Reducing Administrative Burden through Online Dialogues: The Case of Declaring a Property to the Hellenic Cadastre

Efthimios Tambouris, Alexandros Kliafas, Evangelos Kalampokis, Konstantinos Tarabanis[1]

Abstract – Greece is currently developing the Hellenic Cadastre and in that process all properties have to be declared by those with relevant rights. The declaration process is extremely complex and hence imposes significant administrative burdens on citizens and businesses. The objective of this paper is to develop an e-government solution for reducing the administrative burdens related to the informative stage of the specific public service. By informative stage we refer to all these actions that one needs to undertake to obtain all essential information in order to be capable of executing a specific service. The analysis of this service suggest that its complexity is mainly related to the different supporting documents that need to be submitted along with the declaration form, which depend on a number of factors. Consequently, an online dialogue was suggested that enables automatic identification of the input documents to be submitted. The dialogue was modelled using BPMN and developed in an open source environment. This approach is expected to significantly reduce administrative burdens in this service. Most importantly, the followed approach can be also applied in other complex public services.

1. Introduction

For many centuries, Greece had in place a manual recording system of properties' rights which could be characterized as *person-centric*. According to it, the declaration of a property was based on the person that submitted the relevant documentation and not on the property itself. As a result, the same property could and was registered to more than one person and also a large number of properties were not registered at all.

The Hellenic Cadastre [1], founded in 1995, aims at the creation of an electronic record of properties in Greece to also include all rights on properties. The Hellenic Cadastre, contrary to the previous recording approach, adopts a new approach that could be characterized as *property-centric* where information on all properties including the property rights is explicitly recorded.

The declaration of properties in the Hellenic Cadastre is performed in phases. The first phase took place in Greece between 1995 and 2003 in 331 local and regional authorities, covered 7.7 billion square meters and resulted in the declaration of 6.2 million of property rights. The second phase initiated in June 2008 and is expected to be completed by 2011. Each phase is divided into sub-phases that cover specific geographical areas of the country. The first sub-

[1] University of Macedonia, 54006, Thessaloniki, Egnatia 156, {tambouris, mis0711, ekal, kat}@uom.gr

phase of the second phase, started in 17 June 2008 covering 103 areas. It aimed to cover 3.1 billion square meters and record 6.7 million property rights.

The declaration process seems straightforward at a first glance. Every citizen or business that has registrable property rights in the relevant area is obliged to declare it using an application form along with a number of supporting documents. The relevant public service (in this paper termed "Declaration of a property to the Hellenic Cadastre") is obligatory by law for everyone with a registrable property right. Due to the extremely large number of properties and the high percentage of population owning a property in Greece, this public service concerns the vast majority of the country population and will be executed a large number of times (one for each registrable property right).

In practice however the declaration process proved to be much more complicated than initially expected. Despite the wide TV coverage, issuance of relevant guidelines (provided free with newspapers), assistance from the 1000 Citizens Centres all over Greece etc there were still significant difficulties in the understanding of the process to be followed. This resulted in two extensions of the relevant deadline (the original deadline was 30 September, initially extended to 31 October and subsequently to 21 November).

The specific public service imposes high administrative burdens for both citizens and businesses. Administrative burdens initially introduced as the costs imposed on businesses, when complying with information obligations stemming from government regulation [2]. However, Wauters and Lorincz [3] identified the need to extend this definition in order to adequately reflect the qualitative user experience in the sense of reduced processing times, accessibility, transparency and low burden, even in non-obligatory contact moments. In addition, they defined the reduction of administrative burden as a significant condition for the effectiveness of every Electronic Government (e-government) initiative.

The objective of this paper is to develop and apply an e-government solution for reducing the administrative burdens related to the informative stage of the specific public service. By *informative stage* we refer to all these actions that a service receiver need to undertake to obtain all essential information in order to be capable of executing a specific service. This information can specify whether or not a citizen is eligible to execute a service, the specific instance of a service that a citizen should execute, the necessary input (e.g. administrative documents) for the service to be executed, the costs related to the execution of the service etc. The informative stage is normally followed by the *execution stage*, which involves all actions relevant to the execution of a public service. This stage is out of the scope of this paper.

In order to achieve the paper's objective, we firstly analyse the public service according to the literature in order to identify the factors that contribute to the administrative burdens. Next, we model the informative stage as a process which describes a dialogue aiming at providing customised information to both citizens and businesses. Finally, we develop a dialogue-based online application based on open source tools.

We anticipate that the paper's results will provide an in depth understanding of the informative stage of public service provision process as well as of the administrative burdens related to it. We also anticipate the paper to provide an understanding regarding the role of online dialogues as a possible solution for reducing administrative burdens.

The rest of this paper is organized as follows. In section 2 we describe the followed methodology. Section 3 presents the results of the application of the methodology including the analysis of the public service and the identification of the relevant administrative burdens,

the modeling of the informative stage and the description of the pilot application. Finally, in section 4 the conclusions are drawn and future work is proposed.

2. Methodology

The methodology of this paper comprises the following steps:

The first step aims at understanding the public service and identifying the factors that contribute to administrative burdens. For this purpose, we collect information from various sources for the public service "Declaration of a property to the Hellenic Cadastre". This will enable us to better understand the public service itself. We also employ Governance Enterprise Architecture (GEA) service model [4]. GEA defines the main concepts which allow to model (and hence understand) a public service.

The second step of the methodology includes modeling the informative stage as an online dialogue between citizen/business and public administration. The aim of this step is to provide a better understanding of the informative stage as well as to provide a blueprint for the subsequent development of an online application.

The final step of our methodology aims at developing a dialogue-based, active pilot application which will simplify the informative stage and will reduce the administrative burden related to the provision of the specific public service. This pilot application will realise the online dialogue and will provide information to citizens and businesses in a user-adaptable, quick and easy manner regarding the public service under investigation.

3. Results

3.1 Analysis of the Service and Identification of Administrative Burdens

The first step of our work was to fully understand the declaration process. For this purpose, information from various sources was gathered and studied, including:

- The web site of the Hellenic Cadastre [1].

- Relevant Publications: Because our study coincided with an actual properties declaration period, a large number of newspaper articles and publications were widely available.

- The relevant laws: We identified and studied more than thirty relevant laws and ministerial decisions.

- Experts on the specific topic: We discussed with lawyers, public servants, and surveying engineers.

The following analysis of the service uses terms from the GEA model. It should be noted that we restricted our analysis to a subset of the GEA model, namely the one relevant to the Informative stage of the service provision. As the GEA model also covers the execution stage of service provision it includes certain terms that are outside the scope of analysis in this paper. These GEA terms that were used for analysis purposes are in italics.

The service's relevant *societal entity* includes citizens and businesses with a registrable property right. The *Service Provider* is the Hellenic Cadastral. The service is governed by *law* and in our case we identified more than 30 different laws and ministerial decisions. The *outcome* of the service is the conclusive right on some property.

The necessary *input* is probably the most complex part in the analysis of the specific service. The main reasons are two.

First, input documents are divided into mandatory and optional. According to the relevant laws, mandatory input includes those documents that are essential for the declaration process to commence. The laws however also suggest there is a set of documents that can be also submitted at will (the optional input). These are only used in the case that a property right registered by a citizen/business is disputed by some other in order for the final decision to be issued.

The second reason that makes input the most complicated part of the service is related to the fact that the input documents depend on various factors including:

1. The way of submission (receiver or delegate)

2. Various types of ownership rights

3. Various types of registered rights

More specifically, we identified thirty eight (38) different categories and subcategories of rights and eighty two (82) different input documents. In the simplest case, the receiver must submit along with the application five input documents, while in the worst case twenty two documents must be submitted regarding only one property right. So, the receiver of the service must understand those different categories and subcategories, correctly select the specific category in which his property right belongs and finally identify the proper input documents required to be submitted.

In GEA models, the law sets the *preconditions*, which "set the general framework in which the service should be performed and the underlying business rules that should be fulfilled for the successful execution of the PA Service. *Preconditions* can be formally expressed as a set of clauses". In our case, the preconditions are all those clauses that enable dictating the necessary input based on citizens'/business' circumstances. The preconditions also suggest that:

-   All citizens or legal entities that have registrable property rights in an area under cadastral survey are obliged to submit the relevant declaration.

-   The submission can be done using three different channels i.e. face to face, by post and internet.

-   The submission can be done either by the receiver of the service or by a delegate.

In conclusion, the analysis of the service revealed that the most complicated feature of the declaration process is related to the identification of the necessary input documents. As a result, we deem that the informative stage of the specific public service must facilitate the identification of the required input documents.

3.2 Modeling the Informative Stage

In this section we describe the modeling of the informative stage of the service. The modeling is based on a process which represents a dialogue between citizen or business and public administration. The aim of the dialogue is to guide the citizen/business through a number of questions in order to determine the input documents that must be submitted for property declaration.

This dialogue is active in the sense that every question is depended on the answer of the previous one. This approach has been proposed in the context of one-stop government solutions which include dialogue-based, active portals [5]. This approach has been originally proposed to guide citizens and businesses through complex life events and business episodes that include many public services. In this work, we use the same approach but we limit the scope to single public services, albeit a complex one.

In this paper, we employ the Business Process Modeling (BPM) principles in order to model the service's Informative stage. According to Havey [6] BPM is the study of the design and execution of business processes which are the step-by-step algorithms to achieve a business objective. A number of BPM related standards have been developed which include modeling (e.g. BPMN, UML activity diagrams) and execution languages (e.g. BPML, BPEL and WSFL). According to BPM, a process can actually be executed by a process engine.

In this paper we use Business Process Management Notation (BPMN) as the modeling language. It must be noted that this preference is related to the capability of BPMN to generate executable Business Process Execution Language (BPEL) code. For the design of the model we used Intalio Designer [7] which is an open source tool for developing BPMN diagrams.

Because of the complexity and the big size of the resulting model, here we present only a small part of the model (Figure 1).
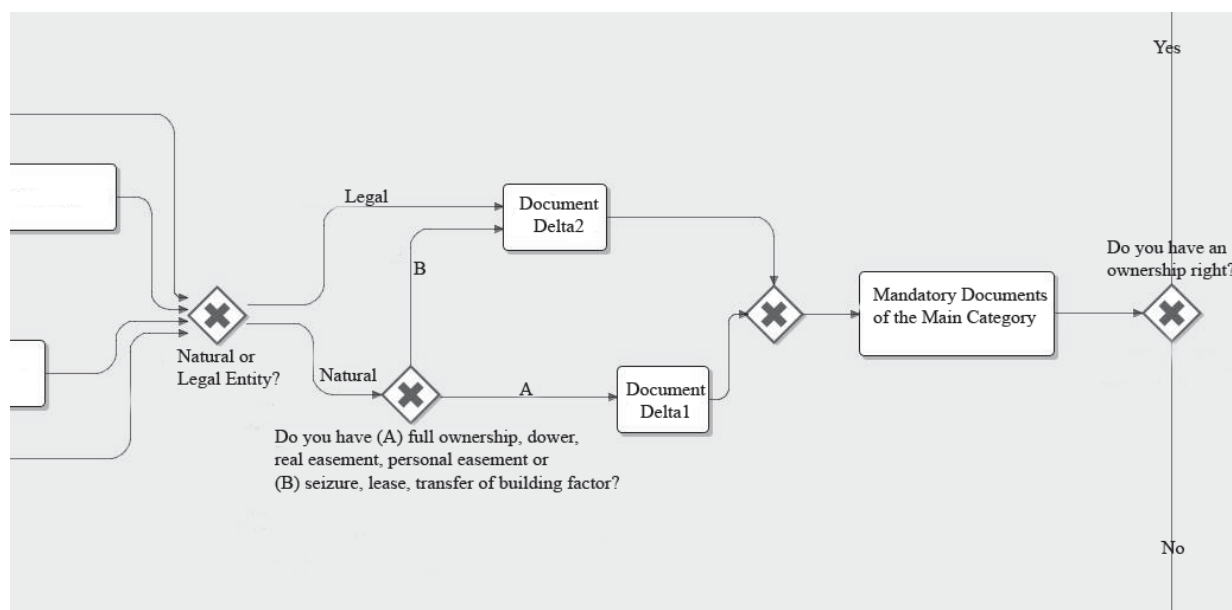

Figure 1: A small part of the conceptual model representing the dialogue between the application and citizen/business

The complete model uses only five of the available BPMN symbols. More specifically, the model contains the start event and the end event in order to represent the initiation and the termination of the dialogue. It also contains the task symbol which represents the need to store a specific input document into a database. Finally, the model uses the exclusive gateway symbol to specify the split of the flow according to the given answers as well as the sequence flow symbol to represent the reconverging of the previous split flows.

The dialogue contains eleven questions in total. The minimum number of answers that a citizen could give is four, while the maximum is nine. In the first case (i.e. where the citizen answers four questions) we identified 15 different possible paths (instances) of the dialogue. In the second case we identified 240 different paths of the dialogue. The paths of the dialogue represent the different routes that the dialogue can follow in the diagram.

Aalst et al. [8] identified and proposed 21 patterns that describe the behavior of workflows. These workflow patterns include amongst others five simple constructs patterns such as sequence, parallel split, synchronization, exclusive choice and simple merge. In our model only two of these basic patterns are used i.e. the exclusive choice and the simple merge. The exclusive choice is referred to the divergence of a branch into two or more branches such that when the incoming branch is enabled, the control is immediately passed to precisely one of the outgoing branches based on a mechanism that can select one of the outgoing branches [8]. In our case this mechanism is the answering of a question. The simple merge is the pattern where two or more branches converge into a single such that each enablement of an incoming branch results in the control being passed to the subsequent branch.

Trochidis et al. [9] modeled the control flow of six life events and business episodes and concluded that all five basic workflow patterns are used in these examples. In that work both the informative stage and the execution stage of service provision were modeled. Our work suggests that the informative stage is likely to use less workflow patterns than the execution stage of execution. But this hypothesis needs more empirical data to be verified or rejected.

3.3 Pilot Application

In this section, we present the pilot web application which has been developed in order to realise the dialogue. This endeavor is based on open source tools so as to achieve low cost of implementation. The model presented in the previous section could be characterised as conceptual because it does not include any implementation details (i.e. forms, connections etc). As a result we extended this conceptual model by adding those features that would convert it to an implementation BPMN model capable to generate executable Business Process Execution Language (BPEL) code. This process was also based on the use of the Intalio Designer tool. Although the conceptual model is an abstraction of the implementation one, we do not describe the later because the presentation of the implementation details is not the objective of this paper.

The pilot application comprises three main parts:
- The web interface which is used for the interaction with the user.
- The process engine which is responsible to manage and execute the modeled process. As a process engine we used the Intalio Server [7] which is an open source BPEL process server.
- The database which stores the required information (in our case the input documents) in order to present it after the completion of the dialogue. The database was developed in a MySQL database system.

The application poses questions and a number of possible answers for each question. Depending on the given answers a sequence of relevant questions is presented to the user. The questions asked to the user are limited to only the ones that are specific to his/her needs (customization). After the completion of this process the required documents are displayed.

We have estimated that the time needed for answering the most complicated instance of the dialogue is about 5-10 minutes, while the time for the simplest one is about 1-3 minutes. In addition the cost for using this application is practically zero if we do not consider the cost of the necessary technical infrastructure (mainly access to a PC with an internet connection). On the other hand, the conventional ways for receiving the same information includes studying all needed documents available in the official website of the Hellenic cadastre and/or studying the relevant laws and/or consulting the employees of the Hellenic Cadastre and/or hiring a lawyer. All these available ways require more time or cost comparing to the developed online dialogue-based application. So, the process of identifying and understanding the regulations and the rules related to the execution of the "Declaration of a property to the Hellenic Cadastre" service could be simplified in terms of required time and cost by using the developed pilot application. Hence we could deem that the administrative burdens related to the specific service could be reduced by following the proposed approach and using the proposed application.

4. Discussion and Future Work

The objective of this paper was to develop an online application for reducing the administrative burdens imposed on both citizens and businesses by a public service. This objective contributes towards one of the most significant aims of the European Union which is the reduction of the administrative burdens for both businesses and citizens. In 2007, the European Commission presented an Action Programme aimed at reducing administrative burdens in the EU by 25% by 2012 [2]. Although, the specific programme is referred only to businesses and to the administrative burdens arising from legislation, in the literature e-government is considered as a significant means for reducing administrative burdens not only for businesses but also for citizens [10] [11].

In this paper we analysed the informative stage of the public service "Declaration of a property to the Hellenic Cadastre". This service concerns most Greek citizens as well as those with a property in Greece.

The declaration process has proven to be extremely complex for applicants. The process involves the identification and understanding of more than thirty complex laws and ministerial decisions as well as numerous abstruse legal terms. The analysis of this public service suggests there are thirty eight (38) different categories and subcategories of rights and eighty two (82) different input documents. The analysis revealed that the major factor contributing to its complexity is related to the identification of the necessary input documents depending on the applicant's circumstances.

The identification and understanding of the input documents is related to significant administrative burdens in terms of cost (e.g. for consulting a lawyer), time (e.g. for identifying the relevant information), population (a significant portion of citizens and businesses is expected to execute the specific service) and frequency (many citizens and businesses have registrable rights on more than one properties).

In this paper, we adopted the use of online dialogues for reducing the administrative burden. More specifically, we have modeled the informative stage of the service as a set of questions that must be answered by the applicant. This dialogue guides the applicant through the different cases and finally provides him/her with all input documents that must be submitted along with the relevant declaration form. The modeling exercise suggests there are eleven different questions in total. The minimum number of questions to be asked is 4 and the maximum is 9. This means that in the most complex case, nine questions will be needed to determine the input documents one has to submit along the declaration form. The number of different paths in the dialogue graph is up to 240. This means that in the most complex case (the one needing 9 questions) there are up to 240 different paths dictating different cases of combinations of answers.

We modeled the dialogue in an open source environment (Intalio) using BPMN as the modeling notation and BPEL as the execution language. The resulting online dialogue can be executed in a few only minutes.

More importantly, the steps followed in this paper can be followed by practitioners in order to reduce the administrative burden of complex public services imposed during the informative stage of public service provision.

Future work includes the application of the idea of online dialogue-based systems to provide assistance to citizens and businesses in order to fill in the declaration form. This is expected to significantly further decrease the administrative burden to hundreds of thousands of applicants.

References

[1]   The Hellenic Cadastre, http://www.ktimatologio.gr

[2]   Commission of the European Communities: Action Programme for Reducing Administrative Burdens in the European Union, COM 23, 2007.

[3]   Patrick Wauters and Barbara Lorincz, User satisfaction and administrative simplification within the perspective of e-government impact: Two faces of the same coin?, in: European Journal of ePractice, 4/2008, pp. 1-10.

[4]   Vassilios Peristeras and Konstantinos Tarabanis, The Governance Enterprise Architecture (GEA) high-level object model, in: Proceedings of Knowledge Management in Electronic Government, LNICS 3025/2004, pp. 85-94.

[5]   Efthimios Tambouris, Mariusz Momotko, Marios Chatzidimitriou and Konstantinos Tarabanis, Active life-event portals by example, in: 6th Eastern European Egov days 2008 Conference, Prague, 2008, pp. 14-21.

[6]   Michael Havey, Essential Business Process Modeling, O'Reilly, 2005.

[7]   Intalio, http://www.intalio.org

[8]   W.M.P. Van der Aalst, A.H.M. Ter Hofstede, B. Kiepuszewski, A.P. Barros, Workflow Patterns, in: Distributed and Parallel Databases, 14/2003, pp. 5-51.

[9]   Ilias Trochidis, Efthimios Tambouris and Konstantinos Tarabanis, Identifying Common Workflow Patterns in Life-Events and Business Episodes, in: ICEG 2006, Pittsburgh, 2006, pp. 234-243.

[10] Rex Arendsen, Tom M. van Engers, Reduction of the Administrative Burden: An e-Government Perspective, in: EGOV 2004, LNCS 3183/2004, pp. 200-206.

[11] Deloitte Consulting: Citizen advantage: Enhancing economic competitiveness through e-government, 2003.