vague terms and broad legal principals create legal uncertainty, deregulation can create business risks which tend to make industry less willing to invest in innovative goods and services, and thus indirectly stand in the way of reducing unemployment. Finally, even if deregulation succeeds in creating options and opportunities for some interest group, this will usually be to the detriment of the interests, in an equal amount, of some other group. Every obligation on one party usually entails a corresponding benefit or right for some other party. For example, fewer safety regulations reduce costs for companies but subject consumers to greater risks.

Thus, deregulation does not simply reduce costs, but rather shifts costs and risks from one interest group to another. A current example in Germany is the recent elimination of the requirement for a master license in order to become a private contractor in some trades. The political goal is to reduce unemployment by enabling unemployed craftsmen to start their own companies. But this deregulation creates risks for consumers, who now will have more difficulty in determining whether a craftsman has the technical skills required for the job.

Indeed, the shift of rights and obligations from one interest group to another caused by deregulation (just as for regulation in the first place) should cause one to question the real motives behind any initiative to deregulate some industry. For example, the Social Democrat/Green coalition of the German federal government has challenged the motives behind some efforts of the conservative opposition to deregulate certain industries, arguing that the conservatives are using red tape only as an excuse to dismantle hard-won protections for employees, consumers and the environment.

An alternative to deregulation is "better regulation" and "good governance". These are closely related, but not identical. The idea of better regulation is related to New Public Management, which has the goal of applying successful management and organizational principals from the private sector to public administration. Indeed New Public Management uses private enterprise as a metaphor for reorganizing public administration: citizens become "customers" and public programs become "services". The concept of good governance, on the other hand, does not try to project the metaphor of private business onto the public sector. On the contrary, good governance emphasizes unique features of the public sector. It reminds us that the main purpose of government is to protect the public interests and promote the "common good". And it views citizens not as customers,

but rather as the sovereign power of the state. A more appropriate metaphor from private industry would be to view citizens as the "shareholders" of the state, rather than its customers.

3. GOOD GOVERNANCE

What better regulation and good governance have in common is the broad goal of improving the *quality* of governance, rather than focusing narrowly on the *quantity* of regulations. The first step towards improving quality is to clarify the factors, requirements or properties of good governance. Typically, the following factors have been explicated:

- efficient
- transparent
- traceable, auditable
- accessible, available, inclusive
- simple
- participative, consultative
- necessary, appropriate

There is not room to discuss each of these factors in detail, but it should be clear that it will be difficult if not impossible to design a system of governance so as to optimize all of these factors simultaneously. Potentially, they can conflict with one another. Thus, it will be a question of balancing the interests behind these factors. Surely there is a political dimension to this. Thus, in our system of representative democracy, ultimately it will be up to our elected representatives to decide how best to balance these interests.

The idea behind deregulation is still a part of this model. The factors requiring laws and regulations to be "necessary" and "appropriate" can be understood as suggesting that unnecessary or inappropriate laws or regulations should be repealed. But of course political judgment, taking competing interests into consideration, is necessary for deciding whether or not some law fails to meet these conditions.

Governance is currently a hot topic, not only because of problems with bureaucracy or red tape. Several trends are working together to cause a renewed interest in governance [15]. These include:

- The changing role of information and knowledge (c.f. information or knowledge society);
- Changing forms of social organization and cooperation, in particular the trend away from hierarchical organizations towards networks.
- Globalization and the perceived or real loss of power of nation states to international or non-governmental organizations and globally operating companies; and
- Last but not least, the potential of modern information technology.

In the next section, we will discuss some ways information technology might be useful for supporting governance tasks. Since "electronic government" (e-government) is also a topic of current interest, it is important here to distinguish governance from government. Although government and governance are closely related concepts, they are not synonymous. Whereas "government" emphasizes the organization and administration of *public institutions*, such as the legislative, executive and judicial branches of government, "governance" emphasizes the *regulatory, guiding or steering function* of the state, i.e. the directing of society so to protect public interests and achieve, to the extent possible, the common good.[2] All of civil society is involved in governance, not just public institutions, including the press, political parties, non-governmental organizations, political lobbies, special interest groups, and individual citizens. Thus, whereas e-government is about applying information technology to support the work of public institutions, e-governance is about using information technology to support the tasks of all actors participating in the governance of society.
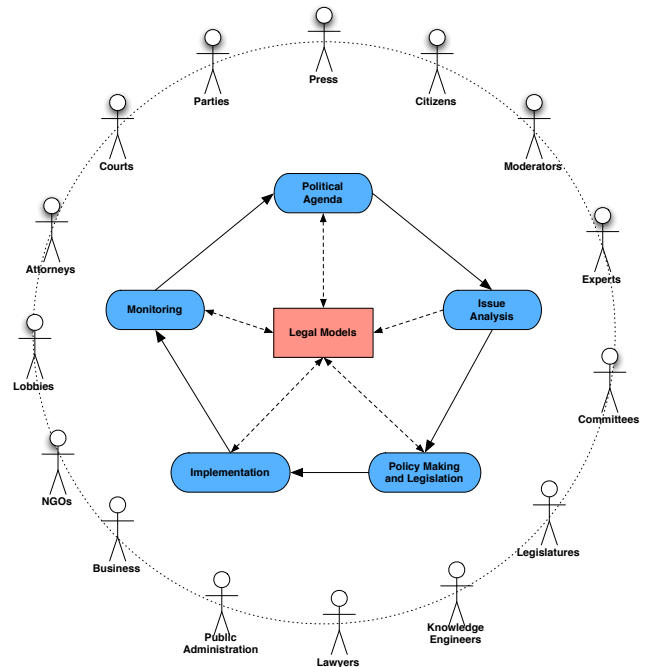

Figure 1: Governance Cycle

As shown in Figure 1, based on a diagram by Macintosh [14], governance can be viewed cybernetically, as kind of control loop. The actors displayed in the outer ring of the diagram are positioned near a phase of the control loop in which they make an important contribution or have a significant role to play. The phases of the control loop in this particular governance model are:

Agenda Setting. The main task here is to order the issues

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[2]In this paper, we are restricting our attention to *public governance*. There is a broader view of governance which covers the steering or guiding of any kind of organization, including private companies.

and problems that have been identified in the monitoring phase. (See below.) Opinions may differ about the priority of issues. Being able to influence the agenda is a significant political power.

Analysis. The goal of analysis is to better understand an issue, including finding, collecting and structuring information about the interests of all stake-holders, proposals for possible solutions, arguments about the advantages and disadvantages of the alternatives and trying to creatively design new, win-win solutions which synthesize the proposals in such a way as to, ideally, satisfy the interests of all stake-holders.

Policy Making and Legislation. In this phase, the executive and legislative branches of government, with the support of their professional staffs and external advisors, create policy and enact legislation, making use of the results of the more public discussion in the analysis phase.

Implementation. Here the task is to put the policy and enacted legislation into practice, by designing and implementing the necessary organizational and technical infrastructure and work processes. The policy and legislation may need to be interpreted and refined at this stage, by developing administrative regulations that clarify and operationalize statutes to the extent they have been left vague, contradictory, ambiguous or otherwise unclear by the legislative body. Included in this phase is the design and implementation of computer software, whether legal knowledge systems or more conventional programs, for supporting the application and use of complex legislation by administrative clerks and other users.

Monitoring. Since people are not omniscient, unforeseen problems do and will arise. The purpose of this phase is to continually check whether the policy, legislation and its implementation are producing the planned results. This requires the collection and analysis of empirical data. Even the goals of the policy may be called into question as a result of this new information. Monitoring can be conducted in various ways. In addition to scientific empirical research, the resolution of legal conflicts in courts of law and critical discourses in the media are a part of this process. The life cycle model of legislation is not intended to be a strict "waterfall" model. The results of a phase may feed back to early phases. For example, during policy creation issues may arise which require further analysis.

4. INFORMATION TECHNOLOGY FOR GOOD GOVERNANCE

Electronic Governance, or e-governance, is nothing more or less than the application of information technology to improve the quality and efficiency of the performance of governance tasks. E-governance is not a particular kind of information technology, but rather a particular application domain for any kind of information technology.

Ideally, the development of e-governance applications should be driven by user requirements, and not so much by an interest in finding applications for innovative technology. In practice, however, the dissemination and marketing efforts of the developers of innovative technology, and the companies who offer products or services based on such technology, will help to create demand, and thus new requirements, by raising awareness of new possibilities to improve the quality of efficiency of work processes.

We will approach e-governance from both ends in this paper. In this section, we take a requirements-driven approach and provide a very brief survey of various kinds of information technology which could be useful in each of the phases of the governance cycle. In the next section, we will take a more technology-driven approach and focus on the potential of legal knowledge systems for improving the quality and efficiency of the implementation phase of governance.

Let us begin with agenda setting. As we have seen, governance is a highly interactive process, involving the participation of many kinds of actors, from both the private and public sectors. Although interaction, communication and collaboration are important in all the phases of the governance cycle, this might be more apparent in phases, such as agenda setting, which involve or should involve open and public political discourse. Under the banner of *e-democracy* or *e-participation* an effort is underway to use email, newsgroups, discussion forums, online surveys and other kinds of communication and collaboration software (groupware), mostly on the Internet, to facilitate and support political discourse. There have been a number of European e-democracy research projects. One of these projects, DEMOS [19, 11], developed and demonstrated an e-participation methodology and technical platform in one of the largest e-democracy experiments of the time, together with the City of Hamburg.[3]

An interesting more recent development involves the publication by individuals of a personal journal on the World Wide Web, so-called *weblogs* or *blogs* [8]. In contrast to e-participation platforms, which are managed on a central server, weblogs provide the foundation for a distributed, decentralized form of political discourse. With weblogs, each author has complete control of the form and content of his or her own publication. Using a technology called RSS, special purpose client software allows readers to aggregated and filter weblogs to create customized channels of information for topics of interest. The editorial task of separating the wheat from the shaft, i.e. to filter out irrelevant, inappropriate or low quality content, can to a certain extent also be done in a collaborative way, by publishing recommendations of other weblogs (c.f. "social filtering"). The growing popularity of Weblogs is politically interesting. Weblogs make it easier for anyone, at least anyone with access to the Internet, to not only consume information, but also to actively contribute to political discourses, on a more equal footing with more organized and powerful interest groups than ever before.

The analysis phase of governance allows involves a great deal of discussion, to brainstorm about possible solutions and to gather and weigh arguments and evidence about the pros and cons of alternative proposals. Thus Internet groupware can be usefully applied in this phase as well. But other kinds

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[3]DEMOS was based on the Zeno system developed by Fraunhofer [9].

of information technology have a role to play as well in this phase. Micro-analytic simulation models can be used to get a better understanding of the probable effects of policy alternatives, for example to estimate the effects of the ecological tax reform in Germany on the distribution of wealth [10]. To better understand relationships between large amounts of data, such as census data, Data Mining techniques can be applied [12]. To make it easier to understand interdependencies among many arguments, not only for lay persons, special purpose software, such as the Araucaria system [20], has been developed to visualize and navigate complex networks of arguments.

Legislative drafting can be supported in a variety of ways. Decision tables have been used to support the drafting of rules in a such a way as to enable their correctness and completeness to be validated [23]. Markup languages, such as the MetaLex application of XML, have been used to make complex relationships between sections of legal code explicit and enable the use of sophisticated, collaborative hypertext systems for helping to browse, review and compare versions of draft legislation [4]. Rule-based systems can be used to simulate the effects of draft legislation on test cases. In 1999, the Dutch Tax Authority published rule-based models of current and draft tax legislation on the World Wide Web, to allow interested citizens to hypothetically test the effect the proposed legislation would have on their tax burden.[4] Groupware has been developed, such as the Document Discourse Environment [22], which can be used to discuss draft legislation online. Two way links between comments and sections of the legislation allow users to easily navigate from a section of the legislation to comments about the section and vice versa. Users can also read and reply to the comments of others, facilitating an open discussion. Finally, technology being developed in the context of the Semantic Web [3], in particular the Ontology Web Language [17], can be used to more systematically define and visualize legal terms and their relationships. The Ontology Web Language is based on description logic [2]. Automatic reasoning systems for description logic have been developed which are able to simplify the definitions of terms without changing their meaning. An interesting research question is whether this technology can be used to simplify legislation, to make it easier to understand and use.

The implementation phase of governance is the focus of e-government, which aims to bring public "services" online, using web portals to create one-stop shops for various life events, such as starting a company or changing residency. Electronic versions of all necessary forms, usually using the Portable Document Format (PDF), are being made available on the web for downloading. Simple kinds of transactions can be completed securely on-line, thanks to modern data encryption methods and digital signatures. More complex transactions, in particular those requiring the application of complex legislation or regulations are usually still processed manually by back-office personnel. However, legal knowledge systems, discussed in more depth in the next section, have the potential to bring these complex, determinative processes online as well.

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[4]http://www.belastingdienst.nl

Finally, we come to the monitoring phase of governance. Sensor and data fusion systems can be used to automatically monitor changes in the environment, such as pollution levels, both to help assure that applicable legal thresholds are being adhered to as well as to gather information useful for determining whether regulations are having their intended impact. Public political discourse serves an essential monitoring function. Thus, groupware applications of the kind discussed previously, for supporting the formation of the political agenda and the gathering and analysis of alternative courses of action, are relevant in this phase as well. To the extend that law suits brought before the courts serve the function of resolving problems with legislation, court proceedings can be considered part of this monitoring phase. Thus, case management systems and other kinds of information technology supporting attorneys and the courts, such as online databases of the full text of precedent cases can be considered as tools facilitating governance. Current research on legal reasoning support systems from the field of Artificial Intelligence and Law, e.g. for finding arguments from models of precedent cases, also needs to be mentioned here.

5. LEGAL KNOWLEDGE SYSTEMS

As illustrated in Figure 1, all phases of the governance cycle make use of legislation and regulations in some way, such as the subject of political debate, as text being drafted or revised, or as applicable law being applied to determine rights and obligations. Most, if not indeed all, governance applications of information technology will require and use one or more *computer models* of the relevant legislation. At the very least, the model will consist of an electronic version of the full text of the legislation. But the full potential of information technology for supporting governance tasks can only be realized on the basis of richer kinds of models. Various kinds of models, at different levels of detail or "granularity" will be required, depending on the task to be supported. In the previous section, we mentioned several kinds of models, such as full text data bases, XML markup, micro-analytic simulation models, and OWL ontologies. No single model will be sufficient for all purposes.

We use the term "legal knowledge systems" broadly, to cover legal applications of information technology based on formal, or semi-formal, models of legislation, regulations and other sources of legal norms, including court decisions. Like e-governance, legal knowledge systems are not a particular kind of information technology, but rather a class of applications of many kinds of information technology, including rule-based systems, case-based reasoning systems, argumentation support systems, neural networks, conceptual retrieval systems and others.

Computer models of legal rules and regulations for helping public agencies to administer complex legislation are nothing new. A large part of IBM's growth in the 1950s was due to the successful adoption and proliferation of large data processing applications for administering taxes and social benefits in the public sector. From the beginning, computer models of legislation have usually been implemented procedurally: applying knowledge of the law and administrative procedures, a step-by-step procedure is designed and then implemented in computer code for guiding clerks through

the process of applying the legislation. The overwhelming majority of software applications for administering legislation are still implemented this way.

Procedural models of the law are expensive to build and maintain as the law changes. Since knowledge about the law is tightly intertwined in the procedural approach with knowledge about how to solve a particular legal or administrative task, it is very difficult to reuse models in different applications of the same law to reduce development and maintenance costs. In the 1970s, interdisciplinary research between lawyers and computer scientists began on ways to model the law and support legal reasoning, based on a deeper understanding of the law and legal processes, which overcomes this problem [5]. An active international research community, going by the name of Artificial Intelligence and Law, was founded and grew in the 1980s. This community, as part of the larger field of Artificial Intelligence (AI), developed methods and technologies for modeling legislation, regulations, and case law and supporting a variety of legal reasoning tasks, using rule-based systems, case-based reasoning systems and other AI methods.

In the mid 1980s, the first prototype legal applications of rule-based systems for public administration began to appear [21]. Initially these were usually called *legal expert systems*, because the focus was on using rule-based systems to model the expertise of legal experts. We prefer the broader term *legal knowledge systems*. It is broader in two ways: 1) it includes the use of all possible sources of legal knowledge, especially original, authoritative legal texts, such as legislation and case law, in addition to the commentary or opinion of legal experts; and 2) it includes all ways of modeling legal knowledge using computers, such as a case-based reasoning methods or so-called neural networks, in addition to rule-based technology.

The advantages of rule-based systems and other declarative approaches for implementing support systems for the public administration of complex legislation and regulations are manifold. Rule-based systems enable the clean separation of the model of the legal domain from task-specific, problem-solving code, making it much easier to maintain and verify the system as the legislation or regulation is amended. This reduces development costs and improves the "time to market", i.e. the time required to get the revised system up and running, making the updated service available to citizens and other "customers" of the public agency. Rule-based system are able to generate clear explanations, with supporting references to the primary legal sources (statutes, cases, etc.), thus improving the transparency, acceptability and traceability of administrative decisions. The conventional way of interacting with users is data driven: all possibly relevant information is collected from the user, by filling out a form, the data is then "processed" procedurally to produce an output and, finally, this output is formatted in a report. The interaction with the user in an legal knowledge system is goal driven: the user asks a question and the system asks for only as much input from the user as required for answering the question. The user retains control of the dialog at all times. The goal can be changed. Previous answers can be modified. The user can ask why a question is being asked. In summary, legal knowledge systems provide

substantial opportunities to improve the correctness, consistency, transparency and efficiency of the assessment of claims, compared to conventional data processing methods.

The Australian government recently published a report on best practices for the development and operation of expert systems by public administration [1]. The report analyses advantages and disadvantages of this technology in much greater depth than we have space for here. It also presents the results of an impressive survey showing the depth and range of current and planned applications of legal expert systems by public agencies in Australia.

The first production applications of rule-based systems for public administration began to appear in the late 1980s and early 90s. The Australian company SoftLaw, for example, was founded in 1989.[5] One of SoftLaw's first production applications was a rule-based system for the Australian Department of Veteran's Affairs, to help administer the entitlements of veterans to pensions and other benefits. An independent audit of the agency's performance had shown that decisions were often highly inconsistent, lacked adequate grounds or justification or incorrectly calculated entitlements. These quality issues were the primary motivation to reform the process using rule-based systems. In addition to resolving these quality problems, SoftLaw claims the use of rule-based systems led to an 80% productivity increase.

In the United Kingdom, a rule-based system, Assert, has been developed using SoftLaw's technology, in a project with Northgate Information Systems, to help low income citizens to assess their entitlement to a range of housing benefits from several different government social programs. Nearly 700 pages of legislation have been modeled in a knowledge base consisting of about 7,000 rules. The interesting thing about this project, besides demonstrating the practicality of modeling complex legislation, is the way it provides a completely new kind of service to citizens, providing a "one-stop" access point to claim services for a variety of separate financial support programs.

In Germany, legal knowledge systems are not yet in widespread use in public administration. According to a recent BITKOM study, about two-thirds of all online government services are nothing more than portals to information, documents and forms. According to Bernhard Rohleder, the director of BITKOM:

> Das reicht aber nicht aus. Bürger und Wirtschaft müssen die wichtigsten Vorgänge direkt online erlidigen können. (But this is not enough. Citizens and business need to be able to take care of the most important transactions online, directly.)

As a first step, together with the College for Public Administration of North-Rhein Westphalia (Fachhochschüle für öffentliche Verwaltung Nordrhein-Westfalen), we recently conducted a feasibility study with the County of Herford, in North-Rhein Westphalia [7]. In the course of the study

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[5]http://www.softlaw.com.au

we performed an empirical investigation of the work processes of clerks responsible for administering the collection of financial support for elderly persons from near relatives obligated by German law to provide such support. In addition to interviews and a survey, the study included an empirical evaluation of the ability of clerks to correctly apply the relevant laws, regulations and court decisions to determine the existence and amount of support obligations. Although the clerks were all well trained and had several years of experience performing this task, and despite being able to answer the test questions at their own pace under ordinary working conditions, about 26% of the answers were deemed legally indefensible in an independent evaluation by two legal experts, a professor at the College for Public Administration and a former family law judge and active attorney who gives courses and seminars on this subject. Using Soft-Law STATUTE Expert, we build a small demonstrator of a legal knowledge system, consisting of about 200 rules, which was sufficient for answering the test questions correctly. We do not claim that the model of this demonstrator is complete or even correct. Its purpose was only to help illustrate the potential of legal knowledge systems using realistic examples. Together with the County of Herford and our other partners in the feasibility study, we are in the processing of planning a successor project, with the goal of developing, deploying and evaluating a full-scale application.

6. CONCLUSION

Let us return to the little puzzle we used to open this paper, about the relative simplicity of typewriters and personal computers. On the one hand, obviously typewriters are a simpler, more primitive technology than computers. But if we step back and take a more holistic view, a complete assessment of simplicity requires us to consider many other factors, including such things as production, maintenance and administration costs, the amount of education and training required to use such tools, the impact of these tools on the quality, efficiency and productivity of work processes, ease-of-use, and the ability to release creative potential for new products or services.

To simplify interactions of citizens and business with public administration, to reduce red tape, to lower bureaucracy costs for business, free up resources which can lead to investments, economic growth and greater employment and improve the transparency, acceptance and legitimacy of government, it will be necessary to modernize and strengthen government. What is needed is not deregulation or the dismantling of government (c.f. Bürokratieabbau), but rather significant investments to modernize the organization and technological infrastructure of government and public administration.

From an internal perspective, the resulting system of public administration may be much more complex and advanced than it is today. But from the external perspective of citizens and business, a renovated government would be much simpler and cheaper to access, understand and use.

As the case studies in Australia and the United Kingdom convincingly demonstrate, legal knowledge systems have enormous potential for improving the accessibility, simplicity, transparency and efficiency of determinative government transactions, especially for the administration of large tax or social benefits programs.

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