POWER to the E-Government

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Abstract. *The E-government framework presented in this article gives handles to govern the relations of governments with all actors in its network. Reflection on this framework clarifies that communication between governments and their stakeholders distinguish traditional governments from E-Governments. A key factor in the success of E-Governments is transparency of its body of knowledge. The POWER program aims at providing such a transparent knowledge corpus. The POWER program can consequently contribute to the transformation of governments to E-Governments.*

1. Introduction

Rules and regulations are needed to be able to live together in today's complex society. Society has delegated this responsibility to governments (and their executive bodies) which makes governments the binding element of society. Legislation and the execution thereof present governments the means to

communicate and execute these rules. There are different ways to ensure that constituents will live by these rules. One way of dealing with this is the use of repression, which can be very effective. Nevertheless, repression is a very inefficient and costly way to ensure compliance with the rules presented. Therefore governments search for a different manner in which they can achieve the same goal. Instead of searching for means to force compliance they seek societal support. This quest for support reflects a general change in attitude. In our society relationships based on power are much less accepted than they once were. Overall people ask to be convinced that certain rules and regulations are indeed necessary and useful to live by. More in general our democracy is founded upon the citizens' *trust* that governments follow rules (legislation) that are in the best interest of society as a whole. This trust depends strongly on the quality and effectiveness of legislation and the related services governments provide. Thus the way to earn and keep this trust is to know at all time the kind of services required and to provide a continually high standard of quality of these services. E-government is presented as a means to realize just this goal.

E-government is a different form of communication between a government and its environment. The government's primary task is law enforcement. The services provided by the government are in line with this primary task. Both legislation and the governments' policy are influenced by politics. But pressure groups like consumer organizations and trade unions try to influence the government as well. They can use different channels to try to influence the government: directly (e.g. in regular meetings with governmental representatives) or via political channels (e.g. lobbying in political circles or speaking to members of parliament). Furthermore the government communicates with its clients. These clients are subject to law enforcement and may want to influence the government. They may do this via their representatives in parliament or via their representing pressure groups. As individual their influence is often limited to operational issues directly related to their case.

The government thus has many channels in which it communicates with its environment (see figure 1.). The way the government and its stakeholders communicate will change due to ICT-innovations. These innovations do not only alter existing channels but will, as we will show, also have great impact on the government's processes as well. In this article we will argue that to make effective use of ICT-innovations the government has to redesign their processes.

As we see it, the problem with many concepts that describe e-government is that they are fragmentary. This way the channels for e-government are isolated and not put in perspective of the uniqueness and the scope of governments' role. We felt the need to develop a framework in which all the different concepts (such as E-Voting, E-Democracy, government on-line etc.) can be put in perspective and

connected to society's actors and their relationships with governments. Moreover, such a framework will also provide a guide for discussions about the different concepts and the way they might influence each other and whether or not the existing concepts cover all necessary aspects of the relationships governments have with society. That discussion might eventually culminate in a true e-government strategy. In this article we will limit ourselves to certain aspects of this E-Government strategy.

The presentation of the framework is a very important first step but it provides us only with a description of the channels that can transport e-government services. To get a full understanding of what E-Government means we need to look one level deeper at the legislation that forms the basis of the services provided via E-Government (i.e. communication) channels. As mentioned before for a well ordered society, effective services are a prerequisite. These effective services start with effective legislation. In order for legislation to be effective it needs to be accessible for all constituents and transparent since that will give citizens the possibilities to verify the rationale behind it and behave concordant to it. Improving legislation's accessibility and transparency is exactly what the POWER program (Program for an Ontology-based Working Environment for Rules and regulations), run in the DTCA (Dutch Tax and Customs Administration), is aiming at. (Van Engers and Glassée, 2001)

2. The E-Government Framework

Many authors in the E-Government field have a dominating technical focus on the phenomenon government. Anttiroiko mentions that technological innovation was one of the main reasons behind the European Union efforts with respect to E-Democracy (Anttiroiko, 2001). But although technological improvements may have their own merits, governments will only become effective if technological innovations are balanced with and integrated in the governments working processes.

A framework in which the interaction between the government and the other actors in society are represented may help to shed light on contributions of the separate e-government strategies. In our E-Government framework (see Figure 1.) we depict the different processes, communication channels and actors that are the stakeholders of E-governmental organizations. After a description of the channels and actors and the way these interact we can position the different approaches to e-government in the framework.

The whole network interacting together is instrumental in the governing of society. The Governments legislative power is the distinguishing feature within the framework and the binding factor in society.

In modern democracies constituents choose the political government. In politics the outlines for governmental policy are formulated. These outlines are translated to legislation and consecutively to policy for execution of this legislation. This enforcement creates the terms for society to function. The E-Democracy and E-Politics discussions merely deal with the relationships between the government's clients (constituents) and politics. The notion of pressure groups remains understated in these discussions.

As stated before nowadays governments rely on the citizens' trust to be effective. This asks for transparency of legislation and policy. Furthermore the quality of the democratic process depends on transparency as well.

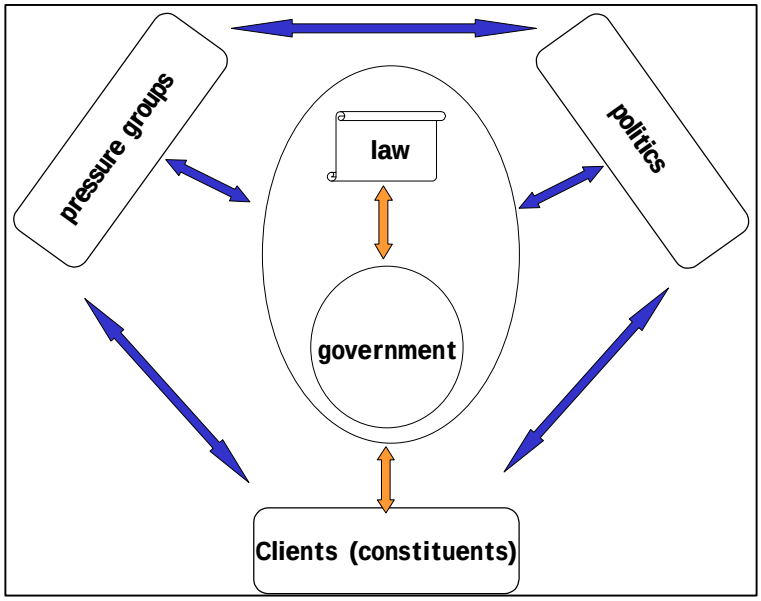

Figure 1: The E-Government framework.

The challenge for modern governments is to meet the demands for improved transparency. Transformation of governments to E-governments provides us with a whole set of means to achieve this goal.

3. Transforming the government

The introduction of ICT in today's governments will have impact on the relationships between the different stakeholders and the governments. Within the E-government literature ICT is seen as a means to:

- Improve the effectiveness and efficiency of democracy (Watson et al. 1999)
- Increase the convenience and timelines of citizen/government interaction and reduce their costs (Watson and Mundy, 2001)

- Stimulate the information society (Anttiroiko, 2001)
- Provide a deeper level of transparency to activities that had been either partially or completely opaque (Zuboff, 1988)
- Etc.

The challenge governments have to meet is how to redesign their processes in such way that citizens can benefit optimally from the knowledge-corpus possessed by the governments. The Dutch Tax and Customs Administrations started the POWER program (Program for an Ontology-based Working Environment for Regulations and legislation) to optimize the transparency and accessibility of this knowledge corpus. In POWER two important knowledge management approaches, the stock approach and the flow approach are combined. According to the stock approach we should aim at storing information in systems (knowledge systems) and databases. According to the flow approach actors involved in the transfer or dissemination process of knowledge add subjective value and therefore we should pay attention to these processes and pay specific attention to communication and the stakeholders' involvement. In the POWER program these processes receive a lot of attention.

4. POWER in the E-Government Framework

Governments have a specific role in society. Its institutional and distinguishing task is the creation and execution of bodies of law. With this legislation and the interpretation needed for law enforcement, governments possess a great body of knowledge. Society expects more and more that the knowledge governmental organizations possess becomes available to the citizens instead of governmental organizations merely being responsible for law enforcement. This opinion has impact on the knowledge infrastructure of governmental organizations. POWER supports the chain of processes from legislation drafting to implementation (including law enforcement and the development of information systems that enable this enforcement). The method developed within this program has objectives such as:

- Improving the quality of legislation;
- Enhancing the knowability of legislation;
- Improving the transparency of legislation and its interpretation;
- Shorten time-to-market of legislation;
- Provide E-Services.

In POWER we aim at achieving these objectives by translating legislation into formal specifications that are suited for systems development. During this

translation process intermediate models are developed and verified with experts to make sure that they are still in accordance with the meaning of the legislation drafters.

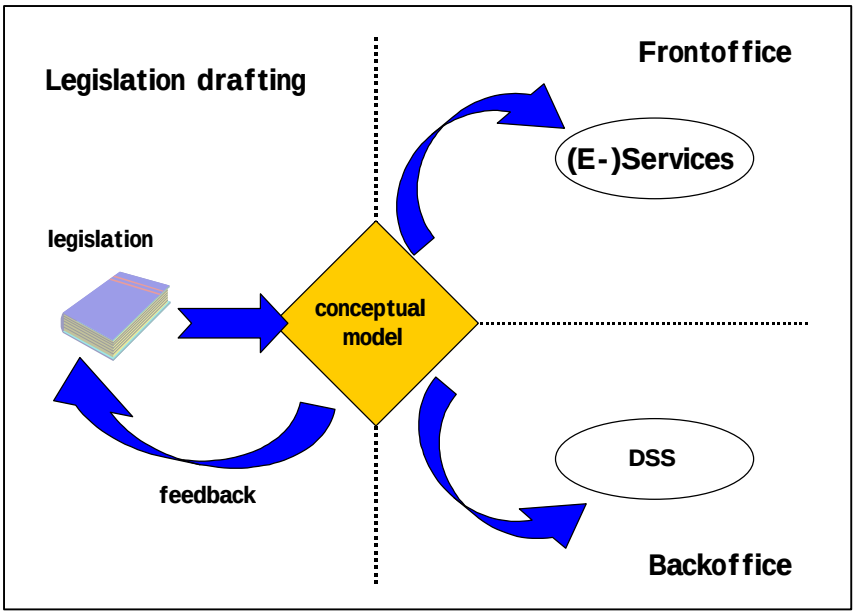

Figure 2: POWER and legislation drafting, front and back-office of governments

The POWER program has currently run for about two years and will probably run until ultimo 2003. We have developed and tested many of the methods and tools that we planned to yet. In this article we will elaborate on the organizational issues concerning the POWER program related to E-Government.

5. The POWER-method[1]

Central in the POWER program is the development of a method based on conceptual modeling of legislation and regulations into formal specifications. This method should provide us with representations of legislation that computers can reason with. A set of coherent specifications can be delivered as a '*knowledge component*'. A component is defined as a coherent package of software artifacts that can be independently developed and delivered as a unit and that defines interfaces by which it can be composed with other components to provide and use services (D'Souza, 1999). Conceptual models, combined with task models, can be used for example in:

[1] For a detailed description of the POWER program we refer to an article in IEEE Intelligent Systems (January/February 2001) "Facilitating the Legislation Process Using a Shared Conceptual Model", Van Engers, Glassée.

- Anomaly detection:

  The conceptual models can be verified with a knowledge verification tool developed in the POWER program.

- Simulation of legislation effects:

  By using the knowledge components on appropriate data, the consequences of legislation and regulations can be simulated. The simulation can be performed on a micro, meso or macro level (i.e. for individuals, groups (social, ethnic, etc.) and the entire constituency).

- Data modeling:

  The data necessary to apply these knowledge components (for example income, household-situation, etc.) can be derived from the conceptual models of legislation and regulations. This information inventory describes the minimal information that must be inquired, retrieved or derived to be able to enforce the law.

- Specification (of knowledge-based systems):

  Knowledge-based systems can support the application of legislation and regulations to specific cases. The knowledge components contain the reasoning necessary in the enforcement organizations' operations. These knowledge components form the core of such knowledge-based systems. Other components are data storage, data access, graphical user interface, security, workflow etc.

  Software that supports complex reasoning tasks like the calculation of the income tax due and the assessment of pension letters in order to detect if any norms are violated, are examples of this type of application.

Although the POWER method translates legislation into formal specifications, knowledge elicitation of experts is performed as well. The knowledge elicitation occurs at a systematically chosen time and serves to complete and validate the models. The POWER approach is typical for the knowledge-engineering approach of knowledge management. The knowledge that is reflected in the legislation and the knowledge that we elicit with the experts is captured in a model. This knowledge corpus is used to improve the quality of the knowledge itself, and disseminated for further use.

The POWER process at an overview level consists of a number of iterative sub-processes:

1. translation of legislation and regulations in conceptual models, including completion of the models by elicitation of expert knowledge;

2. refactoring of conceptual models into coherent conceptual models
3. verification of conceptual models, including the detection of incompleteness and identification of missing legislation and regulations
4. generating knowledge based components for application frameworks, creating knowledge based systems that can be delivered for implementing law enforcement
5. testing and validating knowledge components, including the involvement of experts for certification of the knowledge components

The order of the sub-processes may depend on the route chosen by specific legal drafting or law enforcement implementation projects. Whatever the route chosen, eventually, the legislation, conceptual models and knowledge components will establish traceable refinement relationships.

In this article we will skip the technical details of the method (see Van Engers and Glassée, 2001).

6. POWER and the flow of knowledge

As stated before the POWER program combines both the stock and the flow approach of knowledge management. Exemplary for the flow approach in the POWER method is the role of experts in validating the models, which is a crucial one. This step in the process is very important in bridging the gap between the natural language of the legislation and the formal specifications with which computers can reason. Domain experts do not have to the translation themselves they are supported by knowledge engineers. We found that the experts and knowledge engineers co-operating in this modeling process results in improved quality of legislation. Furthermore the shared conceptual models that are created in this process help to decrease implementation of legislation. These experts know what the interpretation of these legal texts is that the drafters aimed for. Thus this validation process is instrumental in detecting anomalies in the legislation and therefore an essential step in developing tools to support the correct execution of legislation.

This expertise knowledge of the legal experts, organized in so-called knowledge groups, is very scarce. Therefore it is of the utmost importance that effective use is made of their knowledge (and thus of their time). The aim of the POWER method is to use their expertise when eliciting the underlying knowledge of legislation (and the applicable case law) and to represent it in such a way that it becomes (and stays) available in knowledge modules. These modules can be used in different kinds of applications. These applications may support different

types of users, citizens and the governments' employees, and can be used for knowledge dissemination.

7. Distribution and the Framework

After the step of making the expert knowledge available in the knowledge modules, it can be used in many different kinds of applications, as stated before. Besides this very important step of elicitation the POWER method is also special because of its attention for tractability. This means that in the POWER method references to the original legal sources (legislation, case law, governments' policy notes etc.) are always preserved very precisely in the models. Since all of the applications use the same knowledge modules these applications will always be consistent with the legal sources it originated from. When applying this principle to the distribution of the government's knowledge corpus via the different channels for E-Government the advantages are manifold. The knowledge corpus is made available ones but can be used almost endlessly when adjusted for the communication with the other actors in the framework, through the different channels.

8. Impact for E-Government

The aforementioned benefits of the POWER method also have their repercussions for E-Government. Firstly applying the POWER method makes legislation and regulations transparent. Transparent in this context means that they are represented in such a way that they are understandable for all actors in the framework. This transparency facilitates the discussion with pressure groups and constituents.

Secondly POWER keeps track of the sources of legislation and regulations. Thus the normative basis for the government's actions (the legislation source) is always accessible to all actors in the framework. This way the other actors can always trace governmental actions back to the original legal. Thus POWER can contribute to the trust in government's actions. The enhanced trust as mentioned before, is also very important for the government's relationships with the other actors and the acceptance of governmental actions.

A third consequence of the POWER method for E-Government has to do with the involvement of knowledge groups. As mentioned before the role of the knowledge groups in the POWER method is crucial. One aspect of their involvement within the POWER-method is that their input is asked much earlier in the processes than before the POWER method was applied. When this early involvement can be applied so that the results are almost instantly available for citizens and pressure groups they will be able to directly influence the legislative

process. This way they can directly influence the outcome of this process and thus citizen participation (E-Democracy) is given shape. In the future also external knowledge groups (experts) could be consulted (e.g. representatives of different pressure groups).

The last important consequence of POWER for E-Government is its contribution to the reduction of the time to market of E-Services related to law enforcement.

9. Impact of (E-) POWER on E-Business

The differences between governments and businesses should not be overrated. Governments may draft and execute legislation and therefore perform a unique binding role as said earlier. Businesses on the other hand formulate their own (formal) business rules, which are sometimes derived from legislation. In the case of insurance companies one can think of the policies for their different types of insurance. Consequences of inconsistencies and other anomalies in business policies have great consequences, as do anomalies in legislation. Not only the rules of governments and businesses show many resemblances but the way in which they interact with their relations in their network do as well. The ways in which their clients try to influence the rules businesses set may be different but they exist. Analogue to this consideration the channels for businesses are very much like the governmental channels. And for them the effective use of these channels may even be of more importance because of one main difference between businesses and governments. The clients of the government cannot patron a different government, but they can vote for one. When a business does not perform well it will lose clients.

The form in which legal sources and business policy are described may differ and consequently the translation process may have to be adapted as well. Nevertheless the formal models and the modeling supporting tools are likely to be suitable for application in the commercial sector as well as in the public sector. In the E-POWER project (European dimension of POWER in a European Commission supported innovation program) we will test the method and tools in both environments.

The experiences in the POWER program thus far are promising. The approach seems to offer governments means to quickly provide the services needed to be effective. The transparency that results from this approach could very well be the key to success for further development of the E-Government framework.

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