Knowledge Base and Ontology for Managing Human Resources for the Administration of Staff Training

Prasant Kumar Acharya[1]Siba Prasad Mohapatra[2]

1(Department of Basic Science & Humanities ,Gandhi Engineering College, India)
2(Department of Basic Science & Humanities ,Gandhi Institute For technology, India)

Abstract: *In this paper we examine the management of human resources in public administration in The Republic of Srpska, with special emphasis on the staff training. Since the process of training staff is very long and complex and there are a lot of different areas of knowledge that staff in public administration should be competent in, here we focus only on a segment of knowledge concerning office (administrative) operations. Office management involves the tasks in the public administration required to register, follow the progress of work and provide the essential functions of the public administration organisation. We will look at the knowledge required to properly understand office work, planning, the start and finish of work according to the agreed schedule and to the satisfaction of the users and service providers. We will use the latest tools, knowledge bases, ontologies and the Semantic Web to demonstrate that management and staff training may be conducted more efficiently. In order to update the knowledge base we will use Protégé-OWL editor.*
Keywords:- knowledge bases, ontologies, training staff, office management, software tools.

I.   Introduction

Public administration now operates in a very complex, constantly changing environment that is neither stable nor predictable. New demands and expectations from citizens, changes in political and economic systems and the application of European standards, impose the need for changing the way public administrations operate in Bosnia and Herzegovina (The Republic of Srpska) to adapt to these new circumstances. Bosnia and Herzegovina is a complex community composed of two entities and one district, the Federation and The Republic of Srpska and the Brčko District. In this paper we look at development and human resources management in the entity of The Republic of Srpska with the use of new software solutions based on ontologies and knowledge bases. The principles governing staff training and human resource management are different in the other entity and the Brcko District. The public administration of The Republic of Srpska is made up of 16 ministries, 6 administrations, 24 administrative organizations and 63 local government units. Its success depends on the quality of its staff and the training it provides to them. So that public administration is a better, more efficient service provider, staff training must be carried out on a continual basis in order to ensure more efficient management. Knowledge, creativity, innovation, cooperation and motivation, as well as the application of new technologies are necessary prerequisites for the success of public administration. The quality of its personnel largely depends on the knowledge of its adoption, dissemination, collection and administration. Therefore, in this paper we focus on the innovative skills of employees while at work in the public administration. Human resources management in public administration is quite a complex process and starts with recruitment, which consists of a competition that is followed by the selection of sucessful candidates, decision-making regarding their rights and resposibilities, their accountability, placement, ongoing assessment of the quality of their work, progress and capabilities. Each of these stages is complex and can be broken down into a number of sub-stages. The personnel who wish to advance and provide higher quality work should be constantly educated and trained. This paper follows one segment of this education, which refers to the use of knowledge bases and ontologies in the process of acquiring knowledge in office management of public administration in The Republic of Srpska. We use new software tools to introduce the basic knowledge that is required and we present the necessary skills required in a little more detail as they refer refer to office (administrative) operations. Here we will present only a simplistic "picture" of the knowledge required for the human resources development. The knowledge includes: knowledge for defining the mission, vision and strategy, knowledge of the human capital management, knowledge of the quality system, knowledge necessary for predicting future services, methods of knowledge innovation, team work knowledge, how to introduce innovation and develop creative spirit, how to motivate, how to develop mental and physical skills, how to encourage more efficient work, how to give credit to those who deserve it, knowledge about the work culture and service processes, knowledge of good communication and the required technical solutions for knowledge sharing.

Due to the scope of this paper, we focus only on the part concerned with the staff training, i.e on the innovation in their knowledge. Figure 1 ("Required knowledge for Human Resources Management") presents the general picture of the required knowledge, while the segment that we address in this paper is specially marked. For knowledge presentation we use Protégé-OWL ontology.
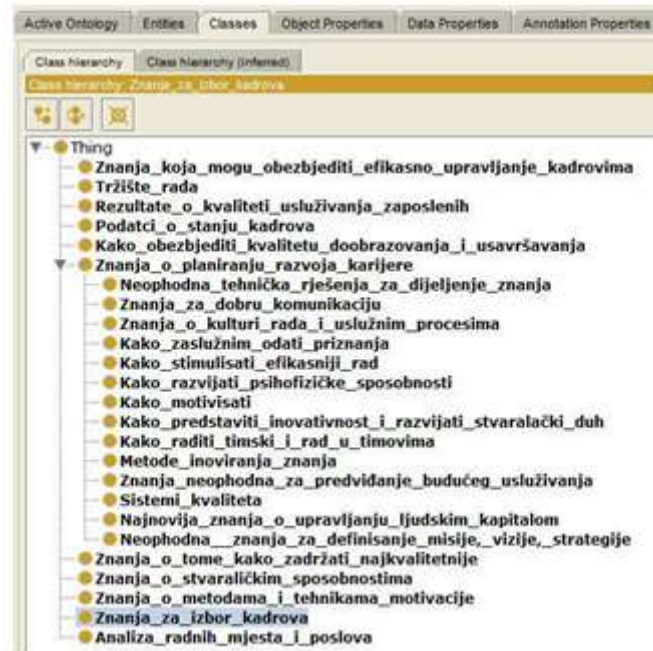
Figure 1: Required Knowledge for Human Resources Management

This knowledge with many detailed features should be implemented in the new automated service system. The system should be designed to ensure that each administrative body and local self-government unit only has access to their data for updating and e management, while the information can be viewed by all the bodies in a variety of statistical reports. All the knowledge in the system must be available to all employees in the public administration of The Republic of Srpska in appropriate quantity, at the appropriate time and in the appropriate place as "procedural knowledge". The system must offer adequate knowledge and suggest options for more effective service to its users. It should be transparent and should offer more knowledge to different users in a format that suits them best - electronic or mobile one. It should perform an analysis of the situation and propose the appropraite solutions for a specific job and a specific employee. The system should have an adequate amount of high quality data, verified information and relevant knowledge.

II. Ontology

The notion of ontology is more of a conceptual idea rather than a strictly defined formalism for expressing knowledge. It describes a specific area through the terminology of a field, its basic concepts, classification of these concepts, and the connection between concepts by defining the rules that govern them. This is a detailed description of the structure of an area of knowledge, with the formal definition of mutual relations and connections among the various elements of the area [1]. They are used for knowledge presentation, management and organization of knowledge, modeling and designing of knowledge bases as well as for searching and downloading the required knowledge. Different authors provide different definitions of ontology: "An ontology is a formal, explicit specification of shared conceptualization" [1] and can be defined as a set of terms and relations between them, which describes a specific domain or field of knowledge. The domain can be any subject area, irrespective of its level of generality. So that it can be used (to be computer readable) by the system, an ontology must be formally recorded. It displays a certain knowledge that is used by a programme. As such, it is accepted in business and scientific systems as a medium for sharing, recycling and processing of knowledge by using appropriate software solutions. It is an integral part of a large number of applications, knowledge management, linking the separate islands of information and knowledge, the semantic web, electronic commerce and so on. An important characteristic of an ontology is that it can be updated with new concepts and relations and it is subject to change and revision. Creating an ontology is an iterative and upgradeable process. When introducing new concepts in an ontology, a problem might arise - whether they will be presented as a class or class feature. If these concepts are without properties, for the purpose of clarity, it is more useful to define them as a class. Ontology should be maintained and updated with respect to the acquisition of new knowledge in the field of public administration. When we talk about the ontology, it is important to know in which context it is used. Here, we will primarily deal with the possibilities of sharing knowledge in the system of management and staff development.

III. Protégé-Owl Editor

A number of languages and tools for describing ontologies is used worldwide. The most frequently used language is OWL (Web Ontology Language) and ontology editing tool "Protégé-OWL." Web Ontology Language is a developed environment presented by the World Wide Web Consortium (W3C). It is a language for describing ontologies on the Web, based on the RDF syntax. We can say that OWL is a language for knowledge presentation since it is used to describe data and information, which then become knowledge rather than data collection. With it, it is possible to accurately describe the characteristics of data and information in the information system. Within the OWL it is possible to[3]:

- define the cardinality of a property,
- define synonyms for objects, classes and properties,
- define limits on the values that a property can take,
- define new classes by applying a set of operations on the existing classes.

Protégé is an open source platform that allows users to: read and save OWL and RDF ontologies, update and visualize classes, define logic class characteristics and the reasons. It is used to present the meaning of terms and the relations between those terms. Also, it provides a rich set of structures and modeling activities that support the creation, visualization and manipulation of ontologies represented in different formats. It was developed at The Stanford Center for Biomedical Informatics Research at the Medical School of The Stanford University in California[4]. When working on the system for staff management and development in the public administration of The Republic of Srpska, we use Protégé-OWL tools for editing ontologies, primarily those related to office work.

IV. Management And Staff Development

Management of human resources and their development requires certain interconnected and complementary actions which are directly or indirectly linked to the objectives of the public service administration. Each institution or unit of local self-government will only be as successful as the quality and training of their staff. Public administration of The Republic of Srpska needs to invest more in the education and training for all employees if it wants to ensure the satisfaction of its customers. A part of the required knowledge in the staff development in the public administration of The Republic of Srpska is given in Figure 2, "Part of the required knowledge in the process of career development and innovation of knowledge."
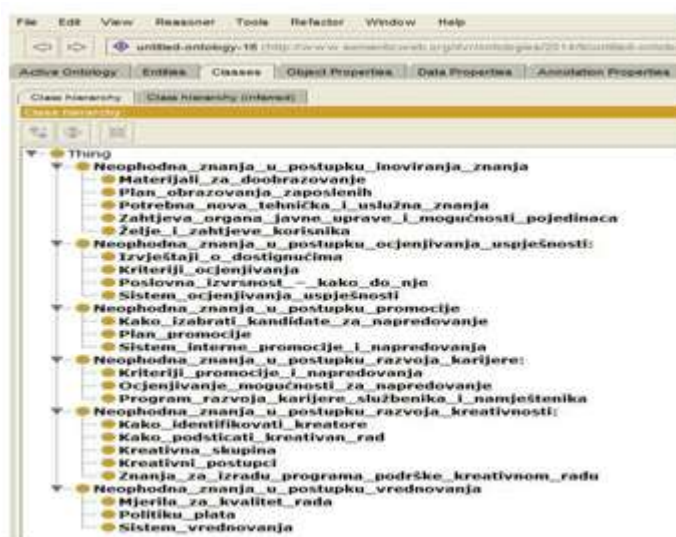

Figure 2 Part of the required knowledge in the process of career development and innovation of knowledge.

In addition to these, the following skills are required: communicational, pedagogical, technical, psychological, economic, demographic, legal and so on. Part of this knowledge can be presented by using Ondographs Figure 2a. "Part of the additional knowledge." This knowledge cannot be collected easily, quickly, efficiently and effectively. The management and staff training system we are working on can achieve it by using software agents and the Semantic Web. At appropriate time, software agents could be activated to provide the required knowledge from other knowledge bases. This knowledge is considered to be "procedural knowledge" in the required amount, and in due time.
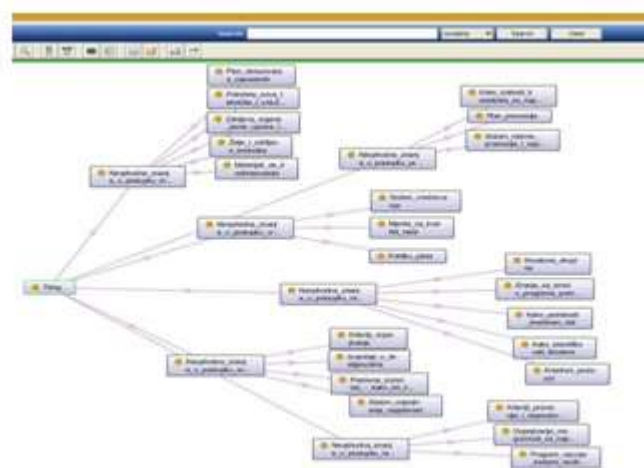
Figure 2a. Part of the Additional Knowledge

Different technological solutions based on ontologies, electronic and mobile serving (e-m-Service) should provide a transition to the intelligent operations in public administration (e-m-i-Management) [5]. This concept will surely improve efficiency and effectiveness of its work. Greater and more effective use of new technology solutions will provide effective communication between the citizens and business systems as users of services and public administration as a service provider. The concept is based on knowledge (e-m-i-Government) should enable service without physical interaction with providers (ministries, departments, administrative organizations and local self-government units - municipalities/cities).

V. Strengthening Human Resource

If we think about strengthening the human resources in the public administration in The Republic of Srpska (Bosnia and Herzegovina), we have to consider the required knowledge on the principles and methods of authority. This is the basis for the proper execution of all tasks in the process of providing services. In order to effectively perform their daily duties, officers in administrative bodies and local self-government units (public administration) must be familiar with the principles of work of the administration, types of service processes, as well as the relations of administrative bodies with other bodies and service users. Officers with the authority to make decisions in administrative proceedings must have adequate knowledge of basic administrative procedures. In performing basic tasks, the personnel in public administration have the duty to ensure expediency, legality, regularity and propriety. Thus, in this respect, continuing professional development and updated knowledge is essential, especially in the field of office management. The automated system based on ontologies, semantic web and knowledge bases must have the knowledge of the principles of the work of: ministries, administrations, administrative organizations and local self-government units. This knowledge must be accessible not only to service providers (public employees), but also to the users of their services (legal and natural persons). The access to the required skills must be provided not only through computers but also on mobile devices. One must have knowledge of the ways of providing services and be familiar with the principles of the organization of the public administration, the relations between the bodies and service users. This is all for the purpose of a more transparent and efficient service to the citizens. New technological solutions, new ways of thinking, acting, managing processes and staff development are essential elements of modern public administration. Planning and management with new technological solutions based on knowledge contribute to the achievement of service objectives, support the achievement of the service goals of the administrative authority and give the ability to make decisions based on access to the relevant data, information and knowledge. Establishing a single management model using technological solutions based on knowledge bases provides the implementation services with wide-ranging data allowing them to assess the economic, political and social situation, and ensure that the service objectives and developments are consistent with other documents. In order to achieve this, decision maker must regularly receive updated information and "procedural knowledge" about all the events to allow them to implement and affect the quality of services. This would provide public administration with a strengthened ability to overcome the challenges faced by government bodies, allowed improvements in the process of mid and long-term planning, policy-making, implementation, monitoring and evaluation of their effects.

Figure 3 "Required Knowledge for Building Capacity."

Employees in public administration must apply their knowledge of public policy, the basics of the legislative process, the civil service system, the legal system of the European Union, management and planning in the public administration, the basis of the budget system, the fight against corruption, leadership in public administration, human rights, data protection and business communication. They must also possess the skills to allow them to use information technology, and presented in Figure 3 "required knowledge for building capacity." In addition to this knowledge presented with very few details, the employees in the public administration must know the basics of office management, which we will discuss in more detail now.

VI.   Office Management

Office management involves the work being done in the public administration and comprises: receiving, opening, viewing and distribution of emails or documents, registration and gathering of documents, their delivery, processing, sending and placing them in an archive (backup) for storing. The process of document movement in office operations is presented in Figure 4 "Basics of Office Management."

Figure 4 "Basics of Office Management."

The basic concepts related to office management that every employee in the public administration of The Republic of Srpska should know and be able to get as "procedural knowledge" are shown in Figure 5 "Basic Concepts in Office Management."

Figure 5 Basic Concepts of Office Management

The required knowledge in the procedure of mail reception and distribution in the public administration of The Republic of Srpska is presented in Figure 6 " Mail Reception and Distribution"
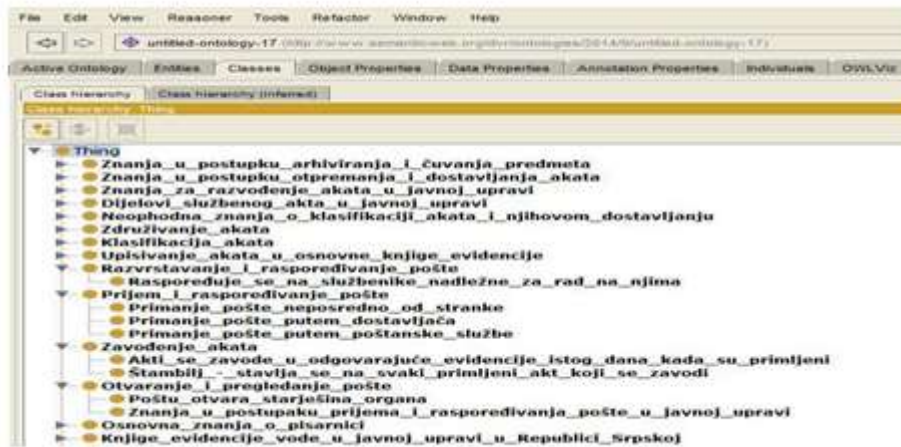

Figure 6 Mail Reception and Distribution

The required knowledge on document registration in the registries, on document classification and pairing in administrative bodies are shown in Figure 7 "The Document Classification and Pairing".
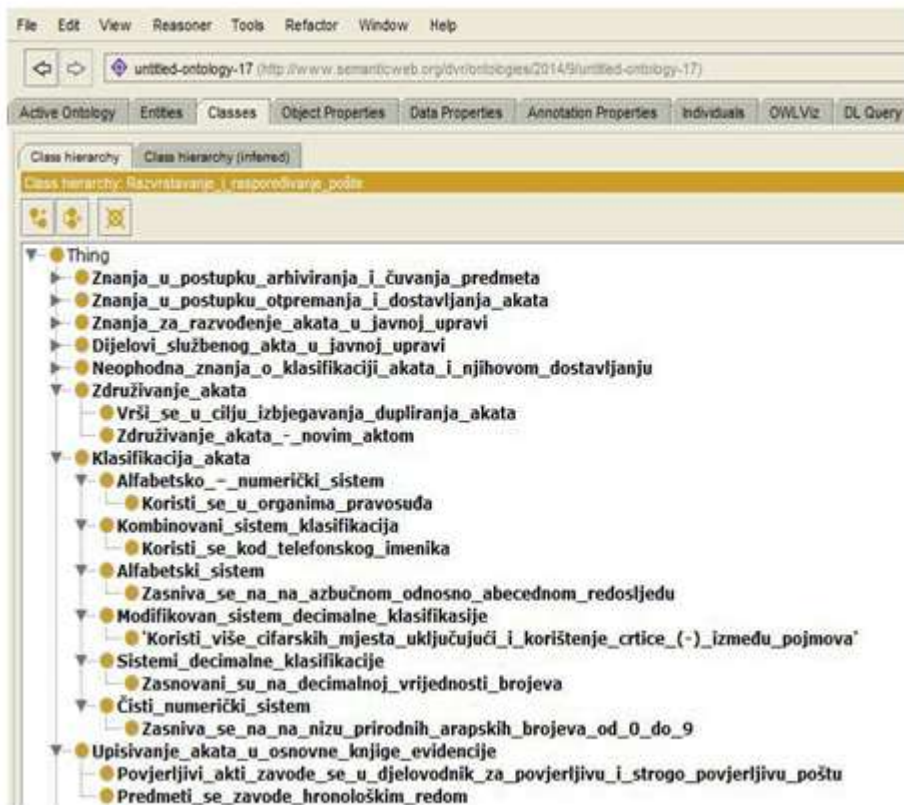
Figure 7 The Document Classification and Pairing

For the integral parts of decisions regulated by Article 194 of the Administrative Procedure Code, see Figure 8 "Components of Official Acts and decisions." The required knowledge in the process of sending and delivery of documents is presented in Figure 9 "Sending and Delivery of Documents."
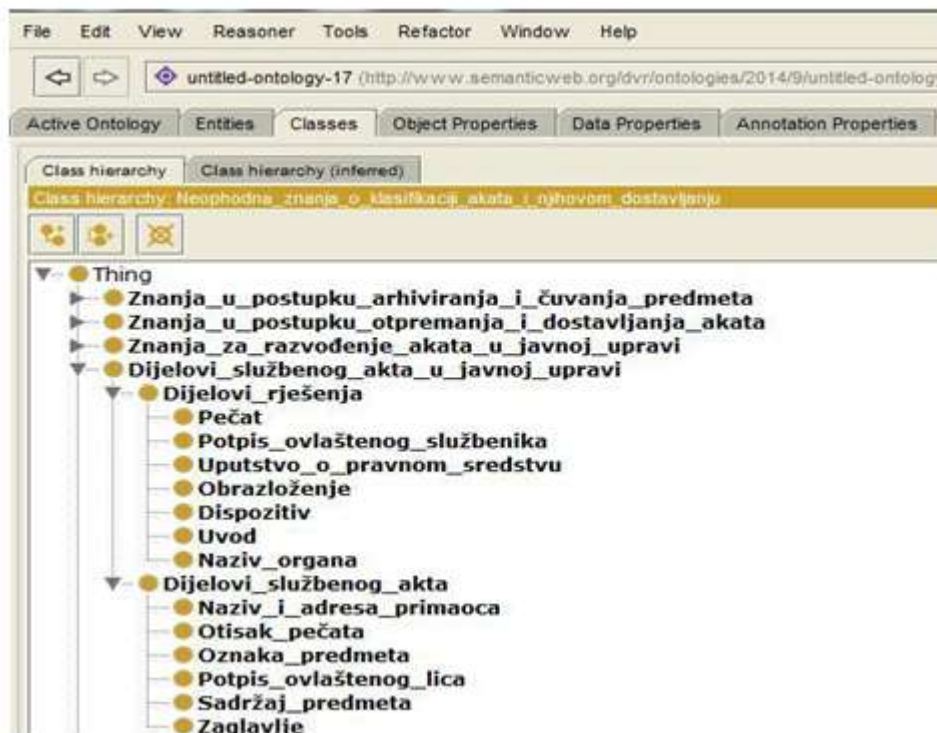

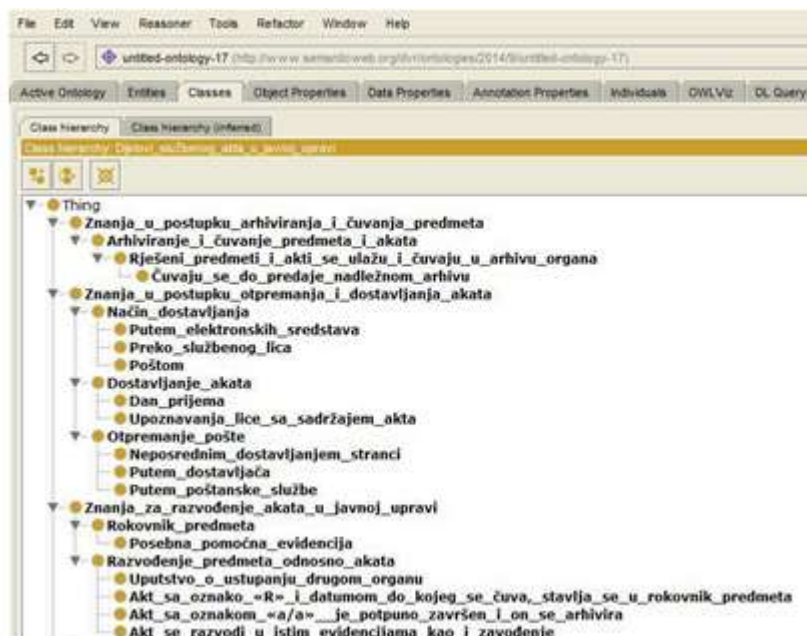**Figure 8** Components of Official Acts and Decisions

Figure 9 Sending and delivery of documents

VII. Conclusion

In this paper we presented a new perspective on human resources management in the public administration of The Republic of Srpska, with special emphasis on the application of knowledge bases, ontologies and new software applications used in the training of personnel in the field of office operations. The process of training staff begins when they start work and ends with their retirement or transition to another economic system. This is an ongoing process because there are a lot of different areas of knowledge that staff in public administration should possess, and here knowledge bases are important for office (administrative) operations. By using the latest tools, knowledge bases, ontologies, semantic web management and straff training can be carried out more efficiently.

Reference

[1]. K. Klarin, "Ontologija i razvoj informacijskog sustava u javnoj upravi," CASE 23, Zagreb, 2011.
[2]. W. N. Borst, "Construction of Engineering Ontologies for Knowledge Sharing and Reuse," Centre for Telematica and Information Technology, University of Twenty, Enschede, The Netherlands, 1997.
[3]. Paunović L., Uticaj ontologija na funkcionalnost Web-a, INFOTEH-JAHORINA, Vol. 11, March 2012.
[4]. B. Smith, C. Welty, „Ontologies: Towards a New Synthesis," FOIS'01, October 17-19, 2001, Ogunquit, Maine, USA, 2001.
[5]. Radivojević M., Concept for Advanced Electronic, Mobile and Intelligent Government Services, International Journal of Managerial Studies and Research (IJMSR) Volume – 1, Issue-3, H.No: 8-3-229/A/7, 2013.