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The new approach to monitoring of public finances based on new technological solutions and knowledge bases

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Abstract

In this paper we deal with new technological solutions and knowledge bases in the area of public finances. We observe a different concept of the use of knowledge on public finances with special emphasis on the use of the new technological solutions based on knowledge bases. We suggest how the new information system efficiently comes to the necessary knowledge related to public revenues and expenditures with the use of new software tools and knowledge bases. We want to ensure that with the use of Protégé-OWL editor and new software solutions is enabled to all those who deal with public finances to quickly and easily access the necessary knowledge. For this to be achieved is required a different approach of recording the necessary knowledge about public finances in the knowledge bases based on the concept of ontologies and with the use of the new technological solutions that can be achieved.

Keywords: Public Finances, Revenues, Expenditures, Knowledge Bases, New Software Solutions

Introduction

Finance is a discipline whose subject and content framework is very complex because of their affiliation and interdependence with numerous scientific disciplines. There are many different definitions of finances and here under finances we imply raising money to perform certain tasks. Finances consist of: public finances (finances of the state and other public corporate bodies), trade finances (finances of the individual business systems), monetary finances (finances of the central bank, finances of the commercial banks, finances of the insurance companies) and the international finances.

Public, commercial, monetary and international finances are interlinked and it is not possible to ensure the successful functioning of one financial part without the functioning of all other components.

To be able to fully review the problem related to public finances, we decided to create a database of necessary knowledge required to any user. For this we will use open source available solutions which are recommended by the W3C consortium.

There is a large number of languages and tools for describing ontologies and knowledge bases and in this paper we used OWL (Web Ontology Language) and a tool for editing ontologies “Protégé-OWL”. Protégé is an open source platform that allows users to: read and store ontologies, update and visualize classes, define the characteristics of logical classes, present reasons and update [1].

Ontologies help in structuring and raising knowledge in a general manner and therefore can be reused and shared by different applications and between different groups of people. Ontology can be a formal tool to store and organize knowledge and thus represents a software upgrade. Chi and Hsu [2] the approach to the development of ontologies define as a process of inclusion and acquiring knowledge, its storage, retrieval and use.

The solution that we propose for recording the necessary knowledge related to public finances is based upon Protégé platform for reading and storing ontologies and to update the knowledge necessary for more efficient and more effective use of knowledge on public finances.

An effective state must ensure the functioning of the legislative, executive and judicial powers. In order to be able to achieve that, it needs financial resources. The scientific discipline that studies the processes of collecting public revenues, their distribution and spending are called public finances. Many authors, in their papers instead of using the term public finances they use the term state finances. Public finances present the economic discipline that studies the financial activity of the state and other legal entities that are legally entrusted to carry out such activity. In order to be able to create a comprehensive knowledge base of the public finances, there should

be terms related to public revenues, public loans, public expenditure, budget, banking system. For their presentation in the knowledge base we used "Protégé-OWL" editor (Figure 1. Javne finansije Public finances). In each of these areas could be created a very comprehensive knowledge base. The authors of this paper will present only a small part of that knowledge in order to be able to look at a new concept of presenting the public finances by means of ontologies and the semantic web.

Due to the specificity of the public finances in some countries, in this paper we will mostly deal with public finances relating to Bosnia and Herzegovina. A good part of these terms is the same in the member states of the European Union.

Public finances among other things include: public revenues, public loans, public expenditures, budget and banking system. (Figure 1.)

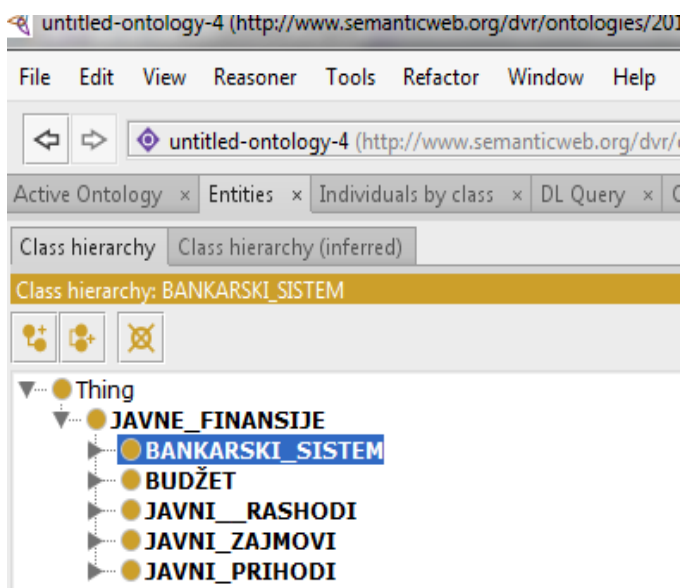


Fig 1: Public Finances

2. Public revenues

The funds that the state uses to meet the needs in their jurisdiction are called public or state revenues. Their form and content have changed over time and are most dependent on the socio-economic system, political order, economic structure, per capita income, the size of the territory, economic links with other countries and the like. So, in this way the type and the number of revenues which are used to meet the public needs are different from one country to another.

Public revenues can be defined as transactions that increase the net assets of the state at all levels of government [3]. A transaction can be defined as the mutual connection (interaction) between the two units based on their mutual agreement.

In order to secure the financing of the military, police, judiciary, public administration and similar, every state must have on its disposal a certain amount of money, which will be expressed through a system of public revenues. Under public revenues we include funds that the state collects or obtains by fiscal means and on the basis of their fiscal sovereignty [4]. The biggest part of this revenues the state collects from taxes in the tax system.

Revenues of the state or the public revenues have the following characteristics [5]: they are collected and expressed in money, they are collected regularly (annually or in some interval), the payment does not prejudice the existing assets,

they serve for meeting the costs which have a general character. The necessary knowledge about the characteristics of the public revenues are updated using Protégé-OWL editor and are presented in Figure 2. (Characteristics of the public revenues (Karakteristike javnih prihoda))

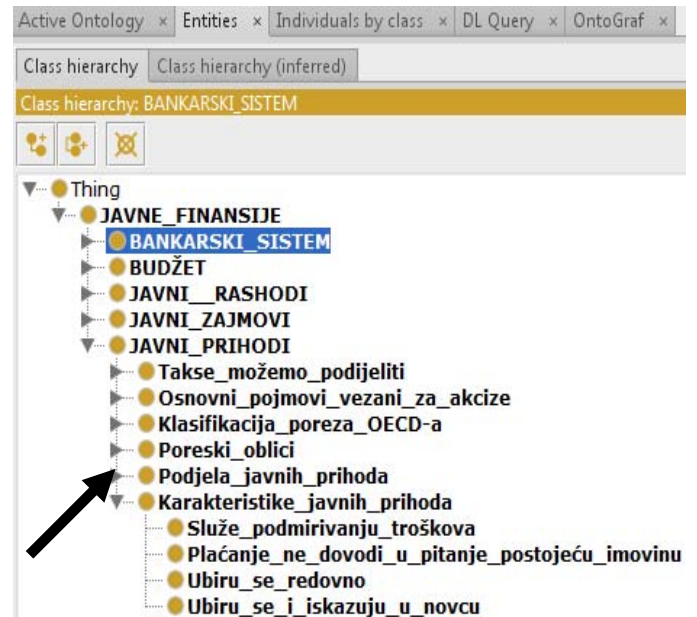


Fig 2: Characteristics of the public revenues

The type and the number of the revenues used to cover the public needs are different from one country to another. In practice, there are a lot of classifications and divisions of the public revenues, here we mention only a few of them while in the knowledge base are listed in much more details. These revenues can be: Regular (collected continuously, in certain period of time), (redovni (prikupljaju se kontinuirano, u određenom vremenskom periodu)), irregular (do not have temporal continuity), (vanredni (nemaju vremenski kontinuitet)), revenues from population (revenues that the citizens provide from their income and assets), (prihodi od stanovništva (prihodi koje građani obezbjeđuju iz svog dohotka i imovine), revenues from legal entities (revenues from business systems based on profit and assets), specific and general (depending on the defined purpose of spending), and the like. (Figure 3. The division of the public revenues)

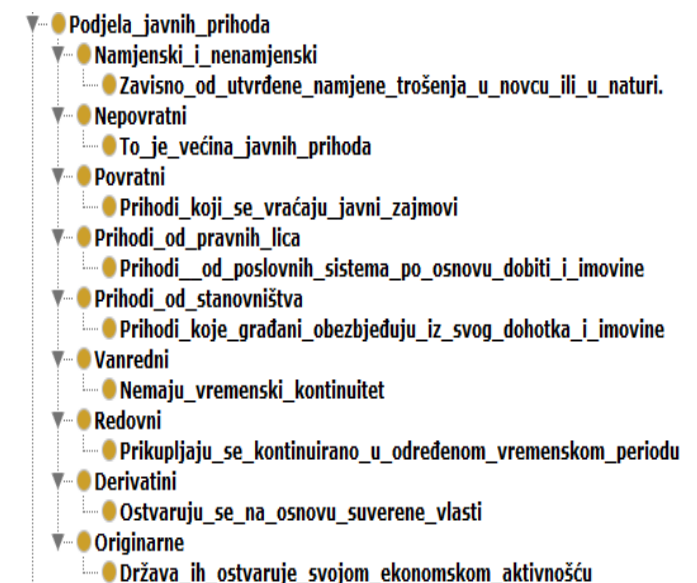


Fig 3: The division of the public revenues

1.1. Taxes

Taxes are the most important form of revenue in each country, so in the contemporary literature of the public finances to the study of the taxes is given a much more attention than to the study of any other form of the public finances.

In the tax system of Bosnia and Herzegovina we distinguish direct and indirect taxes. Direct taxes are: personal income tax, corporate income tax, taxes of citizens, taxes on coffee, tobacco and the like, while indirect taxes are: VAT, customs, excise and road tolls.

Surveys which are undertaken by the World Bank show that B&H in 2014 of 189 countries was on the 135th place according to the criteria for “the ease of paying the taxes”. Of all the Member States the biggest taxes on workers’ salaries has France –47%. In Germany they amount to about 45% and in Austria, Italy and Hungary about 40%. Below 30% are the levies on the wages of workers in the UK, Iceland and Switzerland and between 30% and 35% are in the Netherlands, Norway and Poland.

It is believed that the taxes in Bosnia and Herzegovina (B&H) are too high and that the collection system is rather expensive and irrational according to its degree of development. Because of their height a fewer number of businesses and citizens pay them and even those who want to pay quit when they encounter a very complicated tax bureaucracy. The tax system is often assessed as “tax hell”. Everybody warns that the taxes are too high and the regulations that regulate them are complicated, so that the tax officers themselves interpret them badly. Everybody agrees that this tax system is a burden for businesses and citizens, but nobody does anything to improve the situation. High taxes, frequent changes in tax regulations and their often arbitrary interpretation are one of the reasons for the poor performance of their payment.

Bosnia and Herzegovina is a complex community in which there are three legal and economic systems and is made of two entities, the Federation of Bosnia and Herzegovina (which has 10 cantons and 84 municipalities/cities) and the Republic of Srpska (which has 63 municipalities/cities) and Brcko District. Accordingly, there are: taxes on the state level, taxes on the entity level, taxes on the District level, cantonal taxes – taxes on the cantonal level, municipal/city taxes – taxes on the level of a municipality/city. A good deal of taxes is divided between the state, entity, cantons and municipalities.

For example: taxes on agriculture and forestry belong to the municipalities/cities, the tax on the income from self-employment is divided between entities and municipalities/cities in the ratio of 75% : 25%, while the annual income tax of citizens; tax on income from copyrights, patents and technical innovations; income from capital; tax on rental income and similar belong to the budget of the entity and the taxes on added value, customs revenues and excise duties belong to the state of Bosnia and Herzegovina. In this paper, due to its volume we will deal more with taxes at the state level and less on the entity, cantonal and municipality/city taxes.

The objective of taxation is to provide sufficient funds to finance the established public expenditures. Taxes have a certain characteristics such as: Derivativeness (taxes are an instrument of income redistribution), the enforced use (levy, charge, toll, warrant, impost...), are collected in the public interest (to settle the public, government expenditures).

Tax systems in different countries are different and their number varies from 2-3 up to 80 and more taxes. There are a large number of tax forms and in this paper we will specify the division according to the following criteria: direct,

indirect, subjective, objective and similar. (Figure 4. Tax forms)



Fig 4: Tax forms

Under public revenues (taxes) OECD considers and integrates all the required payments to the state for which it does not receive compensation directly or a counter service. Here we mention only the basic taxes: 1000 Taxes on income, profit and capital gains, (1000 Porezi na dohodak, dobit i kapitalne dobitke), 2000 Social security contributions (2000 Doprinosi za socijalno osiguranje), 3000 Taxes on payroll and workforce (3000 Porezi na platni spisak i radnu snagu), 4000 Taxes on property (4000 Porezi na imovinu), 5000 Taxes on goods and services (5000 Porezi na dobra i usluge), 6000 Ostali porezi, 6000 Other taxes, and in the knowledge base they are listed in a complete form. And they are represented by OntoGraf (Figure 5 Classification of taxes OECD).

The taxpayer is any legal or natural person who is liable to pay tax. In determining the taxpayer as a natural person it is monitored whether it is an individual or a family, while for legal entities it is linked to the status determination and the registration of the business system.

The tax base represents a qualitative and quantitative concretization of the tax object and is determined by using the following methods: *Indication* – observation of facts – visible state, *Direct* – based on the data provided by the taxpayer, *Indirect* – the data submitted by those who by nature have to deal with them, *Official* – data determined by tax authorities and *Comparison* – data determined based on the comparison.

Tax rates represent the portion of the tax base to which the taxpayer settles its obligation. Taxation is conducted by using a variety of rates that can be: *proportionate* - for them to change the tax base does not mean the change of its height,

progressive – with an increase in the tax base also increases the tax rates, and *regressive* – the increase in the tax base reduces the tax rates.

The tax evasion is dating from the beginning of its introduction. It depends on many different factors such as tax morale, the educational structure of the population, a sense of belonging to a particular community, the quality of work of the tax authorities, penal policy and the like. It is considered that the tax moral is high in the Scandinavian countries, the UK, USA, Germany, Switzerland and that it is at a lower level in Italy, Spain, Portugal, Greece, Turkey...In Bosnia and Herzegovina and in the countries of Africa, South America that level is very low. Estimates show that the budgets, because of the tax evasion is still withheld for 27% of revenues, France 10%, Germany 8%, Japan 7% and the UK 6%.

The structure of the tax system of one country is determined by numerous factors: the development of the economy, the degree of marketability of the economy, the educational level of the population, labor force structure, the way of financing of social security, the character of the state organization, membership in a particular international organization, historical development, tradition and the like.

Some of the taxes are Value added tax (VAT), it is the most widespread system of taxation of goods and services in the world and has been applied in more than 120 countries worldwide. This tax is one of the indirect taxes and it is not collected directly from persons who are taxpayers but by persons who are considered to be final consumers. It enables countries greater public revenues, particularly in the countries which are in the conventional systems had many problems

with tax collection. It's characteristic that the burden of taxation is borne by final consumers and thus is affected by the poorer strata of the society.

VAT rate in B&H is 17% and is within the average rate in the EU (which established that the standard rate of VAT may not be less than 15%).

Tax on the income in Bosnia and Herzegovina is prescribed by the Law on income tax and is paid by all natural persons who ear income. Under the income of natural persons is considered the sum of taxable income earned in the tax year. Personal earnings on which is paid tax on income are net salary and all financial and non-financial revenues, compensations and profits which the taxpayer produces on any grounds, if the law does not exempt or tax otherwise.

Real estate turnover tax is defined by the Law on the real estate turnover tax. Subject to taxation under this law is the turnover of immovable properties (land and buildings) and the acquisition of property rights to immovable properties on the territory of Bosnia and Herzegovina.

Contribution for social insurance is the most widespread system of mandatory social insurance, which is financed by mandatory contributions of employees and employers with the possible added support from the state budget. Social security is the protection which society provides for its members to help them ensure the economic and social difficulties caused by significant reduction in their economic strength due to illness, injury at work, unemployment, disability, old age or death. It provides, with one of its segments and the cover of the costs of treatment as well as special assistance (subsidy) in the case of prolonged illness.

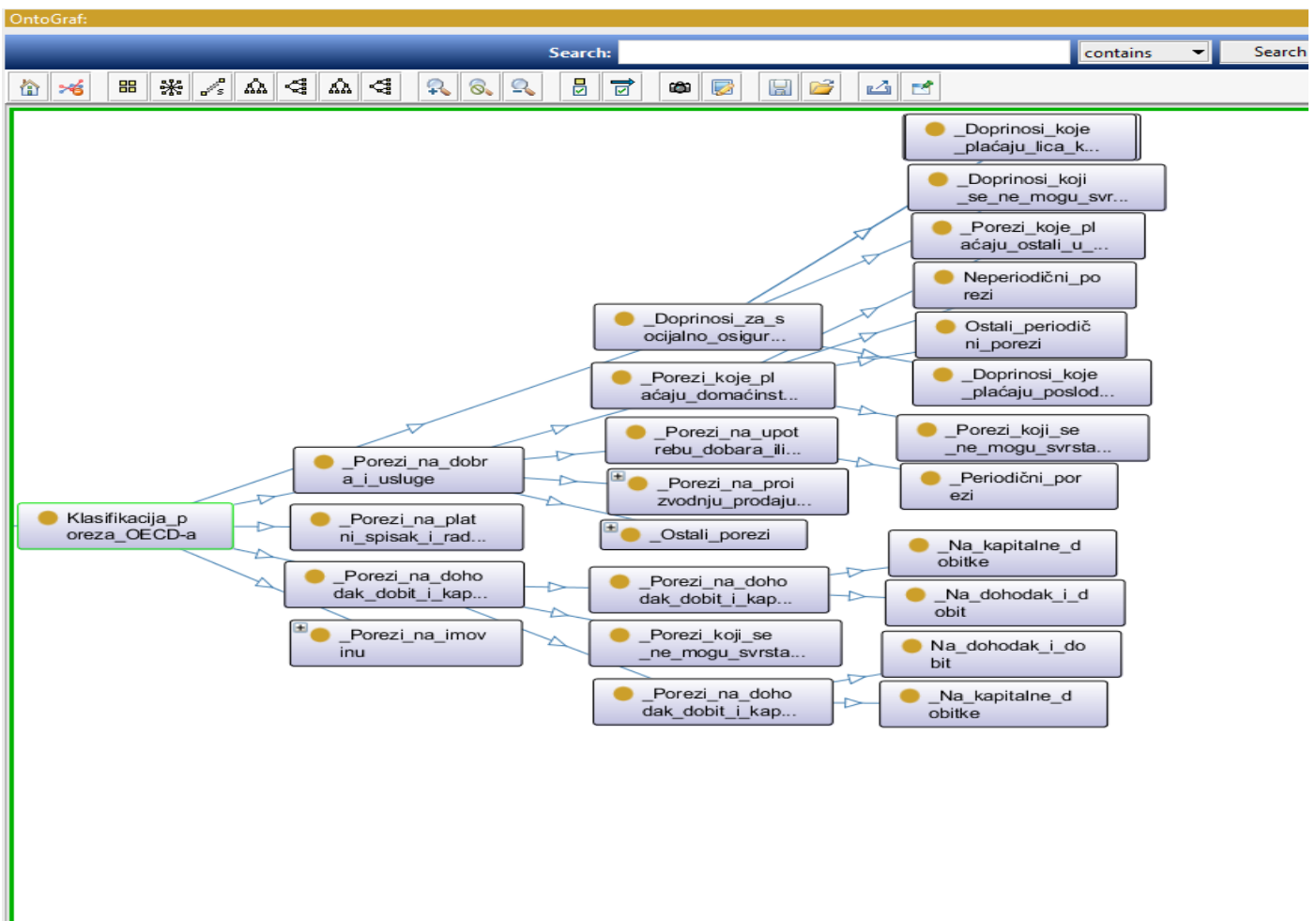


Fig 5: Onto Graf – Classification of taxes OECD

Excises are taxes that belong to the individual goods and services. Excises are taxed consumption or use of particular products, and the aim of their introduction is of fiscal nature. They represent special consumption taxes. The place and role of the excises in taxation varies from one country to another.

The Law on Excise Duties in B&H regulates the system and introduces the obligation to pay excise tax on products such as: alcohol, tobacco and tobacco products, mineral oils and their derivatives and substitutes (Figure 6 Excises).

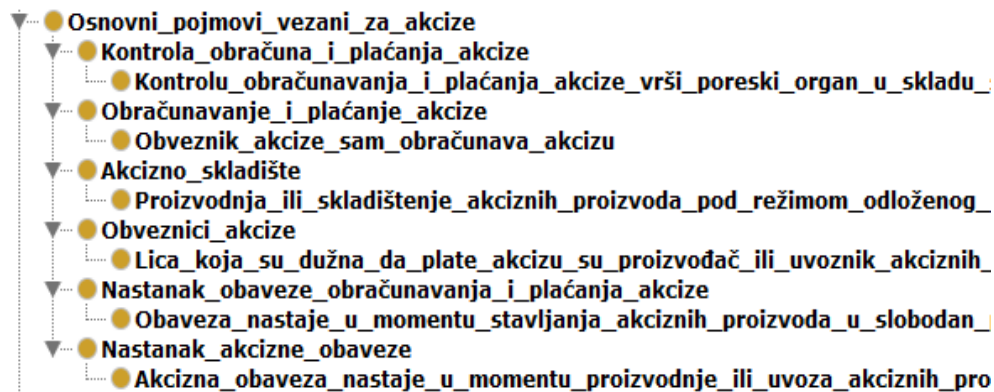


Fig 6: Excises

Duties represent a cash equivalent service provided by the public administration to individuals or legal entities. The ways of payment of duties may be direct or indirect. Under the direct payment of duty is considered payment in cash with the

issuance of receipts. Under the indirect duty is implied the purchase of duty (stamp) such as court duty, administrative duty, cadastral duty, etc. (Figure 7 Duties).

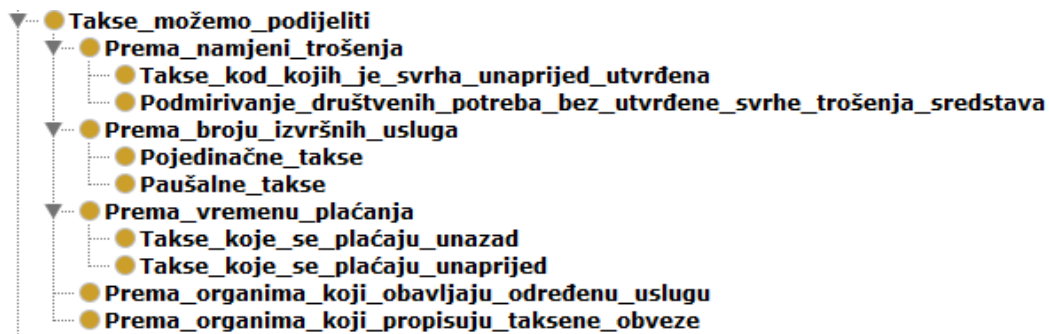


Fig 7: Duties

In Bosnia and Herzegovina there are three types of duties: administrative duties, judicial duties, utility duties, registration duties, city duty.

Customs belong to indirect taxes and represent an important instrument of foreign trade policy. They are charged during the crossing of goods across the state and the customs border.

3. Public loans

Under the public loan is implied a form of public revenues realized by particular country or other administration body^[10]. It arises in conditions when the country in the short term requires certain funds for unexpected expenditures which cannot be covered by a regular income. States approach the emission of public loans in order to achieve certain goals or to cover the rebalance in the budget. It appears as a source of revenue to finance a state and as a very convenient and effective instrument of economic policy.

Public loans are a result of the requirement that the burden of execution of certain government expenditures transfers to future generations that will benefit from spending funds collected by state loan.

If we consider the characteristics of the public loan then we can say that this is extraordinary public revenue and that it belongs to a group of non-fiscal public revenues^[11]. Public loan is characterized by reversibility in contrast to the public revenues, and reversibility applies not only on repayment of

principal than the contracted interest. The loans can be divided by: territorial principle, the method the government uses to get to the loan, according to the time of return, by the way of repayment and the like. In Figure 8 you can see some basic concepts from the knowledge base on public loans.

It is difficult to establish the limit of debt to some countries and it is usually a matter of convention and understanding and depends on many internal and external factors. The height of a debt of some country can be conditioned by economic, legal, political and psychological reasons. The limits of the state debt from the economic and legal point can be determined, but it is not the case when the debt limit is to be determined from the political and psychological determinations.

The criteria for determining the limits of government debt are: debt per capita, debt in relation to state property, debt to the budget revenue, relationship of the lender to the borrower, unwanted distribution of income and assets and relationship to the state product.

Criteria of the international monetary fund where the limit of the debt is determined so that repayment of the loan does not exceed 25% of the current foreign currency inflow of the country;

Maastricht Treaty – that the annual budget deficit does not exceed 3% of the gross domestic product – that the total debt of the EU Member States is not more than 60% of their GDP;

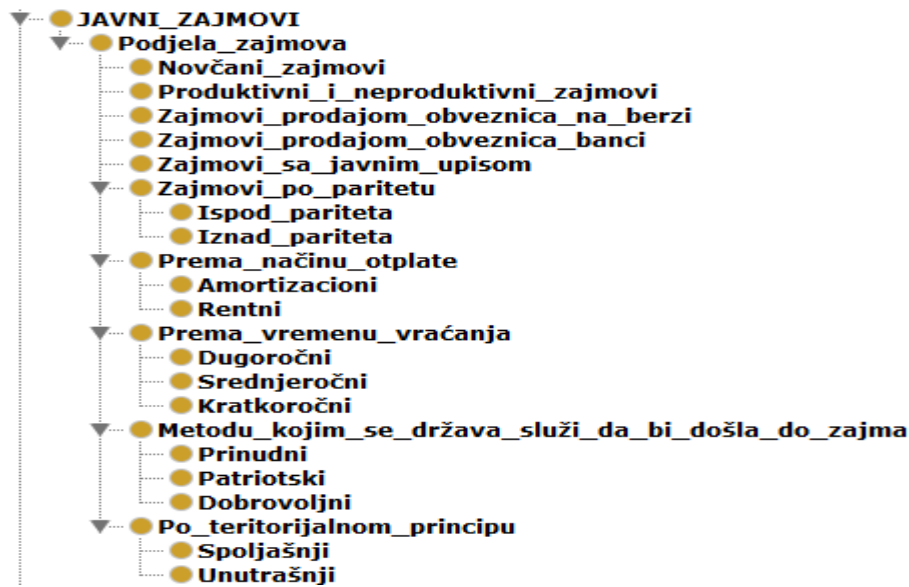


Fig 8: Loans

4. Public expenditures

Public expenditures are expenditures of the state and administrative bodies, and arise in accomplishing tasks and measures within their jurisdiction. They prevent and ensure that the certain state functions. So it can operate education, judiciary, army, police, and other community organizations and institutions. Height of public expenditure is determined by the available public revenues and is important factor in the functioning of each country. For the state and its citizens is very important rational spending of the public revenues [12]. Therefore, the basic requirement is that the public expenditures should serve general interest. The principle of real establishment of the public expenditures is based on the real possibilities of the economy and the population to allocate some funds to meet the needs of the public administration. Saving does not imply a reduction in expenditures but that with the least resources achieve greater effects. There are theoreticians who believe that public expenditures do not belong to the public finances and that they represent more administrative and political than financial category and they also recommend that their study is left to the

administrative sciences [13]. We include them in the public finances because we believe that these are expenses that the state does in the public interest to satisfy public needs.

The main objective of public expenditures is to meet public needs as a basis for the delimitation of the public expenditures from the expenditures of the private individuals. Expenditures of the private individuals are reduced to personal needs or the needs of the individual, while public expenditures represent spending in order to meet the general (public) needs.

For the public expenditures are essential the following: used to meet public needs and are expressed in monetary terms. Part of the necessary knowledge related to public expenditures is represented by Figure 9 Public expenditures.

The structure of the public expenditures is linked to the purpose of their spending. Usually expenditures are for funding the military, education, social security, work of public administration and the judiciary, state interventions in the economy and scientific research, environmental protection and expenditures for culture, sports, housing construction, public transport and the like.

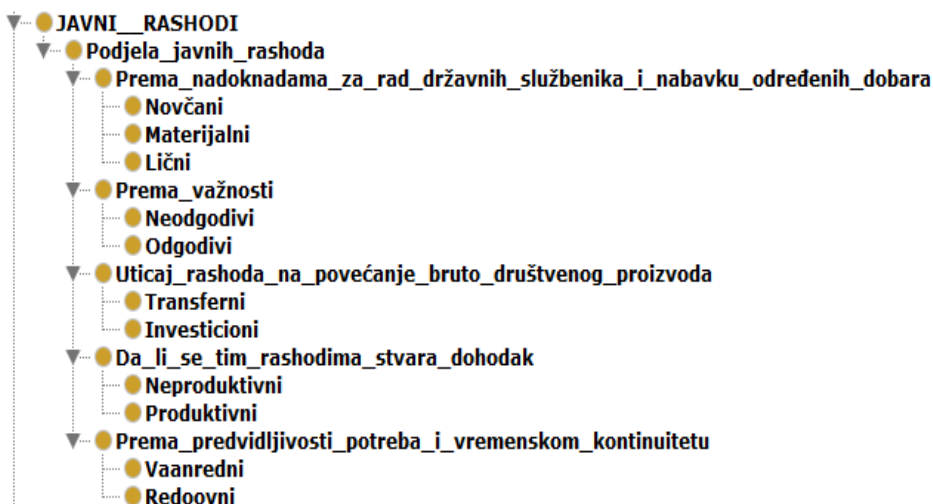


Fig 9: Public expenditures

5. The budget

The budget with which we are concerned in this paper is a one-year law of a country which provides all pre-approved and distributed revenues and expenditures in one budget year.

The budget is the instrument by which revenues are recognized and allocated funds – expenditure for financing, the decision established obligations [14]. It is a legal act which is adopted by strictly following the established

procedure and represents a kind of mathematical (statistical) document showing the plan of revenue on the one hand and cost structure on the other.

In the different definitions of the budget which, due to the volume of work we did not cited there are certain common elements: the budget is a public planning document by which are simultaneously projected revenues and expenses, the budget is established for the period of one year, the structure of the budget contains all the features of the socio-economic and political relations between the municipality/city in which the budget is adopted.

Budget revenues are public revenues with the largest share in it are taxes, while most on the expenditure side are wages and social benefits for employees and material costs.

What are the initial knowledge of the budget necessary to its creators and bringers: it must be known that this is an

administrative act, valid for a period of one fiscal year, precisely determines the structure of revenues and expenditures, shall be prepared and adopted before the start of the budget year, contains general provisions essential for the process of execution and is aligned with the economic policy. This is a systematic review of revenue, the individual types and amounts as well as expenditures grouped based on the type and purpose of use. This and all necessary knowledge should be properly updated and used. Fundamental knowledge of the budget is updated by using Protégé-OWL editor and is presented in Figure 10.

The initiative for drafting and adopting of the budget is implemented by the Ministry of Finance. In its drafting the expenditures in the budget are divided by its users. This facilitates the control of budgetary spending since it is easy to determine the deviation from the planned spending of funds.

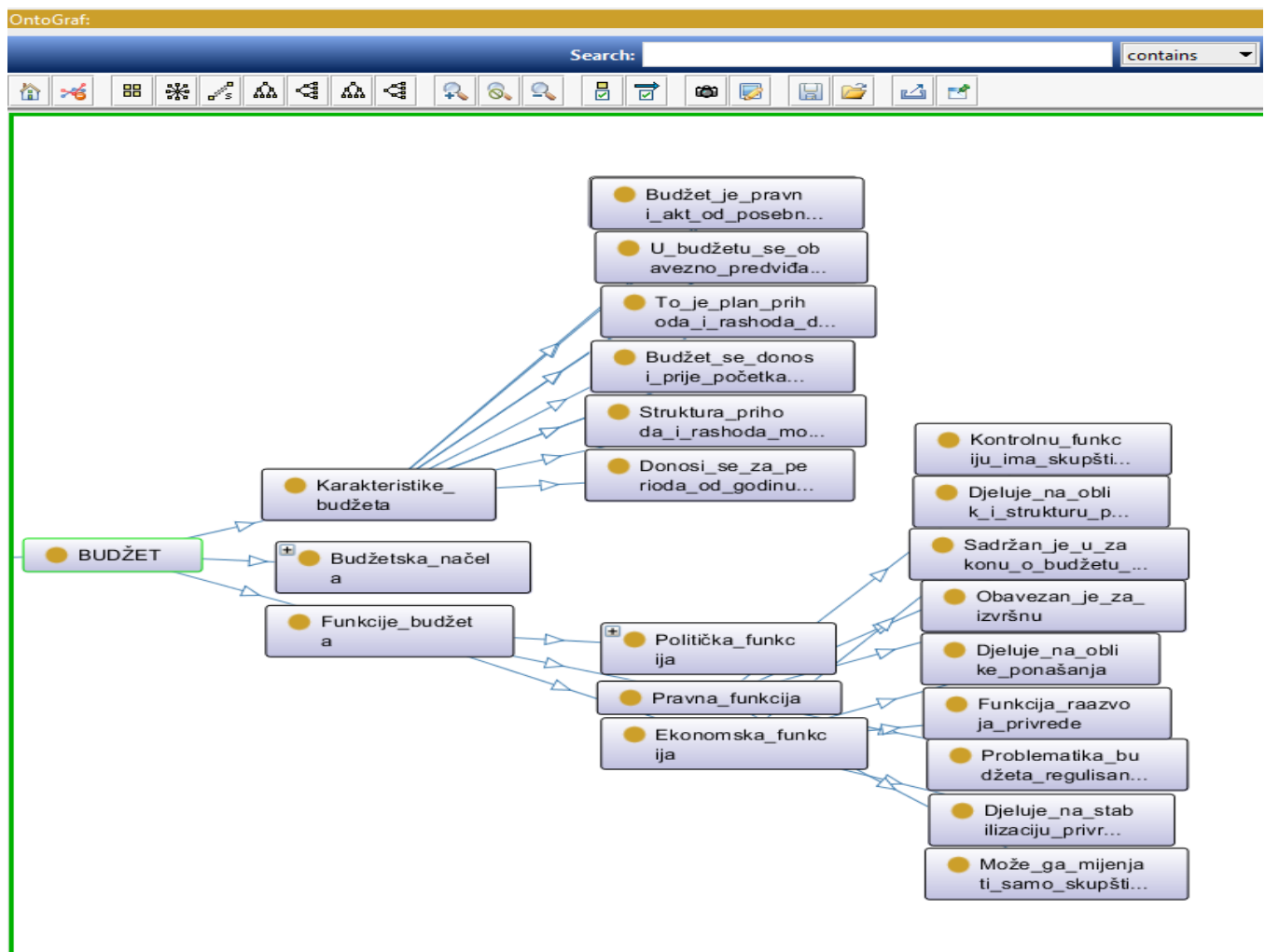


Fig 10: Onto Graf Budget

6. Conclusion

In this paper, we have dealt with public finances and proposed a new concept of their monitoring based on new software solutions, knowledge bases and the semantic web. We believe that these new solutions based on the Protégé-OWL editor can ensure their more efficient monitoring and use.

What should be continued? First of all, it should expand the knowledge base with necessary knowledge concerning the public finances of the countries in the European Union and that the content is translated into the required languages used in the EU. It could become a good basis for the full implementation of ontologies and the semantic web in the area of public finances.

References

1. Radivojevic, M., THE NEW APPROACH TO MONITORING AND RECORDING OF THE TAX BASED ON THE NEW TECHNOLOGICAL SOLUTIONS AND KNOWLEDGE BASES, Research Journal of Economics & Business Studies-RJEBS, Vol 4, No 10 (2015): 01 August 2015.
2. Chi, Y., Hsu, T. and Yang, W. 2006. Ontological techniques for reuse and sharing knowledge in digital museums. Electronic Library, the, 24 (2), pp. 147-159.
3. Popović, D., Nauka o porezima i poresko pravo, Savremena administracija, Beograd, 1992.
4. Duverger, M., Finances publiques, P. U. F. Paris, 1963.

5. Kešetović, I., Đonlagić Dž., Javne finansije, Grin, Gračanica, 2007.
6. Jelčić, B., Oporezivanje prometa porezom na dodatu vrijednost, Savremeni ekonomski problemi, svezak II, Zagreb, 1990.
7. члан 8. Закона о буџетском систему Републике Српске, Службени гласник Републике Српске, бр. 96/03 и 14/04, прописано је који се јавни приходи дијеле између буџета Републике Српске и буџета општина и градова и у којој пропорцији
8. Jelčić, B. Finansijsko pravo i finansijska znanost, Zagreb, 1998.
9. Zakon o porezu na dodatu vrijednost“, Službeni glasnik Bosne i Hercegovine, br. 9/05, 35/05 i 200/08.
10. Zakon o porezu na dohodak, ("Službene novine Federacije BiH" 10/08)
11. Melville, A., Finance Act, Ninth Edition, Prentice Hall, Harlow, 2004.
12. Goranović, P. Fiskalna ekonomija, Podgorica, 2001.
13. Joksimović, N. Upravljanje finansijama, Beograd, 2005.
14. Matejić, M. Zavod za obrazovanje administrativnih radnika, Beograd, 1978.