INTEGRATED DOCUMENT MANAGEMENT SOLUTION FOR THE LOCAL GOVERNMENT

Nistor Răzvan Liviu, Mureşan Ioana, Moca Mircea
Management dept., Business Information Systems dept., Faculty of Economics and Business Administration, Babeş-Bolyai University, Cluj-Napoca, Romania
razvan.nistor@econ.ubbcluj.ro
ioana.muresan@econ.ubbcluj.ro
mircea.moca@econ.ubbcluj.ro

Abstract: *In this paper we present system analysis and design elements for the integrated document management solution at local governing authorities in the rural areas. While specifically dealing with the actual management of the Agricultural Register, an important primary unitary evidence document, we also keep a general character of the discussion, in order to argue for the generality of the proposed solution. Hence, for the identified and described problem space we propose an administrative and software infrastructure solution. This work is an empirical research in which our aim is primarily to identify key problems within the local governing authorities from several perspectives concerning the management of the Agricultural Register then to address those problems with an integrated document management system. For the proposed solution we give and argue the general system architecture and describe the key-mechanisms that support quality requirements. The relevance of this research concern is given by the impact of the actual Agricultural Register management on important stakeholders. This can be measured as the satisfaction felt by taxpayers and the performance of the local governing authorities, the Financial Administration, the Agency of Payments and Intervention in Agriculture and the Ministry of Agriculture and Rural Development. This work is also intended as a start-point for a new, modern thinking of the governing authorities, in their pursue to improve public services. For this, in our work we highlight the importance of complete system analysis at all administrative levels as a main priority concern for all public managers. Our aim is the improvement of the public service by raising the awareness of the decision makers on the necessity of using integrated document management solutions for the provided services. Also, our work aims at increasing the efficiency with which nowadays, governing authorities invest public funds in various IT projects for the management of their services. For this, we highlight the importance of documenting quality requirements during system analysis.*

Keywords: *Local government; integrated system; decision making; document management; Agricultural Register.*

JEL classification: *M15, H11*

Introduction

Improving the public service offered to citizens through integrated software systems should be a permanent concern of the public managers (West, 2005). More, the concern for integrating software systems running at different government bodies within the European Union is an actual concern of the European Commission (EC, 2011).

To modernize means adapting to requirements, to the exigencies of the present, renewing, updating, moving from a static organization characterized by inertia to a dynamic one, adapted to a changing environment in fast transformation. To modernize also means adopting modern behaviors considered innovative in comparison with the previous ones. Therefore, knowledge policies such as research, innovation, education and training are very important for the future of the Romanian public administration.

The administrative reform should be always a current topic on the public agenda. There are several problems that the local government in Romania is facing, leading to the appearance of significant disparities in socioeconomic development:

- territorial excessive fragmentation and inadequate dimensioning of administrative - territorial units, with negative effects on adapting the provided services according to European standards of quality and efficiency;
- high operating costs for administrative territorial units, especially in rural areas and small towns leading to a low investment level at this level;
- low absorption rates of structural and cohesion funds by many villages – development regions with a preponderant statistical role, lead to their incapacity to really play the role that the European Union is projecting for the regional level in the planning for 2014 - 2020.

An efficient local public management involves means of organizing such as: the main organizing directions, implementation of a complex IT program, developing and implementing the Code of Conduct for clerks, relationships with civil society institutions, organizing and conducting environment related activities.

According to article 3 of Romanian Law no. 544/2001 regarding free access to information of public interest, providing access to public information by authorities and institutions is made ex officio or upon request, through the public relations department or the person designated for this purpose.

In Romania, as in most European countries, the practice shows an increasing involvement level of citizens, under at least two aspects:

- information procedures, more and more diversified: motivation of administrative documents, access to administrative documents, reducing the application field of the "administrative secrecy";
- participation procedures, also increasingly frequent: not only consultancy, but also techniques involving a more active role for recipients of administrative action, public inquiries, developing non contentious administrative procedure laws etc.

The progress of IT and of derived methods facilitates this type of relationships, which involves a different form of government, less authoritarian and less rigid.

Nowadays, in many Romanian public administration agencies one can easily note the bureaucracy. Some general causes for this phenomenon can be the maintaining of complicated administrative procedures, the failure to comply with set time-limits

for processing requests, documents flow fragmentation, the presence of offices without IT equipment and technologies, inability to generalize processes, at least when dealing with taxes and the "single window" system.
The consistency of the public administrative management improvement can increase the efficiency of the relationship between central and local government, between the public authorities at national level and those from rural areas and cities. Nowadays we cannot identify an integrated information system of central and local government to support all social policy decisions.
Reorganizing and restructuring the central and local administration requires an increased level of efficiency in document management and decision making.
A frequently required document by citizens in the rural areas is based on information included in the Agricultural Register. This is an official document of primary unitary evidence, containing sections like: the composition of the household/ agricultural holding, owned land identified by parcels, forests in public/ private ownership, the use of agricultural areas regarding the arable area cultivated with the main crops, orchards areas and the number of trees, vineyards, grapevine nurseries, irrigated areas and livestock.
In this work we present system analysis and design elements for the integrated management of the Agricultural Register at local governing authorities in the rural areas. For the proposed solution we give and argue the general system architecture and describe the key-mechanisms that support the identified quality requirements.
The remaining of this paper is organized as follows. In Section 1 we present the background of our work, in Section 2 we describe the problem space, in Section 3 we argue the proposed solution. In Section 4 we present related work and we conclude in Section 5.

1. Background

The research work that aims an efficient public administration assumes interdisciplinary work where the research team address IT, managerial and legal issues under a variety of approaches (Wright, 2011).
The public administration can be seen as a system of institutions or various administrative structures organizing and implementing the central state laws.
Although the characteristics of public administration mechanisms are different from country to country within the European Union, increasing their efficiency requires their harmonization. The values that define the European administrative field are: transparency, predictability, responsibility, adaptability and efficiency (Androniceanu, 2007). Romania is one of the European Union's member states that still deals with the process of adopting and implementing these values.
Improving the management of public institutions in Romania towards alignment with the European standards is a necessity for the contemporary public management system, in a context of major changes which need to be faced both by each public institution, and by the entire system as a whole.
Public institutions cannot be isolated from the general social system. Therefore the relationship between these institutions and the citizens should be a matter of great interest for the public managers. The main objective when improving the management of public institutions is increasing the level of satisfaction of the citizens (Androniceanu, 2007).

The relationship between public institutions and citizens can be improved by:

- increasing rigor in reasoning and replying as well as shortening the response time to requests submitted by citizens;
- reducing bureaucracy of the central and local government agencies;
- strengthening and enlarging the participation of civil society in decision-making;
- ensuring transparency of administrative documents and communicating operatively with citizens.

2. Description of the problem space

In this section we provide a description of the problem space from two main perspectives. One is represented by the public institutions responsible with local governance and the other is determined by the taxpayers. In our discussion we firstly identify and describe the stakeholders from each perspective by highlighting their needs then we present the relationships among them as components of a whole information system.

Within the governance perspective we consider three types of key state institution: local governing authorities in the rural areas, the Financial Administration, the Agency of Payment and Intervention in Agriculture (APIA).

In our context the local governing authority represents a functional structure with permanent activity, consisting of mayor, deputy mayor, secretary of the administrative-territorial unit and the special unit of the mayor. The aim of the local governing authority is to solve current problems of the local community (Romanian Law 286/2006, article 4). In this work we consider the rural areas where the local governing authorities offer services to a small set of surrounding villages. The average administrative territorial area is 9000 hectares (INS, 2013). Also, in average, a district manages the activity of 70 local governing authorities in the rural areas.

In figure 1 we present the distribution of the local governing authority's size (in number of citizens) in the rural areas according to the Romanian Statistical Yearbook (INS, 2013). In this graph we observe that most of the local governing authorities have a small number of citizens. Obviously, this aspect raise challenges in terms of public management efficiency.

In our discussion the fiscal body operating within the local governing authorities have the responsibility of collecting taxes from the taxpayers. Hence, it operates as a speciality compartment within the local governing authority but its activity is subordinated to the central fiscal body, to which it reports the evolution of the tax collection process.

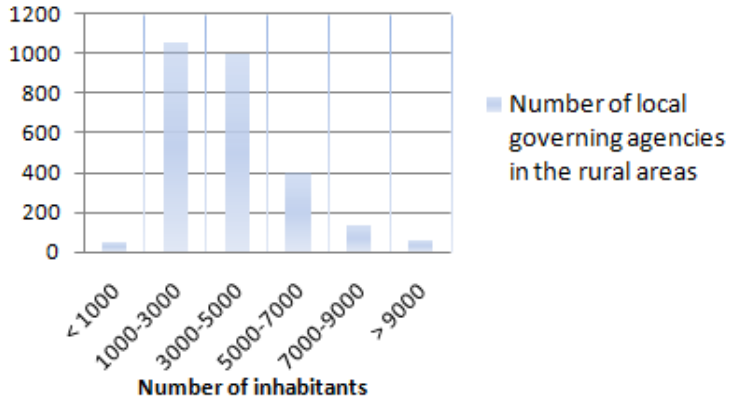

Figure 1: The distribution of the local governing administration size.
Source: Authors' contribution

The Agency for Payments and Intervention in Agriculture (APIA) operates under the Ministry of Agriculture and Rural Development according to the Romanian Law 1/2004 with subsequent amendments. The institution has the following organization: central unit, 42 district centres and 210 local centres. Hence, this body has a nationally spread structure which can be characterized as a tree with three administrative levels.
Since January 2007, APIA is in charge for carrying European funds to implement support measures financed by the European Agricultural Guarantee Fund (EAGF). The subventions are awarded to farmers as direct payments per hectare, managed by the Integrated Administration and Control System (IACS) according to the market measures for the implementation of trade mechanisms under the Common Agricultural Policy (CAP). Regarding the management of the European funds granted to farmers, APIA has the following main responsibilities:

- Provides verification of payment requests received from beneficiaries;
- Authorize the payments to beneficiaries after verifying their payment requests;
- Notifies the beneficiaries of any irregularities noticed in order to resolve them;
- Runs authorized payments to beneficiaries;
- Tracks the framing within the funds allocated for the activities mentioned above;
- Ensure that the requirements regarding public information on its activities.

In figure 2 we present the interactions of a taxpayer with the local governing authority and APIA. In this context the taxpayer is either an individual or a legal representative of a company that owns or rents a given surface of land within the administrative territorial area of a local governing authority, denoted with AL2. The taxpayer has a yearly obligation of tax payment to the local governing authority according to Romanian Laws 273/2006, 215/2001 and the 28/2008 Government Ordinance, all with subsequent modifications.

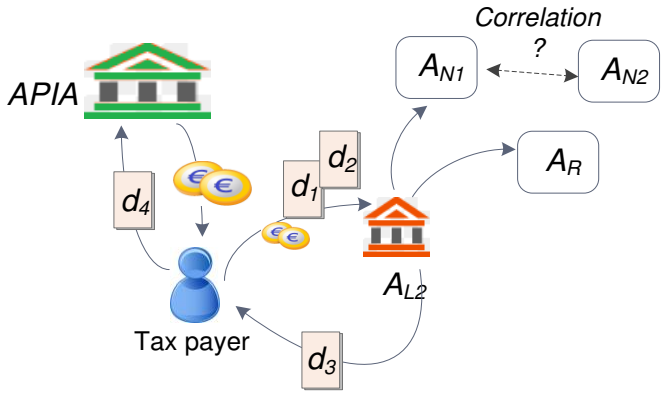

Figure 2: Overview of the problem space at local level.
Source: Authors' contribution

In relationship with APIA, the taxpayer that has a position opened in the Agricultural Register is called farmer. Yearly, a farmer that is registered at APIA receives an invitation to declare her land, culture types and livestock for the current year. For this, the farmer has to obtain a certificate with the content of her position in the Agricultural Register. This document is issued by the local governing authority and we denote it with d3. Forward, the farmer goes to the local APIA centre on the scheduled date and submits a request for payment, denoted with d4. After a while, for the valid requests for payment, APIA orders the bank transfers for the calculated amounts, to the farmers' bank accounts.
For the previously discussed context we identify a set of main issues, which we forward describe. The taxpayer declares the land surfaces, buildings and other taxable properties to the tax office within the local governing authority. This is one of the bases for calculating the annual tax for a contributor. Yearly, the same taxpayer declares to the Agricultural Register office values for the same list as to the tax office. At different key-moments like the end of the financial year, the local governing authorities are facing problems when confronting synthetic data from the two offices. They sometimes find substantial differences between the two amounts, leading to confusion and lack of governance control.
Some local governing authorities have developed applications for the tax collection management. Even these agencies could find sooner the previously described issue due to various process and document flow defects. In this case, other taxpayers may have to spend significant time intervals waiting in line to access the service. Hence, we note a loss of time for both the clerk and the concerned citizens.
At national public management level, the lack of an integrated system for the public services can lead to lack of data correlation, decisions and actions between different state institutions, denoted with AN1 and AN2 in figure 2.
A real understanding of the scale impact caused by the before mentioned issues can be obtained if we multiply the defects with the number of local governing authorities at national level.

3. Proposed solution

In this section we present the solution proposed to address the problems identified in section 2. Hence for two distinct perspectives – governance and infrastructure we give the details of a collaborative integrated system, highlighting important system requirements. We consider that this discussion could start interesting research challenges in the fields, leading to a better social welfare.

We consider that software and hardware infrastructures of quality should be major concerns of the governing authorities at all levels. In this context we define quality as realistic standards created and imposed by public governing authorities to partners developing their software and hardware infrastructures in order to obtain maximum satisfaction. Through satisfaction we refer to a guaranteed system behavior, according to valid quality system requirements professionally documented, and accordingly felt by all types of stakeholder.

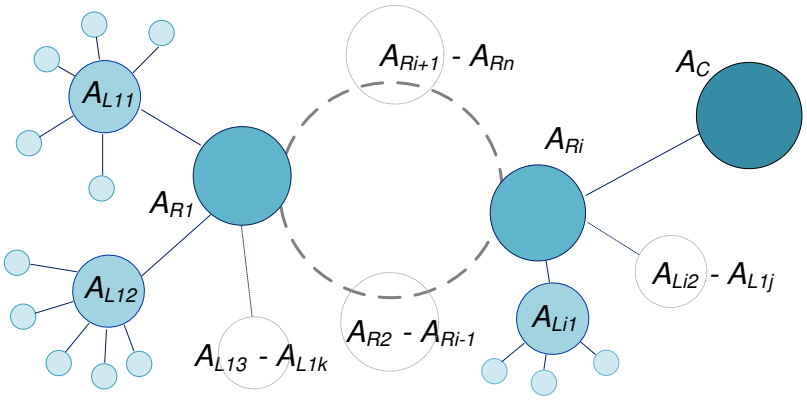

Figure 3: General architecture of the proposed system.
Source: Authors' contribution

Forward in this section we present the vision for a software solution that addresses the problems identified and described in section 2. We propose a general system architecture, we describe coordination and integration mechanisms for the solution, we document the system features and finally discuss the benefits for stakeholders.

In figure 3 we depict the solution proposed for the Agricultural Register management. This is a hybrid system architecture, using the client-server model for the document management at local and regional levels and a peer-to-peer model for the integration of all regional governing authorities at national level. Consequently, we can state that the system is a super-peer network.

We propose a client-server communication model for the regional (at district level) management of the Agricultural Register. The rationale for this approach is that a regional administrative entity is motivated to provide the necessary infrastructure for the subordinate local authorities. As we discussed in section 2, a local governing authority would provide service (i.e. store backup data) for an average of 70 local governing authorities. Another reason for this architecture choice is that the client component running at local governing authorities are independent, managing data from the local context. The advantage is their functional independence from a permanent Internet connection, which could be a real issue for some rural areas. In

general, the communication between AL and AR should comprise periodical saving of backup data, exceptionally obtain recovery data and access data from other regional governing agencies.
The client component running at AL should have local backup mechanisms. Since some of the local authorities have unstable, poor or no Internet connection, the system should provide for the server component running at AR manual update mechanisms. This would function as follows: a user creates a dump file at AL, and then uploads the respective file from a computer connected to the Internet (which can be geographically located outside the local governing agency). By this, the server component can keep more accurate data for subordinate authorities even with no or poor Internet connection with them. Consequently, governing stakeholders from upper levels (AR, AC) will have more up-to-date information regarding the Agricultural Register.
In figure 3, for a clearer presentation of the system architecture we omitted to represent all local and regional governing entities. Hence, AR1 is also connected to the remaining local authorities AL13 – AL1k.
A server component is running at each regional governing authority, which for the current national administrative organization is considered at district level. A server component has also knowledge (i.e. is connected to) of some of the other servers running at regional governing authorities. For this, we propose the employment of the Chord protocol (Stoica et al., 2001, 2003). The advantages of such a distributed solution at national level would imply:

- High fault tolerance of the system due to distribution of data and functionality over the structure at regional level: the server components would communicate in a peer-to-peer fashion among them.
- Insignificant or no down-times for the server components: due to the distribution mechanisms, the role played by a particular server running at AR could be rapidly taken over by another server in the system in case of unexpected failure. This also provides the means for an easy planned maintenance of servers.
- Prevent the system from malfunctioning due to local or regional hazards.
- Reduce the costs with maintenance and local data backup at any AR since data is replicated across the system.

A distinct component that runs at the central governing authority (AC) would provide to stakeholders means for generating various reports on data from all regional governing authorities. The proposed distributed architecture at regional level allows the central authority to access data from any AR.
Another important advantage of the overall proposed system architecture is the capability of integrating any other services that nowadays run on different independent systems at local and regional governing authorities. This solution is capable of supporting other similar services, since it relies on abstract, elastic and adaptive communication mechanisms fitting to the governing organizational structure.
The presented architecture supports the collaboration of the components, allowing the development of a system with integrated functionalities. More, the architecture takes into account the users from different governing levels, which is essential for obtaining an integrated system (Danaiata et al., 2008).
An integrated document management solution for the local governing authorities

would provide through collaboration and communication mechanisms means of integration with other systems employed by other governmental bodies.
More, when designing such a collaborative system with super-peer architecture, the system designer can easily add new levels of abstraction, or build new overlaying functional layers. In the context of regionalization, new functionality can be easily added to the system, which, for instance, would provide service for certain groups of governing authorities at district level. In this way, we insure the maintainability of the system.
The impact of the system on different types of stakeholder from local, regional and central governing authorities is significant, since it leads to a better control over the administrative processes due to availability of more accurate data compared to the traditional informational system. Also, stakeholders can be more reactive to context changes due to the availability of synthetic information reported by the system shortly after data registration in territory, at local level.

4. Related work

Kunis et al. (2007) propose a model for document management in e-government systems based on hierarchical process folders, providing security mechanisms that are tailored to the processing of distributed government processes within and between authorities.
In Viscusi et al. (2010) we find the pursue of studying the importance of the knowledge in information systems for all public administrators. Their findings show strong correlations of information systems background of the public administrators and the quality of the provided services and related processes. More, the authors present methodological frameworks for developing optimal e-government plans while considering technological, economic, organizational and legal aspects. The methodology relies on the quality of the provided services and related processes, as well as the quality of the data managed in the administrative services and processes.
The research group of the United Nations Department of Economic and Social Affairs showed in a recent study (Qian et al., 2012) the benefits of public investments in IT infrastructures made by local governing authorities in rural areas from different countries. Also, the authors present the pursuit of many UN Member States to move from a decentralized single-purpose organization model to an integrated whole-of-government model in order to increase the effectiveness and efficiency of the administrative processes. More, the study argue for the interconnection of different state individual agencies in order to deliver services that successfully deal with the complex economic and social challenges.

5. Conclusion and future work

In this work we presented system analysis and design elements for the management of the Agricultural Register issue at local governing authorities in the rural areas. For the proposed solution we gave and argued the general system architecture, describing the key-mechanisms that support the identified quality requirements. We showed the importance of the integration of services while designing a system and highlighted the impact of the quality requirements on the satisfaction and efficiency of the stakeholders.
As future work we propose to develop this analysis by documenting and validating

functional and quality requirements for the proposed solution in the discussed context. We also intend to continue this work with a detailed economic analysis for the proposed system in order to identify the resources needed for its development.

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