Paving the Way for a Transformational Public Administration

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Abstract. Transformational government as a newborn scientific field seeks for implementation through integration of its components. As a contribution to this end this work impresses a Public Administration's operation ontology modeling and an algorithm for tracing malfunctions and changing the case. PA is considered as a production unit and any administrative act as the output of its processes. This output creates effects and consequences which are to be met stakeholders' goals in order to balance socioeconomic problems.

Keywords: Transformational government, PA ontology modeling, Service transformation algorithm, stakeholder goals.

1   Transforming Government

Transformational Government (t-gov) uses technology to improve public service provision, just like e-government does. However it goes beyond the use of technology; it is more oriented to managerial aspects. It focuses on new governance and organizational structures, the redesign of business processes, and the creation of a facilitating infrastructure that is flexible enough to support these changes at low cost [1].

The ultimate aim is to make a government demand driven as of stakeholders needs, accountable and transparent, innovative, efficient and effective, agile and flexible, providing multi channel services, automating back office operations such that more resources can be released to deliver 'frontline' services [2].

Transforming government has to do with the consistent improvement of processes, meaning the automation of some tasks, the removal of the redundant ones and the creation of new, simpler ones. This is a continuous and iterative process bearing certain restrictions due to the nature of PA and its operational needs. As such, research directions require investigating the change process and resulting structures.

Transformational Government Annual Report identifies three distinctive themes integral to t-Government [3]. These include, Customer-Centric Services; Shared Services and Professionalism (leadership, social entrepreneurship, performance driven management). Most of them are e-government challenges too. The new is the need of

governments to have radical changes in core processes across their organizational boundaries or beyond the traditional organizational borders to cross-organizational business processes to realize t-government [4]. This may requires new governance structures.

Decision makers in Government will need models of Governance that fulfil transformational objectives. Modelling is an essential ingredient of most transformation processes, as it aims at abstracting from reality only its essential and relevant elements [5, 6].

2   Modeling Public Administration's Operation

Public Administration (PA) aims at achieving goals like development, prosperity, equity, transparency, justice, freedom, democracy. To achieve these goals PA provides certain *services*. In order to provide services PA issues administrative acts. The issuing of acts is the core activity of PA; it is always a State activity and concerns e-government.

In modeling PA an approach through ontology was adopted. This model addresses the operation of PA at a top level reusable mode. The ontology of Greek PA procedures [7], represents which types of *documents* are produced by which PA *units* and how these documents *flow* among these units. The ontology consists of two parts. The first part represents, in OWL, the Greek PA *structure* (i.e. administrative units and their hierarchical relationships) and *documents*, which are either used by these units as a legal framework or they are produced by them. Thus, documents are further divided in Judicial/legislative and Administrative/citizen. In the second part, the *procedures* are represented in OWL-S service models. The ontology is updated continuously as new laws, administrative regulations and procedures are issued.

On the "structural aspect" of the ontology, all agents (actors) of the administrative universe of discourse are included, namely the three independent authorities (judicial, administrative and legislative), as well as citizens and businesses. In this work we consider in detail only the structure of the administrative authority. Moreover, the PA document type hierarchy is distinguished in four major classes:

Administrative documents, i.e. documents produced by PA, which can be either *informative*, i.e. they do not have actual impact on the real world but they just inform a citizen or an administrative unit about something, or *acts*, i.e. the decisions have an impact for citizens or business (e.g. an approval for funding). Administrative documents also play the role of *products* of PA procedures.

The PA procedures ontology is represented as an extension to OWL-S (Fig. 1). The key concepts of the ontology are procedures, full procedures, and tasks. Full procedures (or total procedures, as called later in the revised ontology) are composed by one or more procedures and procedures are composed by one or more tasks. Every procedure (and task) has a name which declares or indicates its objectives. The language used to depict this objective might not be strictly administrative. Thus, each procedure has a name, title and a short description providing the possibility to citizens and inexperienced civil servants to understand its aim. The title of an administrative act is used as a title for the procedure that produces this act.
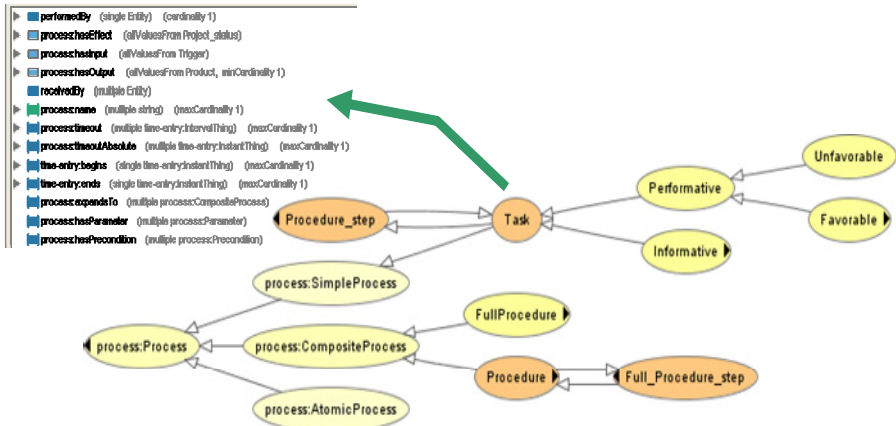
Fig. 1. The public administration procedure ontology as an extension of OWL-S

Tasks are atomic activities that cannot be further cut down to smaller ones, performed by a single administration unit. Every task has as input any kind of text, namely administrative, legal, etc. The output of the task is the document that it produces.

Procedure is defined as each integrated part (or step) of a *full procedure* (service).

In this work PA procedures whose products address to the organization's external environment are regarded. This environment includes citizens/businesses, other public organizations and public servants acting as citizens.
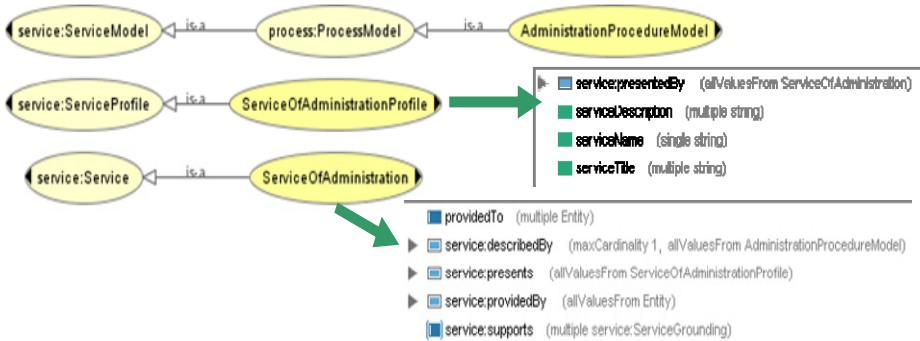

Fig. 2. Specializations of OWL-S Service, Service Profile and Service Model

Full procedure is defined as a number of procedures intertwined. A full procedure may reflect to the provision of a service to one or several entities (property *providedTo*). Fig. 2 shows the specializations of the OWL-S service, service profile and service process model classes. Procedures may be sequential or in an acyclic graph. In this ontology, the control constructs of OWL-S are adopted. Some examples of procedures that can be represented using this ontology are:

- Hierarchical control that is anticipated by a law.
- Hierarchical control that is performed due to objections/appeals.
- Communication between public organizations due to joint responsibilities for the expression of agreement in order for a project to accomplish.
- Sequential procedures that lead to the provision of a service.

2.1   Extensions / Adaptations of the Generic Object / Process Models

The initial generic PA procedures modeling ontology of [7] did not always cover all use cases. Therefore, some (but not many) adaptations have been performed to this generic modeling framework. These adaptations were general enough, in order to be applicable to the use cases already developed using the generic framework.(e.g. The human resource management use case).

A significant development in the (revised) generic object/process model is the modeling of the performative task. More specifically, the new ontology contains two types of administrative documents that harmonize with the products' role produced by the performative procedure found in Public Administration: [8]

Act: It includes all the acts that can be produced by the Public Administration's procedures.

Announcement of Act: It includes only the acts that are announcements of decisions either to another PA unit or to individuals. Announcements, although sound like informative tasks only, because they just deliver information to the interested parties, we consider them as performatives, because according to the Greek Law, the enforcement of an act begins only after its announcement; therefore, the announcement of an act has effects on the real world (fig. 3).
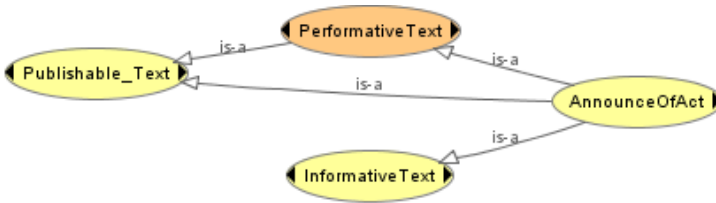

Fig. 3. The document (product) types involved in the Public Administration

In the revised PA procedure modeling framework, every task that produces an act or an announcement of act is considered to be a performative task. The rest of the tasks are considered as informative ones. Thus, a *procedure* consists of:

- One or more informative tasks
- Exactly one performative task (Act or Announce of Act)

A *total procedure* consists of at least one or more (simpler) procedures; therefore, a total procedure is usually composed of:

- One or more informative tasks,
- One or more performative tasks, one for each (simple) procedure,
- One announcement of act, usually in the last (simple) procedure of the process.

Note that a task is considered performative for a PA unit only when the act is carried out by this public organization. That means that the same task could be performative for one PA unit and informative for another depending on the point of view.

3   Performance Driven Management of PA

Performance Measurement is a process that uses and produces information about performance. The use of this information is what is called performance management. Performance measurement is an organizational process that yields performance information. Boucaert and Peters [9] consider performance information truly important for the internal management of an organization. Yet, performance measurement goes beyond public sector reform. It is found in recurring activities in public management and public policy [10]. Performance measurement is based on indicators and concepts of effectiveness and efficiency.

To assess the transformational needs of the whole of a PO's operation and every single process, one can start from the effectiveness part. Effectiveness is the measure of achieving goals that are not necessary financial. They could be goals regarding democracy, equality, etc. and in contemporary theories they should reflect stakeholders' needs.

Step 1. *The effectiveness part.* The ratios of output over effect (Output/Effect) and effect over consequence (Effect/Consequence) are the two effectiveness measures.

(i) **Effect/Consequence**. The ideal situation is to identify consequences of the administrative action with goals/objectives as set by politicians. These objectives are measurable interpretations of the abstract goals of the stakeholders. Effect is the service. The ratio is expressed as actual over prospective, meaning that the service achieves or not the goal that the government and the politicians had set. A problem with this ratio reflects for example policy objectives setting and law making problems.

(ii) **Output/Effect.** This is act/service. It refers to the number of the acts that actually provide the requested service (note that service is also the denial of a request). It concerns number of acts that are invalid due to objections or appeals, number of acts that provide service to persons that are not entitled for that and number of acts that provide the service to people who are beneficiaries of a better similar service. Such problems call for changes to the quality of acts (structural and typical matters, matters of interpretation of the legal framework and discretion margins of public servants, matters of dissemination of information.)

Step 2. *The efficiency part.* The ratio of input over output (Input/ Output) expresses the measure of efficiency. Acts as outputs need three types of inputs: information, communication and expression as resources. All three are tested versus two variables, time and cost.

3.1   An Application Profile

A metadata application profile for keeping information for the overall and sectional performance of a public organization or service was created. The application profile follows the rationale for the operation of PA, which is already organized in the ontology mentioned, while is formulated by elements and sub-elements existing in international and national well established standards. Some of the variables taken under consideration for this application profile are mentioned below:

(Objections + Appeals) sustained, Time for composing an act, Time for issuing an act, Time for Information provided to potential users of the service in addition to what already provided by laws, sites etc., Time for Additional information asked after submitting the application and the documents, Information which other POs provide for the issuing of the act (in relation to law preconditions, law-article-paragraph), Waiting time for this Information, Positive acts/decisions, Information asked by citizens/businesses (in relation to law preconditions), Negative acts/decisions, Waiting time for Information asked by citizen and businesses.

In addition many other variables were used to lead to the exact definition of the problem and the suggestion of the suitable service. For example there were used: Objections sustained for typical or non typical reasons, type of communication, cost of communications, number of phone calls, cost of connection, use of e mails, cost of personnel, number of employees, wages, person hours for seeking for legal framework, person hours for interpreting legal framework, number of phone calls asking information about the service, number of applications for the service, number of applications redirected to the suitable PO, kind of data stored - kind of information asked - information asked by citizens and given by a PO in relation to law preconditions etc.

3.2   PASTA

In order to improve PA's performance an algorithm named PASTA (Public Administration Service Transformation Algorithm) is proposed [11]. This algorithm is a useful tool for decision making in PA. It provides a necessary solution in identifying malfunctions and proposing services to remedy public service failings. Furthermore, the use of PASTA increases the accuracy of the final specifications of functional requirements of e-government systems that should be introduced. It defines the services that are required and what is required from each service. It primarily addresses the conceptual level creating all the necessary plug-ins for the contextual and the logical level according to the Integrated Architecture Framework (IAF) proposed by CapGemini [12]. The conceptual level addresses the "what" aspect of architectural design. This algorithm extends and validates a stepwise approach that was proposed in [13].

In formulating PASTA three main initial assumptions were made:

- Objectives set by politicians are qualitatively related to consequences
- Setting of Thresholds has been done correctly. If not, PASTA can make suggestions using percentages or probabilities.

- There has been, in advance, a setting of accepted limits in consequences, effects, outputs, inputs. In that sense, production of more acts, effects and consequences than predicted is not a problem, since they are achieved by the scheduled inputs. This is simply a best practice and a motive to executives to rethink efficiency matters.

The PASTA rationale is explained further in [11]. Another critical issue is the one of the spotting of redundant tasks. This is made possible through the connection of the information asked (law prerequisite) from a PO or a citizen/business with laws number - article number – paragraph number. If there is the same reference to two different information sources then duplication might occur.

PASTA's service proposals/suggestions were validated against PA experts' suggestions and the resulting proposals of a big Greek project studying the reorganization of certain PA's processes/ services. The validation proved that PASTA is capable of being used in service reorganization projects by utilizing it to suggest very useful services and override experts' proposals. It can also provide suggestions on effectiveness, which are seldom provided by other methodologies, and hardly ever by experts.

4   Related Work

Related work concerns various aspects of the problem we address, namely use of semantic web technologies, like metadata, ontologies, web services, etc., for e-government and PA knowledge, performance measurement and algorithms. PA ontology modeling is a fast evolving field as ontologies are considered critical knowledge infrastructure to address semantic interoperability problems. They provide the necessary basis for further development of SW and SWS eGovernment applications. Due to the fast development of SW and SWS technologies and the research interest in applying such technologies in PA, we expect to see in the next few years a substantial growth on demand for reusable and scalable PA domain models and ontologies.

Currently there are several research efforts that try to address interoperability/integration issues in eGovernment in all three EIF dimensions. The UK e-GIF (e-Government Interoperability Framework) [14] model focuses on 4 perspectives: interconnectivity, data integration, e-services access, and content management. In [15–17] a survey of existing e-Government interoperability initiatives and enterprise architectures in the EU and USA is presented. In [18] a classification of semantic conflicts in database systems is given. Park and Ram in [19] also give a description of semantic interoperability conflicts regardless of the application domain, while in [20] the resolution of these conflicts is proposed using an ontology. The Semantic Interoperability Community of Practice (SICoP) [21] has identified the semantic conflict types in information systems and has recognized the importance of Semantic Web (SW) technologies in this area. In [22], model-driven initiatives and efforts to achieve eGovernment interoperability are reviewed and compared.

In the context of the research regarding the performance of an organization Gartner proposed the Gartner's Government Performance Framework (GPF) [23] as a tool to

assess the value IT can add in a public sector context. GPF groups activities for a public sector organization in three layers [24], Political Management, Service Supply Management and Support Services. The overall perspective has not been focused to provide a top level domain model for the governance system, and this becomes apparent by the way these layers are further decomposed into Aggregates and further more into Primes. Furthermore the Gartner framework does not focus on certain aspects of PA's operation like the back office operations.

5   Stakeholders' Needs (Extensions and Future Work)

In [25], PA's stakeholders were identified and their strategic relationships in the socioeconomic environment, national and supranational were defined. Stakeholders were defined on both sides of public service provision, supply and demand.

The demand side includes citizens (also as employees) and businesses. Judicial power (administrative courts) and Legislative power can also be classified here. Parliament receives PA services in law making process and it is interested in the application of the laws it provides. Courts are control mechanisms regarding public service provision. They are interested in the application of their decisions concerning administrative acts and they support administrative processes providing jurisprudence.

The supply side includes the indivisible of governance. Government national and supranational (EU case). When we are referring to a certain service though, final provision is being made from one Public Organization (PO). The demand side then might includes other POs too.

Especially for the case study of the Greek PA a first set of stakeholder requirements has been presented. In this case, stakeholders are not only national but supranational as well, as Greece is part of the E.U. Stakeholders belong to the direct and the indirect environment of PA and have been defined as: Government, the EU, citizens/businesses, public organizations, public servants, the Law courts and country's Parliament.

To incorporate stakeholders' goals/needs to the whole of a PO's function and every single process, one can start from the effectiveness part, as mentioned above in the performance driven management section.

The above PA ontology is supplemented by goal taxonomy. The taxonomy is not yet fully fledged. It provides goal decomposition based on technology and administrative resources.

6   Discussion and Conclusions

This paper constitutes an overview of the authors' efforts for modeling and transforming PA's operation.

At first a methodological approach to the ontology modeling of PA is presented. It follows a certain rationale of its operation and regards administrative act as the output of every non material service provided by the PA. There are many efforts for

modeling PA's operations using ontologies. This certain approach is differentiated as to the use of administrative act as the core object.

Performance measurement is a research field with mass production of efforts over the last decades. The work presented here follows the rationale of an input-output model which results from a "Flemish perspective" expressed by van Dooren's work [10], which in turn was based on Pollitt and Bouckaert [26]. Based on this input output model administrative act is set as output, service as effect, and as consequence of an administrative operation, the long term effect of which is going to be aligned with the aggregation of goals of the stakeholders as set by politicians.

GFP is the most widespread framework for assessing performance in PA. Our approach considers PA as a production unit and uses an algorithm to trace malfunctions and suggest remedies.

In order to exploit the whole benefit of the proposed method the existence of technological infrastructures is a fundamental prerequisite. At this certain moment the Greek PA is under a strong reformative initiative (Kallikratis). This could be the right momentum for the application of transformational efforts in the operation of PA.

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