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Rafał Wojciechowski, Sergiusz Strykowski
Poznań University of Economics
e-mail: {rawojc; strykow}@kti.ue.poznan.pl

TOWARDS ELECTRONIC GOVERNMENT FOCUSED ON ADMINISTRATIVE PROCEDURE AUTOMATION

Abstract: E-government is implemented mainly through the deployment of IT solutions improving the selected functional aspects of public administration units, but not improving the functioning of public administration as a whole. To achieve a significant synergy effect in relation to the benefits for citizens and businesses, we propose an e-government framework focused on administrative procedure automation. The proposed framework is based on three pillars: e-government services, automated administrative procedure execution and public register services. The pillars are founded on electronic documents. The key objective of the framework is to automate the execution of administrative procedures as it significantly increases public administration efficiency and thus brings the greatest benefits for citizens and businesses.

Keywords: e-government, administrative procedure, automation, electronic service, electronic document, public register.

1. Introduction

The concept of e-government refers to the use of information and communication technology in public administration to enhance the access and delivery of public services offered to citizens and businesses. E-government should not be limited to providing public services through electronic channels only, but first of all it should aim at the implementation of new IT solutions improving various aspects of public administration from work flow through technology to staffing [Deloitte Research 2000]. From the perspective of citizens and businesses, e-government means to facilitate performing administrative procedures and streamline decision-making processes. From the perspective of officials and agencies, e-government means to facilitate work coordination and collaboration to ensure adequate and timely decision-making.

In this paper, we focus on improving the efficiency of public services for citizens and businesses, which means increasing the quality and decreasing the execution time of administrative procedures. For this purpose, it is necessary to implement e-government solutions. However, at present e-government is realized mainly

through the implementation of IT solutions improving selected aspects of the functioning of public administration units. These solutions are local e-government portals, workflow systems supervising clerical work, scanning paper documents, electronic local and central registers, etc. Actions of implementing these IT solutions are frequently not coordinated, which results in independent and isolated systems and information silos unable to cooperate.

For example, the independent implementation of the e-government portal that allows citizens and businesses to submit applications in an electronic form without electronic support for document processing requires printing these electronic applications on paper and then conducting administrative procedures manually in the traditional manner. Conversely, the implementation of an electronic document management system without integration with an e-government portal requires scanning and manual retyping of paper documents and also communication with applicants using paper mail.

These isolated solutions improve only selected aspects of public administration, but they do not improve the functioning of public administration as a whole. From the viewpoint of citizens and businesses, the implementation of such fragmentary solutions does not lead to a significant improvement in the effectiveness of agencies as far as performing complete administrative procedures is concerned. Developing a comprehensive e-government framework, within which different complementary solutions could be developed, would allow achieving a significant synergy effect in relation to the benefits following from the implementation of each of these solutions separately. From the perspective of citizens and businesses, the most important consequence of this synergy effect would be the ability to automate the execution of administrative procedures.

In this paper, we propose an e-government framework for the public administration organization. The proposed framework is based on three pillars: e-government services, automated administrative procedure execution and public register services. The pillars are based on electronic documents which constitute the underpinnings for the whole structure. In Section 2, a review and analysis of current projects in this field are presented. We mainly focus on the problems of the implementation of e-government in Poland. In Section 3, we present a detailed description of the components making up the proposed e-government framework. The last section contains conclusions and plans for future work.

2. Current e-government initiatives

There are many initiatives in the field of e-government carried out currently in Poland (December 2011). Most of them are co-financed from the funds of European Union operational programmes. These initiatives can be divided into two main categories: initiatives aimed at the implementation of IT systems for public registers and initiatives aimed at the implementation of Internet-based platforms for e-government services.

IT initiatives within the first category involve developing national systems for collecting data referring to the range of duties of particular ministries. Examples of such initiatives are the pl.ID system, the CEPiK system and the e-Deklaracje system to mention a few.

IT initiatives within the second category are, in turn, carried out by each local government independently. Unfortunately, the functionalities of e-government service platforms being developed within this category are often limited to publishing information on administrative procedures and documents necessary to initiate them. Incidentally, such platforms offer functionalities for starting administrative procedures via the Internet and then to monitor their courses.

However, such an approach where each local government develops their own IT solutions is highly inefficient from an economic and organizational point of view. The resulting systems duplicate their functionalities with each other, yet they are difficult for mutual integration due to the lack of standardization of process models, data formats, and technology used for implementation. Consequently, the close collaboration of these systems is very difficult or often even not possible, and such collaboration is the primary prerequisite for the automation of administrative procedures.

In order to establish standardized access to services delivered by public administration, there are initiatives aimed at developing e-government portals at national and regional levels. An example of such a project at the national level is the ePUAP platform.

The ePUAP platform (Electronic Platform of Public Administration Services, in Polish: *Elektroniczna Platforma Usług Administracji Publicznej*) is an Internet-based IT system for delivering electronic services by public entities to citizens, businesses, and other public entities [ePUAP 2008]. The main goal of designing and implementing the ePUAP platform was to create a single, secure and fully compliant with legislation, organizational and technical infrastructure which would aggregate electronic services coming from various administrative agencies, bureaus, councils, departments, offices, or other entities at both the national and the local level.

The ePUAP platform is an inter-sectorial system which does not focus on one area. It does not have its own public services. The services delivered on the ePUAP platform come from various public agencies, but the agency delivering the service through the ePUAP is still responsible for its execution and determines the conditions of the execution. The integration of public registers with the ePUAP platform does not imply the acquisition of data stored in those registers by the platform. And finally, the ePUAP platform does not support the document and work flows needed to execute services offered on the platform.

Due to the repeatedly extended duration of the project and a number of technical problems, the ePUAP portal has not found recognition among local governments. Out of the set of several functions offered on it, a significant number of local governments uses Electronic Filing Box only (in Polish: *Elektroniczna Skrzynka Podawcza*). On the other hand, there are many regional governments which decided to develop their own regional e-government platforms providing functionalities

substantially covering the ones offered by the ePUAP platform, e.g., SEKAP [SEKAP 2008], *Wrota Małopolski* (the Małopolska Gateway) [Wrota Małopolski 2004], *Wrota Podlasia* (the Podlasie Gateway) [Wrota Podlasia 2006]. Moreover, next regional initiatives of this kind are in progress or in planning, e.g., *Wrota Lubuskie* (the Lubuskie Gateway) [Wrota Lubuskie 2011].

It is worth noting that the ePUAPplatform is not used by national government ministries either. All the IT systems of public registers listed at the beginning of this section, deliver their functionalities through specially designed, dedicated service platforms.

3. Vision of e-government focused on admin procedure automation

The framework for e-government focused on administrative procedure automation is presented in Figure 1. The e-government concept is based on three pillars:

1. e-government services,
2. automated administrative procedure execution,
3. public register services.

The pillars in turn are based on electronic documents which constitute the foundation for the whole structure.

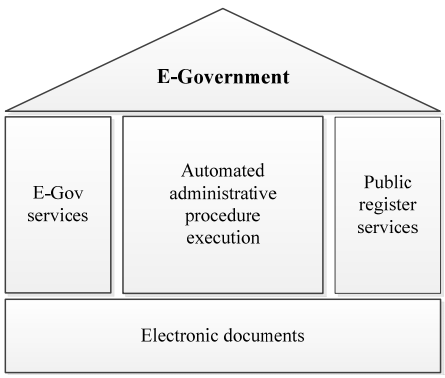

Figure 1. The framework of e-government focused on administrative procedure automation

Source: authors' own study.

3.1. E-government services

The e-government services encompass a full range of public services offered by different administrative agencies. Using the services, citizens and businesses can interact with different administrative agencies regardless of their type, physical location and range of duties. Citizens and businesses can initiate a new administrative procedure, e.g., request a construction permit. They can also check the status of

ongoing procedures that they have already requested. They can also request the data from public records and registers.

Public services are divided into information, communication and transaction. Information services consist in delivering information about institutions, such as their competence, performed procedures and document templates. Communication services consist in two-way communication between the public clerks and their clients, that is, citizens and businesses. Transaction services consist in the execution of transactions through electronic channels, which in the context of public administration means the execution of administrative procedures remotely through the Internet.

Currently, the majority of existing e-government portals is focused on information and communication services. However, to implement automated administrative procedures, transaction services are the most important. The primary form of transaction services is the ability to submit applications, requests, and inquiries as well as to receive decisions and official responses via the Internet. In order to ensure electronic support for the entire course of administrative procedures, the e-government portal must be integrated with the system for the automated execution of administrative procedures. Through this integration, it is possible to initiate new administrative procedures automatically upon the submission of applications without the clerk's participation. In addition, the portal may offer more advanced transaction services, such as the automatic monitoring of ongoing administrative procedures and sending SMS notifications about changes, uploading and viewing documents.

E-government services should be available through both the graphical and programming interface. The graphical interface is intended for citizens and employees of businesses. The graphical interface is usually implemented as Internet portals. However, because of the proliferation of mobile devices, there is a need to build applications offering access to e-government services for use on these devices. In this way, citizens and businesses could access public services from anywhere at any time.

The programming interface to e-government services is intended for businesses to integrate public services within business processes. For example, in the business process of planning and designing a construction investment, it is necessaryto obtain multiple opinions and decisions of various public administration bodies. To enable such integration, e-government services must be implemented in accordance with the Service-Oriented Architecture [Cellary, Strykowski 2009]. The programming interface to e-government services allows initiating and monitoring administrative procedures directly from the IT systems used by businesses. In this way, the interaction with public services can be performed like any other business process activities.

3.2. Automated administrative procedure execution

A key pillar of e-government is the automated execution of administrative procedures. Therefore, a central component of the proposed e-government framework is a system for the advanced automation of administrative procedures. There are two levels of automation of administrative procedures:

- automatic selection of tasks to be performed,
- automatic execution of tasks.

Automatic selection of tasks

Tasks to be performed should be selected automatically based on the analysis of legal circumstances of an administrative procedure. The process of analysis of legal circumstances should be automated as much as possible, which means the need for the maximum possible reduction of a clerk's participation in this analysis. For example, in the administrative procedure for issuing an ID card, one of the key factors is the age of the person to whom the document is going to be issued. The age is a key determinant of legal capacity. Thus, depending on the age of a person, the course of the procedure can be very different in the following aspects [Strykowski, Wojciechowski 2011]: whether the application has to be submitted by the person, by parents or by legal guardians; whether the presence of the person is required when filing an application; who has to sign the application; what are the types of incapacitation to be considered; and who is entitled to collect the ID card. For example, if the age of the person is less than 13 years, then that person has no legal capacity, so there is no need to check his or her incapacitation, but it is necessary to check whether the application is filed either by both parents or by all guardians. The activities that must be carried out are dynamically selected by the automation system based on the analysis of the legal circumstances. The selected activities can be executed automatically by IT systems or manually by clerks.

The circumstances of an administrative procedure can also be sourced from public records. For example, the existence of the building in the municipal records of historic monuments imposes the requirement of receiving the opinion of the city historic preservation officer. In this case, the automation system should select the activities that must be performed by the clerk to receive the opinion and to take it into account in the further course of the administrative procedure. Otherwise, the clerk does not have to take any action related to this legal aspect.The automation system can optionally inform the clerk of the results of the legal circumstances analysis. The dynamic selection of activities based on the legal circumstances enables clerks to focus only on those activities which are actually required for those circumstances.

Automatic execution of tasks

Tasks can be performed automatically by IT systems or manually by clerks. The aim should be to automate the execution of all routine tasks by shifting them from clerks to IT systems. The candidate's tasks are: accessing and processing data from public records; processing electronic documents; and communication between administrative proceedings participants and public administration agencies.

For example, in the procedure for issuing an ID card, it is necessary to verify the consistency of data in the application with vital records. In this case, the automation

system can automatically retrieve the vital records stored and managed by theVital Records Office. Then the automation system can automatically verify the consistency of the data with the data in the application. After successfully issuing an ID card, the automation system can automatically update the data in the document in the central registers, such as ID Card Register, General Electronic Population Register and Central Repository of Vital Records. During the administrative procedure the automation system can send messages about the current state of the procedure to the participants.

In the course of an administrative procedure, it is necessary to interact with other units of public administration, and the communication should be performed automatically. For example, in the procedure for issuing a construction permit, the request for an opinion should be automatically sent to the city historic preservation officer, if required, and the clerk who carried out the procedure should only be informed of that fact. After receiving the opinion in the form of an electronic document, it can be automatically processed and if it does not contain any objections, the procedure may be continued automatically. If the city historic preservation officer has any objections regarding the design, which cannot be processed automatically, the clerk has to take appropriate steps to interpret them and request the applicant to make changes to the construction designas required.

3.3. Public register services

In the course of administrative procedures, it is usually required to get access to records of local and central public registers. Such access should be delivered by public register services.

Local public registers can be divided into two categories: registers which have to be maintained and operated by local governments due to provisions of state law, e.g., vital records registers, land records registers, and registers which have to be maintained and operated by local governments due to provisions of local law, e.g., registers of dog owners for collecting dog licence fee.

In the first case, there should be efforts aimed at making records stored in these registers location-independent. This will enable the administrative agencies of the whole country to gain access to citizens' and businesses' local records and also allow these agencies not to ask citizens and businesses to attach documents certifying facts or actions described by locally stored records.

At the technical level, making records location-independent can be implemented through three various approaches. The first one is to create a central repository containing copies of the data collected and processed locally. The second one is to create a central repository for storing data and developing protocols for communication with the repository. Data processing is performed locally by applications installed on computers in each local government office. These applications can be obtained from different software vendors provided that they support the communication protocol

defined centrally. And finally, the third approach consists in creating a central repository and central data processing applications available in the software as a service model. The last approach is the most economically and organizationally justified; however, it requires local officials to overcome the longstanding habits regarding the need for the "ownership" of data and applications, and to switch to a new model of thinking based on the assumption that it is enough for the public agency to be a data administrator and have access to the tools for processing it.

During the execution of administrative procedures, the register services should be automatically invoked in order to both read and write records stored in the registers. For example, the administrative procedure for issuing a construction permit requires checking whether for the area in which the investment is planned a local zoning plan has been established. If the public register of local zoning plans exists, it is possible to automatically verify whether the investment area is covered by a local zoning plan or not. If there is no local zoning plan for the area, the automation system selects activities that should be performed by the clerk in order to check whether the application is accompanied by an outline planning decision.

Public registers have to be available online and provide an electronic interface compliant with open standards. Due to the fact that public registers are usually implemented as heterogonous IT systems, the successful implementation of the services requires applying an architecture that enables the integration of heterogeneous systems, that is, Service-Oriented Architecture [Strykowski et al. 2010].

3.4. Electronic documents

An electronic document is a set of data constituting a separate meaningful whole, organized within a defined internal structure [*Act on the Computerization*… 2005].

In order to process electronic documents automatically, their internal structure should be organized in such a way as to enable the IT system to unambiguously identify the semantics of all the information contained in these documents [Davies et al. 2008]. Based on this semantics, the system of automated execution of administrative procedures can select tasks to be performed within the execution. The commonly accepted standard for describing the structure of documents which allows specifying the semantics of the information contained therein is the XML Schema technology [W3C 2001].

However, the very application of XML Schema is not sufficient. To enable the seamless exchange of documents within public administration agencies, it is necessary to establish a central repository for document templates. The point is that all documents of a given type, e.g., construction permits, must always follow the same internal structure, regardless of the fact by which agency they have been issued, and they can differ in the information contentonly. It is also necessary to establish legal solutions which would force all administrative agencies and offices, both at the local and the national level, to use templates stored in the repository. Additionally,

templates in the repository have to be legitimized as the only ones acceptable for use by public agencies.

A good move towards this goal was to establish such a central repository for document templates within the ePUAP platform. Unfortunately, the current management of the repository (December 2011) should be considered as a total failure. First, there is no legal obligation for administrative agencies to use templates contained in the repository. Second, the templates in the repository are not binding as the only ones being lawful. As a result, templates from the repository are used by a small fraction of public offices only; different public offices; e.g., municipal councils from different cities, enter into the repository different templates for the same document types.

Electronic documents constitute the foundation for all three pillars of the proposed e-government framework. Ideally, all the documents exchanged between stakeholders and public administration are electronic ones. This means that both the application and all attachments should be in the form of electronic documents. During the course of administrative procedures new documents are created and they also should have an electronic form.

Additionally, documents created in the course of administrative procedures, in particular administrative decisions, should be recorded in public registers. In this way these documents will be available online for all entities which can prove their lawful interest in regard to the content of the documents. Applying for an administrative procedure, an applicant is not burdened with attaching decisions, certificates and other documents issued by other public agencies. The agency executing the requested administrative procedure can download itself all the necessary documents from public registers. Obviously, public agencies can access documents stored in public registers only within the limits established by legislation, and applicants must be informed each time any public agency requests access to documents related to them.

In this way the physical flow of documents to a significant extent can be replaced by a logical one. Such a replacement most likely will never cover all possible cases. First of all, the applicant is often requested to provide documents issued by entities outside the public administration, such as certificates specifying technical conditions for media availability issued by their provider, e.g., a power or gas company. It is not possible to enforce the external entities to maintain and make available online registers of documents. Secondly, for social reasons there are no registers of certain documents, e.g., registers of certificates on physical or mental health conditions, registers of court statements on incapacitation, etc. Thirdly, for economic reasons it is not justified to establish and maintain registers of certain documents, e.g., registers of documents which are seldom issued. In all these cases it is necessary for the applicant to provide a copy of a document, either paper or electronic.

4. Conclusions and future work

The proposed framework of e-government aims to provide strategic guidelines for the computerization of the public sector. Implementation of e-government solutions in accordance with these guidelines allows achieving a synergy effect in respect to the benefits of each of the sesolutions implemented separately. Developing IT solutions within the proposed framework allows using these solutions for the automation of administrative procedures. The automation of administrative proceedings encompasses both the automatic selection of the tasks and their automatic execution.

E-government services based on the automation of administrative procedures allow citizens and businesses to remotely participate in administrative procedures at every stage of their execution, from submitting an application through monitoring the course of a procedure to obtaining an administrative decision. The automation system allows shortening the procedure execution times by shifting the routine activities to IT systems, and leaving to humans non-routine activities primarily related to decision-making. Public register services allow automatic access to records necessary for the execution of procedures, in particular, to perform routine activities. All documents exchanged between the systems of public administration should be in a structured electronic form, which allows determining the semantics of the document content.

The automation of administrative procedures requires the identification and analysis of the legal circumstances occurring at a given stage during the procedure execution. The legal circumstances can be determined automatically based on the records obtained from the public register services and on the analysis of the documents. If the automatic identification of some legal circumstances is impossible, clerks carrying out the procedure have to determine those circumstances arbitrarily in a manual way.

Future work along the proposed framework includes developing the appropriate IT solutions for each of the components of the framework. In particular, emphasis should be placed on the developmentof new solutions in the area of the administrative procedure automation. These solutions should involve both modeling and executing administrative procedures. They should allow building administrative procedure models and executing procedures based on these models at the finest level of operational activities, whose execution is essential for the legal correctness of the procedures. The current methods available in this area do not permit the construction of models at the required level of detail because their main purpose is usually not to automate administrative procedures by IT systems, but to standardize the way administrative procedures are carried out by clerks.

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W STRONĘ ELEKTRONICZNEJ ADMINISTRACJI UKIERUNKOWANEJ NA AUTOMATYZACJĘ POSTĘPOWAŃ ADMINISTRACYJNYCH

Streszczenie: Aktualnie wprowadzanie koncepcji elektronicznej administracji polega przede wszystkim na wdrażaniu rozwiązań informatycznych usprawniających wybrane aspekty funkcjonalne administracji, ale nieusprawniających jej funkcjonowania jako całości. W tym artykule proponujemy model całościowej organizacji administracji publicznej w postaci e-administracji ukierunkowanej na automatyzację postępowań administracyjnych. Zaproponowany model opiera się na trzech filarach: usługi e-administracji, automatyzacja realizacji postępowań administracyjnych i usługi rejestrów publicznych. Fundamentem wszystkich trzech filarów są dokumenty elektroniczne. Kluczowy cel modelu – automatyzacja realizacji postępowań – spowoduje wzrost wydajności jednostek administracji i tym samym przyniesie znaczące korzyści z punktu widzenia obywateli i przedsiębiorstw.

Słowa kluczowe: elektroniczna administracja, postępowanie administracyjne, automatyzacja, elektroniczna usługa, elektroniczny dokument, rejestr publiczny.