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Executive Summary

With their legitimate ambition to integrate more closely into the European Research Area, the WB countries need to upgrade their national RTD information systems, and would benefit from developing a regional information system, effectively supporting these ambitions by facilitating closer and more balanced international collaboration. This awareness is slowly growing, primarily in some government and academic circles, but the first step is obviously to properly upgrade and connect various components of their fragmented national information systems.

At the moment these systems cover primarily information on RTD institutions, researchers and publications, while other elements meant to attract foreign partners are covered by other information systems, characterised by fragmentation and limited connectivity. With the exception of CRIS (Current Research Information System), other systems do not follow international standards/formats, their design is often not very user-friendly, and only few of them are fully operational in English. These partial RTD information systems are usually very poorly promoted, and therefore strongly underutilised. Some good practice cases from EU member states are not sufficiently known in the region.

Observed from a potential foreign partner's point of view, these national systems lack much information on institutions, policies, laws and support instruments available for international RTD cooperation in the respective countries. However, even good practice cases (Annex 7, p.135) from other countries have their weaknesses.

Two surveys, an expert workshop in 2009, and communication among members of the project's expert group on RTD information systems, have demonstrated the potential and growing interest for improving national systems, and for the possibility of their linking at the WB regional level. See: conclusions and recommendations for action, pp.24-29. The WBC-INCO.NET project should continue supporting these efforts through all available means.

The key problem, however, is not of technical but of political and even psychological nature. For recently independent countries, with numerous problems and lack of resources, it is quite a challenge to join a regional information and promotion system, while still lacking proper facilities in RTD information systems at the national level.

Therefore, building a regional RTD information system for the WB countries appears feasible as a long term project which will require also external support, particularly from the EU.

Prof.Boris Cizelj,
President Management Board
Slovenian Business & Research Association, SBRA – Brussels

Brussels, February 2011

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PART A: REPORT ON RTD INFORMATION SYSTEMY IN WESTERN BALKAN COUNTRIES

1. Introduction

The strength of the European Research Area depends on the full integration of RTD potentials from all corners of Europe, including the Western Balkan region– which is characterized by considerable scientific and research & development potential. As WBC-INCO.NET project aims to facilitate these connections it is important to establish what has been achieved so far, and what could be done to upgrade and connect the existing and future information systems at the national level, and look into the possibilities of developing a regional system. Such a system would facilitate partner search within the whole of the Western Balkan Region for interested partners from other parts of Europe and beyond.

Without improved RTD information systems even excellent RTD activities can hardly be noticed, and internationally recognized. Therefore high quality partners have limited chances to be included into the broad international networks linking distinguished researchers from academia and business.

In many countries of the region, and indeed around Europe, we can observe fragmented information systems which are often not integrated into user friendly, advanced information hubs. International links and interoperability is even worse and the existing information systems do not seem to be very powerful tools for fertilization of research activities in WBC countries.

With these questionnaires we obtained an insight into the existing information tools at the national level. According to the Work Programme of the WBC-INCO.NET Project, two surveys with the same questionnaires were conducted in a period of one year. After the first survey in October 2009 and workshop on RTD Information Systems organised in Maribor, Slovenia on 12 November 2009, a follow-up report has been prepared and a virtual meeting was held on the

progress achieved in 2010, to assess the feasibility of the development of a regional TD Information System for the countries of Western Balkans.

Scanning of the existing information tools and corresponding environments should facilitate their fuller utilization, upgrading, and better connectivity which will require some coordination activities. Naturally, each national system reflects some specific national features but for efficient exploitation and better connectivity of these systems some joint principles and technical standards should be accepted in future. These developments shall not be a short-term task of a group of people or institutions, but requires a strategic, long-term recognition by governments that investment into RTD information systems is of crucial importance for fuller integration of the countries' potential into the European Research Area.

With this report we aim at detecting the national **"good practices**", and the potential for their dissemination – which would eventually support connectivity and harmonization of the RTD information systems at the level of the WBC Region. At the same time we have to identify the needs of current and potential users, which could be researchers, policy makers, businesses people or the general public. **The criteria for the selection of good practice** have been the following:

-- **scope, complexity and depth of information coverage (RTD field, as well as economy, government, culture, tourism, conditions for foreign investment, history highlights);**
-- **reliability of information, accuracy, including current updating;**
-- **access, interlinking and interoperability;**
-- **degree of using of English;**
-- **user friendliness.**

In our analysis the focus of the analysis is not on the research information systems in a strict sense. The topic of bibliographic and CRIS (Current Research Information System) Information systems is a core topic of several annual COBISS conferences, organised by the Institute of information sciences in Maribor, Slovenia (IZUM) and brings a holistic approach to identification of challenges in the region of the Western Balkan Countries. The aim of our analysis is to open a professional and academic debate about the importance of broader benefits

of RTD information systems. The fact we could see from the first sight is that there is quite a good coverage of bibliographic & CRIS systems in the region, but at the same time there are very few integrated systems, which would be of broader usage, connecting information about:

- legal and political system of the country;
- socio-economic environment;
- business and innovation environment;
- cultural landscape;
- tourist information.

We believe that this kind of information would be extremely important for networking of researchers as well as for establishing connections also in the business and cultural contexts. One could say that the main added value of such information systems would be in connecting particular national environments with the European and broader international arena. Despite the importance and important role of national languages in such networks of information system only English language could realistically be used as a »*lingua franca*«. From the point of view of our analysis only trans-institutional cooperation and a truly supra-institutional approach to the development of such systems could be successeful. Such information systems put research activities and researchers into a social context which stresses the importance of knowledge as a factor crucial for further development of the regions and countries.

2. Methodology

In our analysis the following Western Balkan countries have been covered:

- Albania;
- Bosnia and Hercegovina;
- Croatia;
- Kosovo*;
- fyr Macedonia;
- Montenegro
- Serbia.

From our mapping exercise we know that many of these countries already have in place information systems for support of science and research. Predominantly there are high quality CRIS and bibliographic systems which are an important support of research activities. The aim of our analysis is to present broader aspects of holistic information systems, containing broad information about research and development potentials countries of Western Balkan. To achieve synergies between different levels of research, development, innovation and commercialisation activities it is essential that appropriate and accurate information is available in a manageable and user friendly form, and of course in English language. The expected result of our analysis is to present existing good practices and identify problems regarding these information systems in partner countries. As a goal of the exercise we expect to influence national and regional decision makers to understand the role of broader, promotional information systems for overall visibility of knowledge production and innovation competitiveness. We also elaborated some key recommendations on how to improve the situation or at least open some dilemmas and debates in and among partners from WBC-INCO.NET countries.

The analytical work was divided into two phases, including slightly different target groups with different scope of the analysis. As a starting point we prepared a questionnaire, which was disseminated through ministries to the RTD community in target countries. The idea of the questionnaire with majority of (semi)closed questions was to measure the opinion of major stakeholders regarding the research and information support to research in a broadest possible context. To reach these experts we have prepared a web-based application with a questionnaire which was used for easy access to experts and computer based analysis.

In the first survey **45 responses** have been received, and **44 structured interviews** with different national stakeholders were conducted in the listed 7 countries. Structured interviews (based on the concept of the web questionnaire) helped national experts to prepare qualitative report on RTD systems but at the same time exact answers were analysed together with web-based data. The selection of method depends slightly on the responsiveness on the web survey and approach of the national expert. In some cases both methods have been combined. The distribution of answers was as it follows from Table 1.

The second survey (with a revised questionnaire, covering the issue of the regional RTD information system) produced **30 responses from 6 countries** (we did not succeed in Croatia), and **12 interviews** were conducted.

Table 1: **The distribution of responses on the first web-survey**

Respective Country	**No. of responses**	**% of all responses**
FYR of Macedonia	18	40%
Kosovo*	9	20%
Bosnia and Herzegovina	8	18%
Croatia	5	11%
Montenegro	5	11%
Serbia	0	0%
Albania	0	0%

Table 2: The distribution of responses in the second web-survey

Respective Country	**No of responses**	**% of resp.**
Albania	9	30%
Bosnia-Herzegovina	4	13%
Croatia	0	0%
Kosovo *	3	10%
FYR of Macedonia	7	23%
Montenegro	1	3%
Serbia	6	20%

Structured interviews were conducted among different target groups, which can be grouped into

the following three categories:

- University/academic level: consisting representatives of universities, university libraries, national bibliographic centres;
- Governmental level: consisting representatives of governments, executive agencies;
- Business level: consisting representatives of business sector. The distribution of interviewed persons is presented below in Table 3:

Table 3: Distribution of interviewed persons

	Governmental level	**Academic /R&D level**	**Business sector**
Number of interviewed persons	12	20	2

During the period of preparation of the report altogether 34 individuals were interviewed and consulted. Therefore a wide national consultation was prepared.

The second part of the analyses is based on qualitative assessment of the situation in partner countries prepared by key national experts. They critically assessed the situation in their home countries and in the WB region. The questionnaire has been used for a series of in-depth interviews all experts have conducted among key policy-makers and stakeholders in their countries. On the basis of their analysis of national systems we have drawn the conclusions and findings of the first part of the analysis. We have received national reports from 6 countries from Western Balkan. For fully understanding the specific national situation in each of the countries concerned, it is useful to read the respective country reports, while this analysis only summarizes and elaborates key common elements and points of similarities/differences between countries. With the aim of presenting some key common points of departure in the region we have deliberately put together all quantitative answers. From that point of view we can see that when talking about specific aspects of RTD information systems, many problems of WB countries are very similar.

As an annex to the report we have compiled an overview of existing national RTD information systems which could/should be developed further in line with joint regional/EU standard, and as a result such systems could be linked in a way that the region of Western Balkan would become more competitive compared to the more advanced EU member countries. We decided not to list the general ministerial web pages in this group, though the web pages of ministries responsible for science, research and innovation normally present some policy information, and therefore should be a part of the more complex RTD information systems.

Presentation of RTD Information Systems at the workshop in Maribor

In order to develop a methodology for greater compatibility of national information systems (with the overall aim of creating a virtual regional information system based on cross linkages and a unique search system) a training workshop has been organized in Maribor, Slovenia on 12 November 2009. The event was organized by Slovenian Business and Research Association (SBRA) as partner of the WBC-INCO.NET project.

The objectives of the Workshop were to **review the national information systems** in the countries of Western Balkans, **look at some good practice**, and propose how these systems could better contribute to closer integration of their research communities into the process of building the European Research Area and to more effective participation in EU RTD projects.

The workshop was based on a report - **position paper prepared by SBRA** on existing databases and portals offering information on RTD capabilities. It envisaged an active involvement of the 2 suitable experts from each of the beneficiary countries with good insight into the RTD information area. The experts were commissioned to prepare national reports by using in depth interviews with relevant policy makers and stakeholders as well as results of an on-line survey organized by SBRA. Interviews were conducted with government officials and other active stakeholders (science boards, RTD agencies, academies, science foundations, etc.) who have an influence on RTD information flows and prepared the country reports based on an on-line survey that was conducted among active researchers and users of RTD information. On the basis of country reports a report on RTD Information Systems in countries of Western Balkans was made,

containing also recommendations for national authorities on how to advance towards integration of establishing stronger platform among national systems.

Ministries from beneficiary countries were invited to send to RTD organisation in their countries (RTD entities in academia and business, RTD associations, universities, etc.) the invitation to participate in the online survey. Only **47 stakeholders** who have influence on RTD information flows **filled out the on-line survey**. Such limited result was achieved due to the fact that each week many surveys are taken, and people are not willing to participate. It is remarkable that answers obtained show a consistent assessment of the situation (poor RTD info systems with little impact, particularly on international cooperation). Additionally over **40 interviews** with RTD policy makers and stakeholders were conducted.

Out of invited 14 experts from 7 beneficiary states, **9 experts attended the workshop**, 1 from Croatia, 2 from Bosnia and Herzegovina (one from Republika Srpska and one from Federation of BIH), 2 from Serbia, 1 from Kosovo, 1 from F.Y.R. Macedonia and 2 from Albania, however 12 of the invited experts were involved in writing the country reports. Out of 9 workshop experts, 5 are coming from universities, 2 from ministries of sciences and 2 from research institutes.

The workshop was conducted by Dr Boris Cizelj, who emphasized the importance and potential of integrated RTD information systems for the promotion of RTD potential in WBC. In order to do that he presented the lessons and benefits from the development of Slovenian SYCP System (Slovenia – Your Cooperation Partner). The final overview of the situation on RTD systems in Western Balkan countries was presented by Dr. Tomaž Boh, who also presented the key findings and recommendations, which could be the basis for further joint activities. In the session before the lunch each expert presented the specific benefits, problems and opportunities of existing RTD systems in their countries. After lunch the other half of presentations were made. Workshop was concluded by making some recommendations how to upgrade RTD information systems in the countries and how to better connect them at the regional level.

The following **recommendations** were made:

(a) Ministries of science should pay **more attention to their task of promoting national RTD potential** in EU countries and beyond;

(b) One of the key promotion instruments is **a well-functioning and properly structured RTD information system** (covering more than just information on RTD personnel, and publications);

(c) Such a **system does not have to be run directly by the Ministry**, it is even advisable to delegate this task to a suitable public or private organisation (experienced in operating complex information systems) but providing the necessary funding;

(d) **Ministries in the region should utilize their contacts also to exchange experience in the field of RTD information systems**, which should facilitate efforts for their greater compatibility, and possible developments in the direction of linking these systems into a regional, though for the start virtual, common system.

At the end of the workshop it was agreed that experts will finalize the country reports in order to send them to the responsible stakeholder for further actions. According to the task description short reports would be made for a virtual meeting by the end of the year assessing the progress achieved and proposing further activities towards the creation of a virtual regional RTD information system.

As revealed by the reports and reinforced in the discussion, there are still **serious problems of interactivity of various national info systems**. Although some top-down initiative can help in search for proper solutions to these problems, the **bulk of efforts need to be undertaken at the national level.**

The event coincided with the 2nd day of the COBISS-2009 Conference organized by the Institute for Information Sciences, IZUM in Maribor, which was following the meeting of European ministers of higher education.

3. Results of the first survey

The report consists of the following parts:

- Main characteristics of the existing RTD information systems;
- Initiators, promoters and financiers of the systems;
- Usefulness of information system and its openness for integration.

3.1 Main characteristics of the existing RTD information systems

The national information systems regarding research, development and innovation are in a way as good as they satisfied expectations of their users and support international cooperation. Therefore it is important to consider what are the predominant perceptions of different profiles of stakeholders and potential users. If they are not satisfied with the product or are even unaware of it, we can detect at least two causes for the problem:

a) non-existing, fragmented, low quality or not user friendly system;

b) poorly visible or publicly "advertised" system.

In this respect respondents were asked:

"... does your country have accurate, reliable and up-to-date information system(s) providing the national and international public with sufficient information about RTD environment and potentials?"

Distribution of answers is presented in Table 4, but what is evident is that **only 5 % of respondents (2 answers) from all target countries answered that existing information systems are appropriate and fully sufficient**. On the other side there are 37% of respondents who answered that there is no appropriate information system in the country. Due to the fact that all countries analysed have a kind of RTD information system, this means that these information systems are missing public visibility. If we combine this result with 44% of answers which indicate that there are existing information systems but are not sufficient, we can conclude that

there is very moderate part of the public (app. 24%) assessing the systems as adequate.

Table 4: Appropriateness of existing information systems

Appropriateness of the system	No. of answers	% of answers
Yes, a fully sufficient system	2	5%
Yes, a partly satisfactory system	6	14%
Yes, but it is not satisfactory	19	44%
Not existing	16	37%

If we compare these answers with qualitative assessments from these countries we can detect that this percentage may not correspond to the real situation. Nevertheless, the relatively low number of satisfied users and great number of dissatisfied or unaware of such systems clearly shows, that this topic should not be underestimated, and that a very clear discussion and realistic strategic plans for promotion of such systems should be developed.

A very important element of the discussion about information systems relates to the question of their substance. Namely, the concept of data presentation strongly determines target audiences and scope of the system. Broader concept of data presentation determines attractiveness for broader public but at the same time there is a danger of loosing focus and developing into a general information system with no focus on R&D potential.

Table 5: Type of data presented in existing systems

Type of information	No. of responses	% of respondents
RTD organisations	**16**	55%
RTD personnel	**14**	48%
Bibliographies of Researchers	**17**	59%
On-going research projects	**17**	59%
Business RTD	**1**	3%
Scientific output	**5**	17%
Areas of specialisation and excellence	**8**	28%
Patents	**2**	7%
Participation in EU funded RTD programmes	**8**	28%
RTD funding (national, EU, international)	**4**	14%

Table 5 underpins the claim of well established and developed CRIS systems (Current Research Information Systems) in the region. **Most of systems contain information on RTD organisations, RTD personnel, bibliographies and research projects.** But if we compare these shares with broader group of potentially important and interesting information, the shares of the second group are already much smaller. Data about business RTD activities, patents and scientific outputs are for example important elements for potential partners but are often not directly linked to public sources and therefore public CRIS systems are not covering it. This situation partly derives from the fact that CRIS and bibliographic systems are mainly focused on ministries for research, education or culture. On the other hand the **responsibility for broader systems is inevitably shared between various domains and groups of stakeholders where consequently the coordination and ownership is much more difficult and more often than not even problematic.**

Among the existing information systems (in some countries we can find several different/overlapping information systems) there is **relatively weak interoperability.** This is a result of parallel development of these systems, with no or little focus on holistic approach but merely satisfying particular (usually short-term) interests of an individual institution or sphere.

Table 6: Interoperability between different national research systems

	No. of responses	% of respondents
Yes, it exists	4	12%
Partly existing	14	42%
No interoperability efforts	15	45%

In the times of highly globalized world, in the situation where we want to communicate with ever greater number of interested public, **the ability to communicate with foreigners** (in their own or in a third language) is of crucial importance. Countries from the WB region are small by the rule and therefore their national languages are rarely spoken outside their countries. Because of that it is inevitable for information systems from these countries to be available in English being the »*lingua franca*« of research.

Table 7: Languages used in RTD information systems

Language used by the information system	No. of answers	% of answers
National language only	9	24%
English language only	3	7%
National and English language	24	63%
Other	2	6%

From Table 7 we can see that majority of existing systems operate both in national and English

languages. There are even some, operating only in national language, while very few operated exclusively in English. These orientations show that only some of the existing systems are designed primarily as universal information tools, while most of them are combining the national and the international dimension.

The substance, language and interoperability of information systems significantly determinate the target audience of information systems. From Table 8 we can see that in the opinion of our respondents the **RTD stakeholders themselves are the greatest users of RTD information systems.** They are followed by the general public (to a smaller extent) and the potential international partners. This is important to note as it illustrates the role RTD Information Systems could play in facilitating international partnership. Also, this is in line with our findings that in the group of WBC the CRIS and bibliographic systems are fare more developed than other aspects. Especially small proportion belongs to policy-makers and business sector, which should both be key players in »knowledge based society«. Knowledge, »advertised« and publicised through these channels should have much bigger impact on societies as it seems to be the case according to the answers in Table 8 below.

Table 8: Users of information systems

Main users of systems	No. of answers	general public
RTD stakeholders	27	42%
General public	14	22%
Potential international Partners	12	19%
Public sector (policy makers)	6	9%
Business sector (private sector users)	5	8%

As already mentioned a major group of users come from the group of RTD users, followed by the general public. There is even a great number of those seeing research as ultimately international activity. Therefore the **use of English in this respect is crucial**. Despite the existing systems and

use of English, respondents are relatively critical regarding the visibility of researchers gained through these information systems.

Table 9: Visibility of researchers as a result of information systems

Visibility provided by information systems	No. of answers	% of answers
Very good	4	9%
Acceptable	16	37%
Poor	18	42%
Don't know	5	12%

As we can see from the Table 9, a great majority of respondents concluded, that the visibility of researchers and their communication tools ensured through these systems reaches relatively limited audience outside the research community. The promotion of research potentials is supposed to be one of great challenges for further development of systems. According to responses the central **role in maintenance and further development of the system should be lead by government institutions and their organisations**. Namely, governments as the central state authorities have the power to impose or at least encourage the harmonisation of systems and thereby to ensure their international interoperability. The majority of respondents see this role as natural, but despite this fact and power of governments to influence activities, **pulling together all different sectoral and regional interests remains of crucial importance and presents a major challenge.**

3.2 Initiators, promoters and financiers of the systems

For fully operational information system a few factors are of crucial importance. At the beginning there should be **strong ownership of the idea**, which is usually initiated and developed by a few or a group of enthusiasts. But as it is evident from some cases, for long term sustainability even

an enthusiastic group is not enough. The system has to be institutionalised which means that there should be **very clearly defined promoters and financiers of the system**. According to the survey 50% of respondents answered that **government** should be **the initiator of the system** and **main promoter** of its development. Similar share of respondents (43%) indicated that development of such a system should be implemented in **a private-public partnership**. The central **role of government is of crucial importance when talking about holistic information systems**. When the system, covering a broader area, is in question we inevitably face the **problem of coordination**. In cases when the RTD information system cover only one aspect (e.g.: research, tourism, business...) there could be ownership of only one ministry or institution. But when there is a question of broad coverage and coordination of different ministries/institutions, there should be at least a government-mandated, centralised coordination of the system.

3.3 Usefulness of information system and its openness for integration

The Internet is an instrument of connecting the world as a whole. Scientific cooperation was always based on communication between national scientific and research environments, and the development of ICT facilities today enables this communication. In Table 10, the distribution of answers regarding the satisfactory role of information systems is presented. We can see that very limited share of respondents (only 12%) indicated that the existing system is very good or excellent and that it brings enough relevant information to support research potentials of the country to be presented to broader international public. On the other hand 55% of respondents believe exactly the contrary. This is a rather clear message from the survey.

Table 10: **Satisfaction with existing systems**

Satisfaction with a system	**No. of answers**	**% of answers**
1 - Dissatisfactory	9	26%
2 - Satisfactory	10	29%

3 - Good	12	34%
4 - Very good	2	6%
5 - Excellent	2	6%

In our analysis we discovered that there are several information systems supporting RTD activities in Western Balkan Countries (WBC). There are also well established CRIS systems in place. But there is quite a different picture with broader RTD information systems. There are very **few interactive »research capacity promoting« systems**. Due to the fact that the long term development goals of the region are to increase cooperation and on that basis catch-up with the more developed Western European countries, it is natural that »supporting mechanisms« as RTD information systems should support these intentions. A key element for connecting regional research information systems into a common platform, or even a joint infrastructure and information source, is interoperability of systems at the regional, transnational level.

Table 11: Interoperability of systems in the region

Level of interoperability	**No. of answers**	**% of answers**
Rather good	**11**	24%
Interesting, but difficult to achieve	**21**	47%
Potentially useful, but practically unrealistic	**7**	16%
Don't know	**6**	13%

As we can see from the Table 11 above, the main concern of respondents was not so much the usefulness of such connections, but rather the **practical implementation of linking systems**. Almost half of respondents answered that the idea of establishing inter-operable information systems surely is interesting, but remains difficult to achieve.

4. Results of the second survey

Although is was not originally planned to conduct 2 surveys, SBRA felt it will be beneficial for the credibility of the report on possible regional RTD information system, to make a fresh effort after a year, and so the second survey was conducted in October 2010.

In many countries of the region, and indeed around Europe, we can observe **fragmented information systems** which are often not integrated into user friendly, advanced information hubs. International links and interoperability leaves much to be desired, and the existing information systems are not efficient and powerful tools for building synergies and achieving fertilization of research activities in WBC countries.

Naturally, each national system reflects some specific national features but for **efficient exploitation and better connectivity** some joint principles and technical standards need to be accepted. These developments shall not be a short-term task of a group of people or institutions, but **require a strategic, long-term recognition by governments that investment into RTD information systems is of crucial importance** for fuller integration of the country's potential into the European Research Area.

With the initial report, and the second survey/series of interviews, we aimed at **detecting the national "good practices", and the potential for their dissemination** – which would eventually support connectivity and harmonization of the RTD information systems at the level of the WBC Region. At the same time we have to identify the needs of current and potential users, which could be researchers, policy makers, businesses people or the general public. A great issue of all information systems is their **sustainability and interoperability**. Generally, information systems are worth only as much as **accurate, comprehensive and up-to-date information they contain**, as well as how **user friendly** they are. How to achieve **sustainability** of a RTD information system is of crucial importance. It should be noted here, that a tendency was revealed, namely that **due to elementary digitalisation of registers, catalogues and data banks, people somewhat too easily refer to them as »information systems«,** although they

have very limited if any search engines and other computerized facilities.

From our previous mapping exercises we know that many of these countries already have in place information systems for support of science and research. Predominantly there are **high quality CRIS and bibliographic systems** which are an important support of research activities.

Among the existing information systems (in some countries we can find several different/overlapping information systems) there is **relatively weak interoperability.** This is a result of **parallel development of these systems**, with no or little focus on holistic approach but merely satisfying particular (usually short-term) interests of an individual institution or sphere.

Another key feature of the existing RTD Information Systems, or their weakness is, that since they are **primarily focussing on publications and researchers, the latter** are also the **main users. Very few other local, let alone foreign knowledge economy actors are even aware of these systems.**

Opinions of the **second survey** on the **evaluation of the existing RTD information systems** have been **more divided than a year ago**. Probably that should be interpreted as a sign of disappointment over the existing info systems, more attention attributed to them, and probably more practical experience in using them.

There are very **few interactive »research capacity promoting« systems**. Due to the fact that the goal of the long term development of the region is to increase cooperation it is natural that »supporting mechanisms« as information systems should support these intentions. A key element for **connecting regional research information systems into a common platform**, or even a **joint infrastructure and information source**, is **interoperability of systems at the transnational level**. That remains the key obstacle in the process of building a possible regional system.

5. Key findings and recommendations for action

Conclusions and recommendations from the first survey:

From the analysis of quantitative answers, as well as from qualitative country reports prepared by national experts, we can offer some key common points, and identify the challenges which could be the basis for further debate and joint activities:

1. There are **several types of RTD information systems in practically all countries** of the WB region, however they differ among themselves strongly in terms of scope, depth, complexity, ease of use, interlinking with other systems, and language of operation;
2. There is relatively well developed **CRIS and bibliographic infrastructure** (information systems) which can serve as a good basis for more ambitious future developments in the direction of more comprehensive, integrated RTD information systems;
3. In initial phase the **group of enthusiasts is needed, but it is not sufficient** or optimal in a long term. Development of a comprehensive RTD information system at the national level requires proper commitment, resources and collaboration of several policy-makers and key stakeholders;
4. There are great problems with **fragmentation of information systems and their interoperability** (even in national level), while the connection with similar systems abroad is almost non-existing;
5. **Existing information systems** (except CRIS systems which are mostly compatible with CERIF standard) do **not (yet) follow common international standards/formats**;
6. Generally, there are great **problems with quality control and updating of systems**, and consequently problems with the reliability of systems (except CRIS & bibliographic);
7. It is evident that the majority of information systems are developed in national/local contexts and therefore they **lack the ambition of broader, regional cooperation**;
8. The majority of systems have some English parts but **only very limited number of them is fully operational in English**;
9. In most cases there is **no single responsible authority or there is lack of initiative** for

creating more comprehensive, integrated systems, and therefore no coherent strategic development;

10. **Modest collaboration** among potential public and private partners, and **lack of coordination** between different stakeholders;
11. There is noted **low interest of the business sector** on such kind of information systems and therefore systems are unable to attract broader partnership able to pull-off the development of such an ambitious project.

It is evident that WB countries face very similar problems and challenges in developing more effective information systems to support European and broader international collaboration of their RTD communities. Therefore it would be **appropriate to tackle these problems in a coordinated way**. It would be wrong to say that the WB region completely lacks the RTD information systems, and that there are no good starting points to develop common standards.

The WBC-INCO.NET project offers the possibilities for RTD actors in WB countries to compare their experience and potential for developing comprehensive and effective RTD information systems at the national level, as well as to discuss the possibilities of **joint action at the regional level**. If WB countries wish to accelerate their integration into the European Research Area, this could be an important tool to reach this goal. It is quite feasible to imagine **European Commission being ready to support such a regional project**, but the initiative has to come from the region itself.

Conclusions and recommendations from the second survey:

After the results of the second survey were obtained and the follow up report was made, SBRA organised a virtual (Skype) meeting on 4 November 2010 where some members of the Expert Group (Prof.Bushati and Mr.Rocco from Albania, Mr.Šipka from Serbia, and dr.Cizelj from Slovenia – some technical problems prevented Mr.Dadašević from fyr of Macedonia, and Mr.Markez from Bosnia & Herzegovina, to take part) exchanged views on the draft report, specially on proposed recommendations. All members of the Group have received by electronic mail the text of the report, and some comments were received.

Members of the expert group agreed on the following **conclusions:**

1. Between 2009 and 2010 the situation concerning RTD Information Systems in the countries of Western Balkans has **not changed very much**, although the **awareness** of the potential benefits from a more comprehensive Information System **seems to have somewhat risen**, not only among the research communities.

2. With **growing emphasis on knowledge-based competitiveness,** the links to these countries' innovation capacity, on the quality of their human capital, and on the technological capabilities, are becoming key to their improved performance in the future European knowledge economy. An important element in this process is the support these systems should give to stronger **engagement of the regional players in EU RTD programmes**. In order to be effective in this direction, the existing Information Systems need to be **fully functional in English language** (which is still not always the case).

3. With some differences among countries of the region, segments of the classical **RTD Information systems at national level are functioning rather well** in all countries, but their focus remains for the time being primarily on the following three domains:

    - data on researchers, research institutions and their potential;
    - bibliographic information;
    - EU RTD Programmes and Initiatives.

4. The existing systems can serve as **a good basis** for more ambitious future developments in the direction of more comprehensive, integrated RTD information systems, though they do not necessarily have to be the basis or the start for such a national project. Though the initiative may come from »outside«, most experts believe that accelerated **development of national systems - going beyond conventional RTD domains – seems like a precondition for any initiative at the multinational – regional level**.

5. The initiative from within the countries may come from any public or private institution, experienced in ICT, promotion and system management, but **without an essential support from the Government** (it can be any of the ministries: RTD, economy, higher education, government information-communication office, national tourist board, national patent office, or other) the **chances of success are remote**. Involvement, and if necessary leadership of appropriate Government department normally gives credibility to the project and allows many other actors, such as business associations, chambers, big companies, research institutes, to join such a **»national project«** and permit their own information systems, websites, and data bases to become **an active part of the new, integrated information system.** The key challenge is **trust and motivation for »pooling resources«** for a bigger cause, and therefore government involvement is essential.

6. When such a credible initiative is launched, it is essential, that **strong partnership** is built from the start with interested organisations, and an appropriately **skilled and respected person, willing to devote sufficient time**, is put **in charge** of the project. This should not be an extra responsibility of an already overcharged government official.

7. By definition this is not a project to be completed in a shorter period, such as for example **6 months**. With good management, it will rather take **at least 2 years**, but if launched successfully, and properly handled, it will start **a life of its own and could almost secure continuity.** For this to happen, besides **a committed coordinator, other public and private organisations involved in the project should feel part-ownership of the system,** and that requires **a common coordination body** and possibly **co-financing of the system.**

8. **Promotion of the RTD Information system** is also of great importance, and it can be done in many ways. **Besides** the on-line version, it is important to publish from time to time some **promotional material** (depliant, CD or DVD, poster) which will maintain and enhance the visibility of the system, specially if **systematically disseminated** (at relevant international conferences, on the occasion of official and other visits, through the diplomatic missions, etc.).

9. It is recommended that the **WBC-INCO.NET working group on RTD Information Systems keeps contact among its members, as well as with contacted interviewees until the end of the project**, and continues with the pressure for proper development of national systems, including the initiative to secure their inter-linkages, interoperability and gradual integration – with the perspective to create in future a functional regional system which will be helpful to all countries of the region. This will be in direct function of Western Balkan's stronger integration into the European Research Area and the Innovation Union. Benefiting from good practice cases in EU member states, including the Slovenian SYCP System, the national and later the regional system should also help attract into the region more foreign investment, particularly in the areas of knowledge economy, and RTD itself.

Since it is difficult to expect that some major development will take place shortly in order to create a WB regional RTD Information system, it is fair to summarize on the basis of all research, and discussions among the members of the expert group, **a tentative action plan**, with some specific **recommended activities** to be proposed to those concerned in the region:

1. **Ministers for science** in the Region should pay more attention to the issue of national RTD information systems, upgrade their scope, support their operations in English, and regularly exchange their experience in the field, including the prospects to make their systems more compatible, and ready for interoperability. They should pay more attention to greater compatibility between relevant national information systems, as well as between national systems in the WB region.

2. **People responsible for the existing RTD information systems** should communicate among themselves more systematically at the national and regional level, so as to become aware of the developments and challenges of various systems, and to be able to discuss possibilities to link the systems, increase their compatibility and encourage their interoperability. Although these matters require decisions by politicians – **proper initiatives of the government officials**, supported by **"technical arguments"** and illustrated by good practice cases, could play a role in **creating the necessary mind-frame** which will allow developments in the direction of a regional (multinational) RTD information system for Western Balkans. Although the strategic objective

should remain to involve all countries of the region, **even some initiatives limited to a smaller number of countries should be encouraged** – in order to demonstrate the potential benefits of such a system.

3. **Major RTD stakeholders** (from academia and business) in the countries of the region should take an active interest in their national RTD information systems and express their interest for the development of a regional RTD information system, as it should additionally attract potential investors, business and RTD partners for collaboration with them. They have a **direct interest in this type of international promotion**, specially since they are normally not requested to participate in funding the system.

4. **European Commission** should encourage national authorities from the region to upgade their national RTD information systems, and support efforts to develop a regional information system for Western Balkans. This can be done in variety of ways: through informal or formal suggestions during political consultations and preparatory technical meetings, through monitoring the implementation of RTDI policies in the Pre-Accession Process, and by funding some activities leading to the development of a regional RTD Information System.

PART B: NATIONAL REPORTS ON RTD INFORMATION SYSTEMS

National reports have been prepared by members of the Expert Group on the basis of the first Survey (composed of an on-line questionnaire, and a series of structured interviews). The latter were conducted in September-October 2009 on the basis of the same questionnaire by the Group members. The Reports were delivered prior to the Workshop in Maribor (12 November 2009), and were presented and discussed during the Workshop. SBRA has processed the on-line answers, and delivered the results to Group members.

The second on-line questionnaire was not originally planned, but SBRA decided to conduct it in order to check any possible shifts or developments. Very limited changes were recorded, and that is reflected in the report and in the recommendations.

1. ALBANIA

Report prepared by:

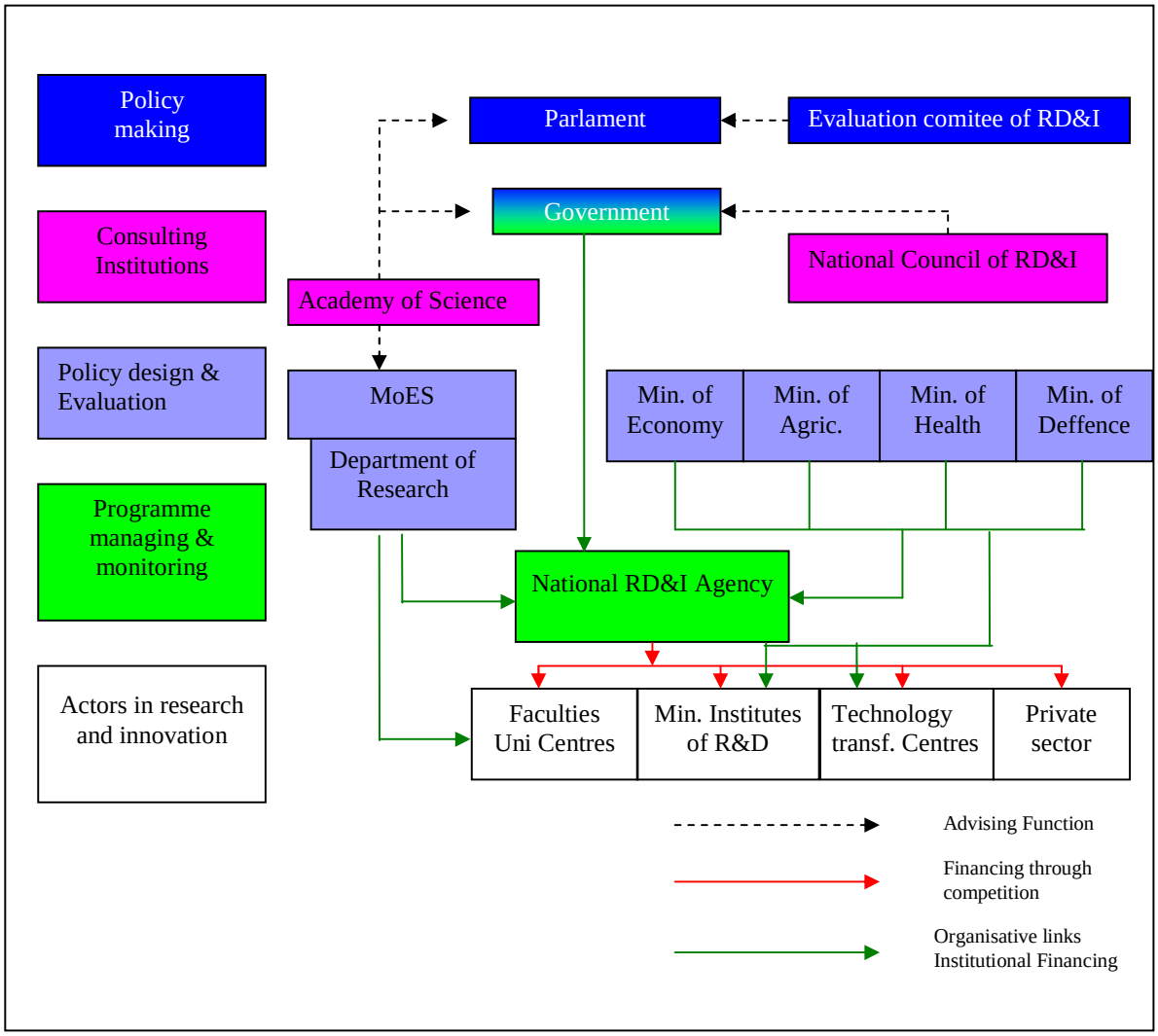
Academician Prof. Dr Salvatore BUSHATI (General Scientific Secretary of Academy of Sciences of Albania.

Prof. Assoc Dr Evan ROÇO (Lecturer of the University of Agriculture of Tirana).

October 2008

According the new Law on Higher Education in the Republic of Albania, the MoES develops the new scientific research system in Albania by reconstructing most of the existing research institutions in the universities (as institutions, centres and departments) and by introducing several new research institutions.

Existing system of research in Albania presented as follows:



Scientific research system in Albania

In higher education institutions, the main R&D activities are carried out in Humanitarian, Economic, Social-juridical and Medical sciences, and in Natural and Technical sciences. They are mainly concentrated in the University of Tirana, the Polytechnic University of Tirana, the Agriculture University of Tirana, University of Vlora, the University of Shkodra, and partly in the University of Elbasan. The small share of R&D in the higher education sector is mainly due to the lack of direct financing. Hence, higher education institutions in Albania are mainly oriented

towards teaching processes, while scientific research remains limited and is mainly possible through foreign cooperation initiatives (Bushati, ICBSS, 2006).

There are currently 12 public and 22 private universities in Albania. The total number of students in the academic year 2009-2010 in public and private universities reached 120.000; tendency increasing. All activity of the public and private higher education institutions is managed by the Law on Higher Education with the same standards about study plans, programmes and curricula for both private and public higher education institutions.

Main S&T Stakeholders in Albania (Dall, 2006; Bushati, 2006)

Main ministry in Albania competent	- Ministry of Education and Science
Other ministries with importance to the S&T sector	- Ministry of Agriculture and Food and Consumer Protection - Ministry of Economy, Energy and Trade - Ministry of Culture, Tourism Youth and Sports - Ministry of Health - Ministry of Environment, Forest and Water
Other important	- Council of Higher Education and Science - Rectors Conference - The Academy of
Universities, Centres and Institutes	- Interuniversitary Centre for Albanological Studies - Polytechnic University of Tirana -Agriculture University of Tirana - University of Tirana - Centre of Nuclear Physics and Albanian Atomic Authority - Institute of Water, Energy and Environment - Institute of Geosciences - Military University of Tirana - University of Shkodra - University of Elbasan "Aleksander Xhuvani" - Agricultural University of Korce - University of Gjirokaster - Technological University of Vlore - University of Durres -Academy of Arts - Academy of Sports and Physical Training, Tirana - Institute of Statistics

The private sector's investment level in S&T in Albania is extremely low. SMEs, or rather micro-enterprises (entities with fewer than five employees), make up the vast majority of private businesses. Their survival strategy focuses on labour intensive, low-cost production. Against this background, R&D falls almost entirely under public responsibility. Overall, there are very few private institutions, and these few operate mostly in the field of Human, Social and Political sciences but their personnel structures and their financial and cooperation procedures are not stable. However, in the field of information technology, the private sector became dominant by establishing market activities with some relevance to research and development (Bushati, ICBSS, 2006).

The Centre for Research and Development in Tirana is a private research institute worth referencing. Since early 2002, it has produced and disseminated information about business development based on quarterly business tendency surveys for manufacturing and construction sectors. It is becoming well recognised by Albanian institutions, international organisations and is frequently referred by journalists and academics as a source of information regarding business development in Albania.

In the ICT field, there are Albanian institutes participating in various international scientific projects, such as TERENA (Trans-European Research and Education Network Association), SEEREN and SEEREN2 (South Eastern European Research & Education Network- INIMA with the Polytechnic University of Tirana and the Faculty of Economics of the University of Tirana), SEE-GRID and SEE-GRID2 (South Eastern European Grid-enabled e-infrastructure Development), SEEFIRE (South-East Europe Fibre Infrastructure for Research and Education), ISOTEIA (Integrated System for the promotion of Territorial-Environmental Impact Assessment in the frame of spatial development) (ASA Annual Report, 2006).

Albania also participates in the IDEALIST - FP7 Network which supports participants in ICT Priority by network for 1ST under the transition to the 7th Framework Programme (funded in FP6). IS2 WEB is a project coordinating the integration of scientists into the IST (Information Society Technologies) Programme of the FP6 and SEE-INNOVATION (focusing on the integration of SMEs in the field). The projects are funded by the European Commission and

assist innovative research organisations and SMEs in Western Balkan countries in getting informed about, and actively participating in, IST research funded by the European Commission. Furthermore, SCORE (Strengthening the Strategic Cooperation between the EU and Western Balkan Region in the field of ICT Research) is relevant in this field. CIVET – 2000 (today Trenkwalder Civet 2000), a private NGO is a partner of these projects in Albania.

The National Statistical Institute of Albania (INSTAT) has not yet released official statistics according to the standards of the OECD Frascati manual for R&D funding and performance. Government expenditures on R&D in Albania accounted with empirical formula approximately 85% of the expenditure of research institutions (Bushati, ICBSS, 2006).

The data in the table below regarding government expenditure on R&D shows that GDP during the 1996 to 2003 period was very low. After the deep financial and social crises that were a result of the collapse of the pyramid schemes in 1997, expenditure increased to 0.19% of GDP in 1998. During the Kosovo crisis in March 1999, the value of R&D expenditure/GDP was 0.11. Since 2000, the values have increased very slowly, a trend which will hopefully continue.

R&D expenditure as a percentage share of GDP and as the annual rate from 1997-2003 (Bushati, ICBSS-2006)

Indicator	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2005*
As % of	0.17	0.14	0.19	0.11	0.17	0.18	0.18	0.18	0.19
As annual		84.03	169.4	67.7	177.5	112.5	106.3	107.8	

The Ministry of Education and Science reported that total expenditure for research institutions in 2004 reached EUR 2.4 million. In 2005, R&D state funding still remained low at approximately 0.2% of GDP (INA - Great-IST, 2007). The government took the initiative to increase R&D expenditure up to 0.6% of GDP in 2015.

The state budget finances R&D activities in Albania in two complementary ways: via funding institutions and via national R&D programmes. The institutional financing goes directly to central organisations in order to support the R&D activities of their dependent institutions. As

for financing through R&D programmes, this is conducted using (Bushati ICBSS, 2006) the state budget, which is designated for national R&D programmes (see chapter 5.3). It is used to finance different projects in the priority areas in a competitive way through the MoES, following established and standard procedures, especially for international cooperation

There is hardly any current data available on the private sector (1997-2003). The level of investment in S&T was still too low to draw any substantive conclusions; despite its current difficulties and serious economical issues, some experts have been rather optimistic about Albania's future development, especially taking into consideration its proximity to European markets and innovative abilities of its people. Anyhow, step by step, the changing situation is optimistic for the R&D in Albania.

R&D Infrastructure

According to Uvalic, the overall state of R&D infrastructure in Albania is not very satisfactory. At the time of writing this report, there were still no research centres at the local or regional level, nor new technologies or innovation parks. The technology and technical research equipment has improved in recent years, but is still insufficient. In some institutions of ASA there are a lot of new scientific environments (for example, Institute of Nuclear Physics, Institute of Biological Researches, Institute of Hydrometeorology and Institute of Seismology). The communication and information infrastructure, the network access for higher education and research institutes, and the library information systems are highly inadequate and there is almost no access to electronic journals (except some incentives of ASA since 2004 to the CEEOL) and Science Citation Index databases (Thomson) (Uvalic, 2006). In the recent years the Government has become more sensitive to the need to ameliorate the situation.

There are also some private or non-profit making organisations offering and developing internet services (for example, Adanet, Albaniaonline, ICC, StarSat, Abissnet, SUN etc.). The MoES and the ASA have jointly set up a procedure to establish the Albanian Academic Network (AAN), which would be in charge of the national research and education network. At the time of writing this report, the network was still in a preliminary phase and did not cover all the research

institutions and centres, higher education institutions, and other important stakeholders for S&T sector in Albania. Gradually, LAN networks for every institute/centre within the ASA system were created, and the internet services now work regularly (Bushati, ICBSS, 2006).

The Albanian government built up the Information Society Agency. The mission and the objectives of this institution are:

- establishment and monitoring of ICT common standards on a national scale development of the modern platform of e-government for the public administration coordination of the major projects of ICT in central and local level, by avoiding duplications and increasing the efficiency of the funds' use development of common components of ICT in use by the government update and monitoring of strategies and national policies implementation by the Information Society in Albania;
- highlighting of the recommendations serving for the implementation in the information society of strategies and policies. This included recommendations on rules of procedure and laws;
- enhancement and facilitation of ICT spread in government's local services (E-Local Government) aiming to make easier citizens daily life;
- reforming and modernisation of the public services, focusing the citizen (citizen-centred);
- organisation of the public private partnership (PPP) for the development and implementation of the strategies and plans of the information society; - evaluation and the suggestion of the budget needed for the implementation of the different stages of the national strategies;
- offering maximum transparency in governing through ICT and E-Govemment in order to prevent corruption and increase public administration prestige infrastructure establishment offering information free access to the public;
- integration of the Albanian society in the European and world structures of the Society of Information, and the coordination of the projects in European and local levels;
- preparation of the necessary steps for the European integration through the adaptation of the electronic legislation and the set up of useful infrastructure.

Taking into consideration the main duties and objectives set out by the Civil Society Information Agency, a national project can be implemented by this Agency.

Albania has a relatively low INTERNET penetration while the ICT facilities are concentrated in the state capital. New government has a priority on ICT development infrastructure in Albania. The government has undertaken the initiative of establishing a high-speed INTERNET network between various governmental institutions, as well as a network of Public Access Centres (PACs) in rural areas of the country, to inform Albanians of information and communication technology benefits as well as provide access to modern services (SBRA-Great-IST, 2007). To allow the R&D infrastructure capacity of education and sciences in universities, the government invested EUR 1.6 million in 2007 (Agolli, DR of MoES, 2007).

Patenting and Trade Marks Office in Albania is another important institution aiming to collect, stimulate and disseminate the patents and innovations, which are very low in the country.

Among other approaches, innovative output can be measured by patent data, the most important advantage of which is the wealth of the information supplied.

Albania has its own Patent and Trademark Office. From 1957 the protection of foreign trademarks in Albania was carried out by Chamber of Commerce. On 22nd March 1993, the function of the Chamber of Commerce for registration of trademarks and industrial design passed to the Patents Office (Decision: D.C.M. No 135), which was under the dependency of the Committee for Science and Technology. On 27th April 1994, the law on Industrial Property was approved; providing grants and protection for the following industrial rights, such as patents for inventions and utility models, trademarks and service marks, industrial design and appellation of origin. The activity of the Albanian Patent and Trademark Office (ALPTO) as a Central and Public Institution financed by the state budget under the dependency of the Council of Ministers began with the resolution of the Council of Ministers no. 313, "For functioning of the Directorate of Patents and Trademarks", dated 13th June 2000. ALPTO is a government institution, which provides grant and protection for: patents for inventions and utility models, industrial designs, trademarks and service marks, geographical indications and topography of integrated circuits.

The tasks of ALPTO are determined and regulated by law no. 7819 dated on 27th April 1994 on "Industrial Property" and amendments in power. Today ALPTO is a public institution under the Ministry of Economy, Trade and Energy (METE) (Albanian Patent and Trademark Office, 2005).

ALPTO services are based on laws and regulation in force, offering new information to the public, free of charge, relating to the object of industrial property rights. This information can be found in the publications and bulletins of the office. The office also provides assistance by answering general questions in the field of industrial property rights; by helping to interpret the laws and regulations relating to forms of protection; by responding to questions concerning application procedures; by offering services to users all over the country; by increasing awareness of the industrial property systems through organisation seminars; by publishing specialised information in a tri-monthly journal; and by issuing regular leaflets and materials related to industrial property items (Albanian Patent and Trademark Office, 2005a).

ALPTO organises activities, trainings and seminars to increase the public awareness related to the Industrial Property Rights. It gives consultancy for universities, private companies, attorney offices, etc. ALPTO also organises seminars and training in the occasion of the Regional Cards Programme for South and Eastern Europe. This project is financed by the European Patent Office and the European Community (Albanian Patent and Trademark Office, 2005).

In the framework of strengthening institutional capacity of ALPTO, in 2007 some improvements have been made to the integrated information system in accordance with WIPO standards. These improvements include the completion of the database for all the Industrial Property objects (patents, trademarks and industrial designs) and correction of data imported and processing of applications carried over from previous years. These are processes observed and assessed by WIPO.

In 2007, four Intellectual Property Bulletins were published on-line.

Publication Activity in Albania is one of the most important activities in R&D information dissemination.

Most of the scientific work is carried out by the Albanian Academy of Science, universities and other research institutes. In the words of Peter Ballantyne in the 2006 UNESCO report "Accessing and Disseminating Scientific Information in South Eastern Europe", the Academy is certainly a local leader in this sector, since the publication is an integral part of its research process (Ballantyne, 2006).

Various scientific studies are published by the Academy's Publishing House *Shkenca* in the form of books, monographs, periodic volumes, bulletins and other types of literature; offering the output of scientific research to the academic community and wider public on a continuous basis. Albanians abroad (especially in Kosovo/UNMIK, the FYR of Macedonia and Italy) also play a role in the providing of these publications.

The principal aim of PH Shkenca is to publish studies in the field of Albanology - Linguistic, Historical, Ethnological, Folkloric, Archaeological and other fields of scientific research. The most important journals and periodicals of the Academy of Sciences of Albania are Philological studies, Historical studies, ILIRIA, AJNTS, Folk culture, the magazine Our language, Matters of the Albanian folklore, Candavia, published in Albanian and with a summary in English or French are listed in the CEEOL (Central and Eastern European Online Library) - an on-line archive, which provides access to summary text articles (access to the full text is restricted to subscribers) from 255 humanities and social science journals, electronic books and re-digitised documents pertaining to Central, Eastern and South-Eastern European topics. Its content is provided by numerous publishers and editors, mainly from Central and Western European countries, which deal with Eastern Europe in terms of its history, languages and literature, along with its cultural, social and political realities (C.E.E.O.L., 2007).

One of the journals, the Albanian Journal Natural and Technical Sciences (AJNTS) (two publications per year in the English language) has an important role in the scientific community in Albania. A lot of papers are a contribution of scientists living in and out of the borders of Albania. These papers strengthen the cooperation and transfer of technologies in Albania. Many bulletins are prepared by the institutions of the Academy of Sciences of Albania (ASA) about the

national emergency (for example, seismological, hydrological, meteorological, radiological dose rate) (ASA Annual Report, 2001).

Extensive exchange activities are conducted between Albania's National Library, its University libraries, the Scientific Library of ASA and a variety of external institutions. This has numerous positive effects for Albania: the libraries are not only enriched with scientific literature but the most important scientific publications, especially those of the Academy of Sciences, are not only sent to European libraries but also to the Library of Congress in the USA. It is thought that the situation described by the above-mentioned report to UNESCO, stating that Albanian researchers seem "to need additional training and support to help them publish in regional and international journals" is now in the past (Ballantyne, 2006).

Another important source for the scientific publications are the private publishing houses with the original publications of well-known Albanians, but also with the publication of important internationally-renowned scientific works, that have become part of the scientific community since their translation to Albanian. However, the crucial problem today regarding scientific publications in Albania is the total lack of online access to these publications that are today a reality in many countries.

The Information Resource Center was established in the frame of the ACIT project and supports participatory and informed trade policy decision by providing all stakeholders with accurate information and data about conditions, opportunities and risks that international trade entails. Being client-oriented, the set-up of facilities, types of information and services provided will are by consulting their clients' needs and preferences. The Albanian Center for Economic Research (ACER) founded in 1993. ACER has been active in research identification and execution, information publication and dissemination throughout the public opinion exchange.

The objectives of ACER are to advance educational and scientific profile and understanding, in the field of the promotion of free enterprises, limited government and personal responsibility as pertaining to Albania; to publish, to conduct seminars, and to engage in such other and further means as may be necessary and proper to accomplish the

foregoing objects and purposes including research and research management; Education and training; National policy development and legal and regulatory reform; Public outreach and advocacy; and Information exchange and dissemination.

Universities, especially the UT, PTU, and AUT, have increased the efforts in publishing the results of the research performed in their own institutions. They publish several periodicals and text books and monographs according to the areas of research. Unfortunately the publications are mainly in Albanian with an English summary. The publications are not yet presented to a large public in internet.

There are also several online **business support web-portals:**

- **Albanian Business Information Centre (ALBIC** - http://www.albic.net) presented the network of the Regional Development Agencies. The Albanian Business Information Centre contains business information including practical information in all the fields related to business: Fiscal system; Legislation; Financial system; Public procurement and Licensing; Online materials about business; Training and consulting, various publications, surveys and studies; online application forms and Discussion Forums. Unfortunately the page is not updated.
- **SEEbiznet** developed by the former SME Agency. At the time of writing the report, the indicated webpage http://www.seebiz.net.al was not operating.
- **WIRAM/GTZ is** supposed to present the network of partners for local development on the internet. The website is nevertheless also not available.

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2. BOSNIA AND HERZEGOVINA

Report prepared:

mr Djordje Markez, Ministry of Science and Technology of Republika Srpska,
mr Denis Mušić, Faculty of Information Technology, University "Džemal Bijedić", Mostar,
Sarajevo, 27.10.2009.

Introduction

Bosnia and Herzegovina has a specific model of organization and institutional jurisdiction on scientific and research work. According to the Constitution of Bosnia and Herzegovina, constitutional competence in area of RTD belongs to two Entities - Republika Srpska (RS) and Federation of Bosnia and Herzegovina (FBiH). Therefore, establishment of integrated RTD information system is matter of Entity's Governments and specialized agencies, at this moment. The Ministry of Civil Affairs of Bosnia and Herzegovina (MCABA) is a state ministry which has jurisdiction in area of international scientific and technical cooperation (like EU framework programme, COST, EUREKA as well as bilateral RTD cooperation) so MCABA is focused on establishing of RTD info-system oriented toward international RTD programmes and networks. One year ago MCABA established NCP office in Bosnia and Herzegovina, which previously operated as project supported financed by Austrian Development Agency, Open Society Fund BiH and MCABA. Project was designed to support the integration of Bosnia and Herzegovina into the ERA by further development of a National Contact Point system (NCP) responsible for the provision of information and advice on participation of BiH researchers from academia and industry in EU Framework Programme. The NCP system consists of a main office in Sarajevo and regional branch offices at the BiH universities which enable to run activities on the whole territory of BiH. NCP FP BiH main task is to promote participation of BiH researchers and research institutions in FP7. That effect on creation of first RTD information system of Bosnia and Herzegovina www.ncp-fp.ba devoted to EU Framework Programme. This info-system is offering domestic researchers quick access to EU FP web and link as well as possibility of partner searching in all Europe. There is also list of domestic higher education and RTD institutions, SMEs and chamber of commerce in Bosnia and Herzegovina.

Report for RTD information system in Republika Srpska

Due to fact that Republika Srpska as a Bosnia and Herzegovina's second entity has a constitutional competences and jurisdiction under sector of scientific work and research, all aspects of creation of RTD information system is under full responsibility of Ministry of Science

and Technology of Republika Srpska. Only exception is area of international scientific and technical cooperation which is under responsibility of Ministry of Civil Affairs of Bosnia and Herzegovina (MCA).

Ministry of Science and Technology of Republika Srpska (MSTRS) is Ministry within Government of Republika Srpska and main activities of this Ministry are administrative and other special tasks related to: science-research activities; creation of RTD policies and strategy; strategy of technological development of the Republika Srpska; incentive to fundamental development applied researches; development of national investment technologies; innovations policy; development and improvement of technologies; informing on issues scientific and technological development; planning, preparation of programs and agreements on science-technical cooperation in accordance with the Constitution of Bosnia and Herzegovina; inspection and supervision in these fields, provision of information via media and other types of informing on its work and perform other tasks in accordance with the Law and other regulations of the Republic of Srpska and Bosnia and Herzegovina.

Under MSTRS competences and jurisdiction is also creation of RTD information system of Republika Srpska which has to provide various information to different external and internal users like RTD policy makers, research institutes, universities, business unity and international RTD association and networks. From moment when MSTRS is established first time as an independent administrative authority in Republika Srpska, it started to build RTD information system as integral part of RTD system of Republika Srpska. Unfortunately, fully operated and completed RTD information system of Republika Srpska which is offering wide range of useful information and data is not established yet. There are many reasons for that.

From very first moment of autonomous work of MSTRS, creation of RTD information system was not recognized as important issue and identified in strategic document made by MSTRS. In 2004, MSTRS published document “Strategic trends for development of science and technology in Republika Srpska”. None of chapters in this strategic document was devoted to establishment and development of national RTD information system, although issues like international networking, strategic partnership at EU level and participation in EU RTD programmes were identified as a very important. Furthermore, in that moment there was no synergy between Ministry which act as a task leader and other RTD key players like universities and research institutes.

Just after 2005 MSTRS start to thinking about development of information system, especially RTD data base of Republika Srpska. During this period MSTRS start to negotiate with IZUM (Slovenian Institute of Information Science) about introduction of COBISS system (Co-operative Online Bibliographic System & Services) and CRIS system (Current Research Information System) in order to implement it in Republika Srpska. MSTRS declared that implementation of COBISS system is one the top priorities because MSTRS did not dispose of any kind of RTD data base neither important and relevant information necessary for mid-term planning. In this

moment, MSTRS together with Ministry of education and culture of Republika Srpska (MECRS) are implementing this project and it expected its finalization in middle of 2010.

Almost at the same time, MSTRS initiate project of establishment of SARNET (Academic and Research Network of Republika Srpska). At the same time, University of Banja Luka - Faculty of electrical engineering (FEE) was participant in FP6 project *SEEREN*. Very soon, MSTRS together with FEE start to implement project known as SARNET and it has to emphasize that all RTD stakeholders were involved in it (Ministries, Universities, business community, etc.). Finally, Government of Republika Srpska decided few years ago to establish SARNET as a specialized Institute within MSTRS and provide necessary financial means for development of ICT infrastructure. Main goal of SARNET institute is building and development of ICT infrastructure in HE and RTD sectors as well as participation in international projects and organizations dealing with ICT technologies. So far, SARNET Institute managed to develop and construct almost full infrastructure (optical fibre cables) between cities in Republika Srpska. In second phase SARNET will expand its ICT infrastructure within cities as well as connect all universities and research facilities in Republika Srpska.

Finally, end of 2008. MSTRS started on preparation on new RTD Strategy of Republika Srpska. Until now, working group appointed by MSTRS has prepared draft version. Due to fact that this is working version of document and still changes can be happened, but it is clear that one chapter will be devoted to development of national RTD overview and establishment of RTD data base and additional ICT infrastructure. All this elements will be integral part of national academic information system of Republika Srpska.

Currently, there is no integrated and comprehensive RTD info-system in Republika Srpska. Instead there are several web-sites developed separately by different institutions, which has some elements of RTD overview and information RTD data base, offered to end users. Here is the list of relevant portal and web-pages in Republika Srpska:

1. MSTRS (http://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/) - This is web site of Ministry of Science and Technology of Republika Srpska. It provides very modest overview of RTD system in Republika Srpska like: list of RTD institutions, basic info on RTD environment in Republika Srpska and legislative frame for RTD activities, etc. Data presented on this web is focused mainly on national RTD programmes and public calls for project proposals financed form national funds. Information regarding international RTD programmes, national RTD landscape, partner search option and related data are limited and insufficient. No “open source” data base as well as effective network building tool. There are only linkages toward CPM and AIDRS webs, but no other linking options for advanced search.
2. MECRS (http://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mpk/) - This web site of Ministry of education and culture of Republika Srpska that offers only brief introduction on higher education system of Republika Srpska as well as list of all licensed HE public

and private institution. There you can also find all necessary information related on other issues like accreditation and licensing of HE institution, diploma recognition, legislative frame, etc. But there is no clear and visible overview of all HE system offered to international visitors. No public data base as well.

3. CPMRS (www.cpm-rs.info) - CPM centre is virtual centre created together by MSTRS and two public Universities in RS (Banja Luka and East Sarajevo). This web and virtual centre comprises information on different EU programmes offered to domestic researchers and business community. Very descriptive and useful for domestic researchers. It also offers international partners to easily find suitable RTD partner in Republika Srpska. Main lack - there is no comprehensive RTD landscape of Republika Srpska
4. AIDRS (http://www.aidrs.org/) - Web page of Agency for Information Society of Republika Srpska. There you can find all documents and domestic RTD policy related on ICT. It also can be useful for domestic RTD community for being connected and updated on relevant EU policy and events. Main lack - no comprehensive overview on domestic ICT research unity as well proper model for partner search. There are no tools for network building as well as good insight in RTD- ICT area in EU.
5. UNIBL (http://www.unibl.org/) - This web of University of Banja Luka provide complete overview on University of Banja Luka, its technical and human resources, RTD equipment, ongoing national and international RTD projects and similar information. It is an “ordinary way” of University presentation to visitors. Main lack of this web is absence of effective data base. Unfortunately, this kind web design also did not manage to create wide and quality overview in order better networking and easier connection of domestic researchers to EU RTD programmes.
6. UNSSA (http://www.unssa.rs.ba/) - This web of University of East Sarajevo page provide also complete overview on University of East Sarajevo, technical and human resources, RTD equipment, ongoing national and international RTD projects and similar information. Main lack of this web is absence of effective data base. Unfortunately, this kind web design also did not manage to create wide and quality overview in order better networking and easier connection of domestic researchers to EU RTD programmes.
7. SARNET - No web available. This is Institute within MSTRS and ongoing project of Ministry of Science and Technology and Government of Republika Srpska.

General impression for Republika Srpska regarding RTD information system is quite fragmentation of it and divided responsibility for maintenance of that partial systems. There is few non-integrated RTD info-system in Republika Srpska like SARNET, MSTRS, AIDRS, MECRS webs, etc. But, it is more than obvious that is Republika Srpska does not have fully

accurate and comprehensive information system offering to international and domestic public necessary data on RTD potentials.

Short analysis of existing "partial" RTD info-systems in Republika Srpska show that most information offered to public is mainly limited to data like: list of main RTD institutions, incomplete list of RTD personnel, list of ongoing research project (financed by national, EU or international RTD funds), areas of specialization and excellence and participation of domestic RTD institution in EU RTD programmes (like TEMPUS and FP7). But no comprehensive overview of all RTD potentials and environment as well as efficient software tool for partner search and networking was created and offered.

It is clear that these partial info-systems developed locally as a result of action of individuals or particular department/ institutions. There were no synergy between MSTSR, MECRS and other RTD stakeholders for full implementation of integrated RTD info-system so far. Therefore, complete linkage and interoperability between these partial systems has not been established.

One of weak point of these partial info-systems is their "inside-orientation". Namely, most of these web sites mentioned (like MNTRS, MPKRS) are offered only on domestic language and therefore it is obvious their orientation toward domestic researchers and domestic users only. Just AIDRS and CPM web sites are offering some of information on English and domestic language version. Naturally, it could be expected that "external" users (international partners, networks, etc.) who searching for potential partner from Republika Srpska or just search on RTD potentials of RS are enabled to get requested information. Domestic users (research unity, business community, NGO, universities, etc.) are inadequately informed too, not only users abroad. Level of necessary technical support and providing of all interesting information (links, data bases, important EU RTD networks and associations, web addresses, forthcoming conferences, etc.) for domestic users is very low and that could be one the main reason of low participation of domestic RTD institution and individuals in EU RTD programmes and networks like FP7, COST as well as participation in bilateral RTD programmes.

Continuous flow of useful information is essential for RTD community in Republika Srpska/Bosnia and Herzegovina and RTD stake holders, so MSTRS especially and MECRS have to make additional effort to assure this dynamic environment. These Ministries have to also create short-term plan for promotion of importance of national RTD information system and RTD potentials as well as its significance for international linking and networking. It is important that Government take over leading position in process of establishing national info-system and crate long-term strategy for this area. This approach would be definitely most productive, considering all conditions and RTD environment in Republika Srpska.

Another important aspect of information system in Republika Srpska is technical maintenance, its upgrading and updating, financial sustainability and further development of additional tools and software. All these elements are necessarily for effective introduction and complete implementation of integrated information system in RTD sector in Republika Srpska.

MSTRS and MECRS as task leaders have a common interest regarding this issue so they have to create joint approach and joint action plan for development and financial sustainability of RTD info-system of Republika Srpska. Additionally, institutional frame for maintenance and care-taker have to be created.

Report for RTD information system in Federation of Bosnia and Herzegovina

Problems of developing, maintaining and integrating information systems that contain necessary information related to: research institutes, universities, business unity, international RTD associations and networks are very similar in Federation of Bosnia and Herzegovina (FBIH) and Republic of Srpska. However, most of the problems in FBIH are caused by the fact that authorization for investing and planning educational and research development is divided between Ministries of Education. When it comes to education, science and culture, the umbrella organization at the level of FBiH is the Federal Ministry of Education, Science and Culture (FMON::http://www.fmon.gov.ba). In addition to the aforementioned organizations, the cantons have their own Ministries which possess quite large powers in the field of their activity. The division of powers in the field of educational and research activities causes different perceptions of needs and allows the conduction of different vision in its future development.

Academy of Sciences and Arts of Bosnia and Herzegovina (ANUBiH::http://www.anubih.ba/), through National Commission for UNESCO, has prepared the text of the study called "Strategy for Scientific and Technological Development of BIH". After the adoption of the Strategy, a natural process would be to create an action plan for its implementation. Government institutions which adopted the Strategy would enable its implementation in a given time horizon. However, at the state level, process of the Strategy implementation flows a little bit slower. The Strategy has clearly defined the importance and need for having institutions which can support research infrastructure. Those institutions include the following: Register of Researchers, Institutions, Projects and Infrastructure Investment (FEBHRIS), Cooperative Online Library Information System and Services (COBISS) and Bosnian and Herzegovinian Academic Research Network (BIHARNET).

Register of Researchers, Institutions, Projects and Infrastructure Investment, also known as FEBHRIS (http://registar.nub.ba/), includes a database of researchers, institutions, projects and infrastructure investments. This project has been started with the main aim to establish a unique research area. The project was implemented by the ANUBIH and financed by FMON. Generally, the FEBHRIS contains the following information:

- *Database of researchers*: name and surname of a researcher, education, phone numbers, fax and e-mail address, employment details (organization, length of employment, workplace), scientific or research positions, research area, the area of

previous research, the description of expert knowledge (keywords), knowledge of the language and references.

- *Database of institutions*: organization name, phone numbers, fax and e-mail address, classification of activities, number of employees, number of doctors of science and master's degree in teaching, examination equipment essential for the activity, a list of scientific and research projects, and other items chosen by the organization.
- *Database of projects*: title, duration and cost of the project, funding sources, the names of the project managers and associates, their phone numbers, fax and e-mail address, name of research organizations in which the project is implemented or realized, the names of fellow-research organizations, a summary of the project, the essential project results, keywords, classification codes of the project and a possible connection with other projects.
- *Database of infrastructure investments*: purchasing rights for accessing international scientific database, funding of infrastructure systems (COBISS, BIHARNET), support for creation of doctoral and master thesis, internationalization and raising the level of domestic scientific journals with the ultimate goal to become an international reference, support scientific production abroad with the aim of attracting foreign partners to scientific and research cooperation, support the maintenance of scientific conferences in the country with a mandatory international participation, support for publishing activities of scientific literature and academic books with mandatory international review, financing and / or support laboratory and IT capacity is a prerequisite for accreditation and / or certification of quality and international exchange, production of encyclopedia and lexicon, innovators support for international appearances.

Currently, FEBHRIS is the roof information system which contains a few subsystems. One of the subsystems is called CASRIS (http://registar.nub.ba/) and it represents Register of Researchers, Institutions, Projects and Infrastructure Investment in Canton of Sarajevo. In the near future FMON plans to assembly FEBHRIS and CASRIS into a single system that will be used on a whole FBiH area. CASRIS presents certainly a positive example of different perceptions among Cantonal Ministries of Education. The Ministry of Education Science and Culture of Sarajevo Canton (MONKS:: http://portal.monks.ba) is one of the first government organizations which recognized the need and importance of ownership of information systems that will integrate information in the field of research activities and organizations, so they started a CASRIS project. After that, FMON initiated FEBHRIS project.

FEBHRIS has all the prerequisites to become one of the main systems that will integrate data on researchers and research institutions at the level of FBiH. However, efficient use and development of FEBHRIS requires solving a large number of obstacles. First of all, one of the

main FEBHRIS's shortcomings is information update. Most data on researchers and research projects have not been updated for a longer period of time which significantly impairs the efficiency and brings into question the need for such a system. A big problem also represents the fact that some Cantonal Ministries of Education in FBiH are totally uninterested to support FEBHRIS project. Previously mentioned problems could certainly be solved by making the appropriate legal regulations which would ensure that the researchers and institutions regularly update their data and obligate Cantonal Ministries to fully support FEBHRIS.
In addition to integration with CASRIS system, in the near future we can expect considerable improvements of FEBHRIS system, and some of the most important are: the possibility to record data about the researchers who live outside of BIH (Diaspora), improved use of Frascati specifications, establish connection with CORDIS system.

Library information systems and information systems on scientific research activities are an important infrastructure necessary for achievement of modern education, science and research, as well as technological and economic development. The need to search different databases and cataloged records can be effectively satisfied by an integrated library system. One example of the efficient and integrated library information system is COBISS which was promoted in 1991 by the Institute of Information and Science (IZUM::http://www.izum.si/). The project called "Computational Linking Libraries in BiH Over the Internet", which was adopted by all universities and many libraries, presents the starting point of COBISS implementation in BIH. The project implementation lasted for two years (1998-2000) and for the most part was financed by the Government of the Republic of Slovenia with technical assistance of BIH government representatives. In February 1998, University of Banja Luka (UNIBL::http://www.unibl.rs.sr/), University "Džemal Bijedić" (UNMO::http://www.unmo.ba), University of West Mostar (SVEMO::http://www.sve-mo.ba/), University of Sarajevo (UNSA::http://www.unsa.ba), University of Tuzla (UNTZ::http://www.untz.ba) and the IZUM signed the agreement of establishing the COBISS Center. The main aim of the COBISS Center was to coordinate activities and provide technical assistance in the development and organization of online cooperative library system called COBISS.BH (http://www.cobiss.ba/). In the recent years COBISS Center was regularly faced with financial problems which were mostly solved by help of FBIH Government and various donors. However, all efforts to solve the system's status at the state level have been unsuccessful. Work of COBISS Center was terminated in September 2004 when the workers of COBISS Center, in their perspectiveless situation, left the facility. The consequence was the termination of the functioning of the COBISS.BH system. However, in December 2004, MONKS decided to support reactivation of the COBISS.BH system (Virtual Library of Bosnia and Herzegovina) and currently COBISS.BH has 37 members, of which 34 are active. The remaining libraries are in the process of acquiring the necessary licenses to operate. COBISS.BH members are mostly national and public libraries from the FBiH, and only a few of them are from RS. The main parts of the system are available in the national and English

language. Users of COBISS.BH system are more than satisfied with its functionality, so in the near future the major system modifications should not be expected.

The most serious attempt to solve the issue of ICT (Information Communication Technology) usage in education was made in 1998, with the establishment of BIHARNET (BIH Academic and Research Network). BIHARNET network and BIHARNET Center were established with joined forces and initiatives of the UNIBL, UNMO, SVEMO, UNSA and UNTZ. The Government of Republic of Slovenia provided financial recourses for organizing the network. The BIHARNET was the first institution at the country level and the best indicator that the seriousness of the situation in this sector has finally been recognized. The objectives of BIHARNET were development, organization and operation of a single academic and research network in BIH. For two years of its existence (through the donation of the Republic of Slovenia) BIHARNET was the driving force for integration. Some of the BIHARNET basic tasks were clear from the beginning of its existence:

- The formation of the ICT infrastructure to connect universities and other research institutions within the country
- Establish a BIHARNET connection with GÉANT
- Provide efficient Academic and Research Network of BIH in order to build capacity for equal participation in GÉANT and be part of the European "e-Science" platforms

However, BiH government did not adopt a permanent method of funding which should ensure sustainability of the BIHARNET network. This kind of government support has clearly defined a lifetime of BIHARNET project which ended at the beginning of 2000.
The main problem related to BIHARNET is that it was established at the state level but financing education, research and culture institutions in BIH is organized from other levels (entity and cantonal). Government institutions do not feel responsible for BIHARNET sustainability. The Steering Committee of BIHARNET is consisted of representatives of 5 universities which were included in its establishment. Currently, BIHARNET as an institution formally exists, but does not function. This made BIH the only country in Europe which has registered an academic network that does not function. A group of BIHARNET project members has made a proposal that the next conference of university rectors should make some decisions related to the activation and general future of BIHARNET project. The status of the BIHARNET project can be easily described by the fact that the domain biharnet.ba used for the purposes of this project is currently free.

The project which has great importance, and from which significant results are expected, is known as the FARNET (Academic and Research Network of FBiH). The aim of this project is to connect universities of FBIH into unique academic and research network. So far, this project has linked 5 public universities in the FBiH. Universities are connected with optical cables which

provide throughput of 100Mbps. In the near future the SVEMO is expected to be connected to the FARNET, and FARNET to the Internet.

In order to SARNET and FARNET get official access to the global academic network, it is necessary to form a joint institution which will take care of the BIH academic network. As indicated, BIHARNET as an institution already exists, but the above-mentioned obstacles need to be solved. Also, BIHARNET's Steering Committee should urgently take the following steps: select the director which should ensure activation of the BIHARNET institution, make extension to other public universities in BIH.

In accordance with the CERIF's (Common European Research Information Format) recommendations, E-CRIS (Current Research Information Systems::http://e-cris.bh.cobiss.net/), a web application developed by the IZUM, has been offered to the users of COBISS. Usage of E-CRIS system ensured the possibility to record information about researchers and institutions necessary for managing scholars and institutions bibliographies. E-CRIS currently provides information about 78 research organizations and 1677 researchers. However, information about research projects is currently unavailable. It should also be noted that the CRIS-E system cannot boast with regular data update.

Web sites of the main FBIH universities provide overview of their technical and human resources, equipment, institutes, projects etc. Sometimes, these sites can become a great source of information about research activities and research results of their employees. However, some universities have gone step further and launched projects to create their own registry of researchers and research projects. For instance, the aforementioned universities are UNTZ and UNMO. The UNTZ has started a project called Register of Researchers (http://www.nir.untz.ba/) which allows researchers and other visitors to chronologically track science and research results (competence) of teachers/researchers/employees at the University of Tuzla. The ultimate goal of this functional system is a decisive step towards the market and other scientific and research institutions in terms of further improvement and synergy effects.

The project called “Electronic Support for Scientific Research – eNIR” has been started on UNMO with the main goal to ensure upload and publication of scientific-research works, and other publications, on the Internet, and their storage to the data base. Apart from this, the idea is that teaching staff and other associates in the process of higher education find out more about scientific-research work, about applying for available funds, etc. for the purpose of more quality education, better communication, and improving the quality of education itself. The catalogue of PhD, MA, BA papers, together with seminar papers, would help teaching staff and students by giving them an insight on what materials and books are available for their faster, better, and high quality academic development. At the beginning, eNIR project was funded by International Forum Bosnia (http://www.ifbosna.org.ba), but due to lack of interest, relevant persons and institutions are causing quite questionable future of this project.

Current organizational structure of FBIH leads us to the conclusion that development, implementation and sustainability of integrated and comprehensive RTD information system in FBIH will require time consuming projects with significant efforts of government institutions. Of course, this will require significant financial investment, but above all recognition for need and importance of existence of RTD Information Systems at the state level.

3. CROATIA

Report prepared by:
Vesna Kotarski, Office of International Projects, Ruđer Bošković Institute

30. October 2010

Information needs

Internet is a mean of connecting the world on the whole. Scientific cooperation was always based on communication between national scientific and research environment and the development of communication potentials today enables this communication more than ever before. But, huge number of data, its distribution, various formats for their storage and its datedness, make their search and use more difficult. The need for more transparent data display requires adequate organization of data in order to be user frendly. Therefore, to get an overall insight into the research potential of any country it is necessary to create a scientific information platform integrating human, communication, computer and information resources. The aim of such an initiative is to create a focal point for the information about individuals and their activities, to increase access and quality of data, to enable direct connection to international and other projects, to promote scientists with the aim of their involvement in economics and other needs of country and to popularize science, scientific research and scientists and promote ethical values of science.

There are numerous portals, websites, databases and other information systems providing scientific information in Croatia. One can find information on RTD organisations, RTD personnel, bibliographies of researchers, on-going research projects, scientific output, patents, RTD funding opportunites at different fragmented information systems. Those systems are not interconnected and often providing information in Croatian language only, with some exceptions but often to a certain extent. It is very difficult for someone who is not a native speaker to find the information on RTD potential or even more difficult to find a partner by searching for certain areas of specialisation and excellence.

Existing databases and RTD information systems

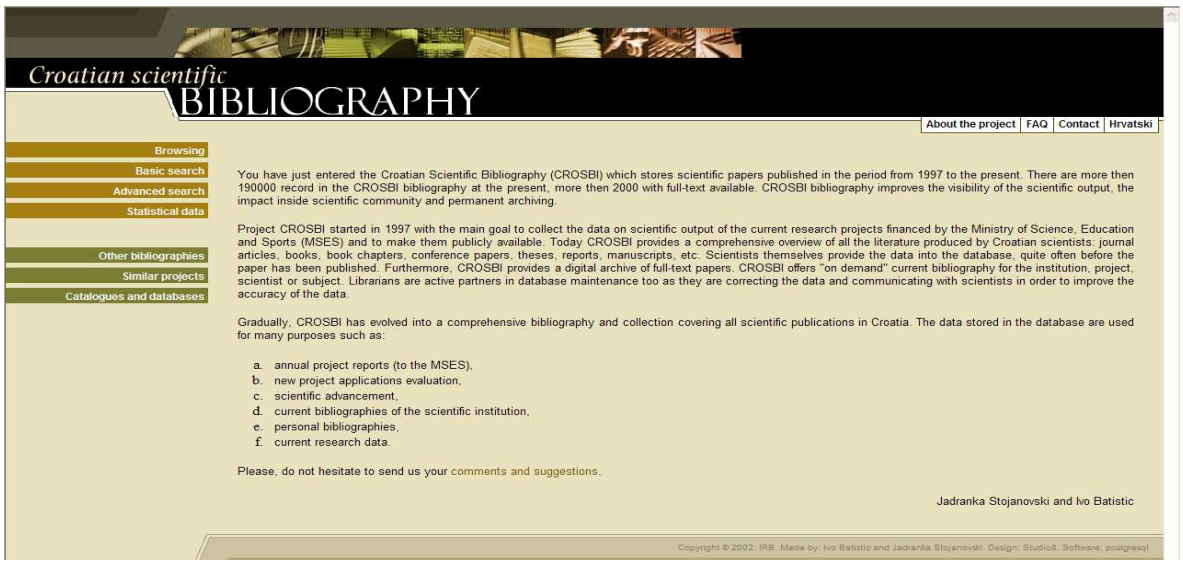
Croatian Scientific Portal

The Croatian Scientific Portal combines, in one place, all information about Croatian scientists, their papers and research projects, Croatian magazines and scientific instruments, all with an aim of providing better interconnection between scientists as well as promotion and popularization of science in Croatia. The project started at the end of the year 2006 with the support by the Ministry of Science, Education and Sports, and it was led by Mrs. Jadranka Stojanovski from the Rudjer Boskovic Institute. For the past two years the portal has grown into an indispensable source of relevant information about science and it averaged more than 20.000 visits per day!

Croatian Scientific Portal provides all relevant information both, in Croatian and English language and by doing so Portal continues to promote Croatian science in the county and abroad.

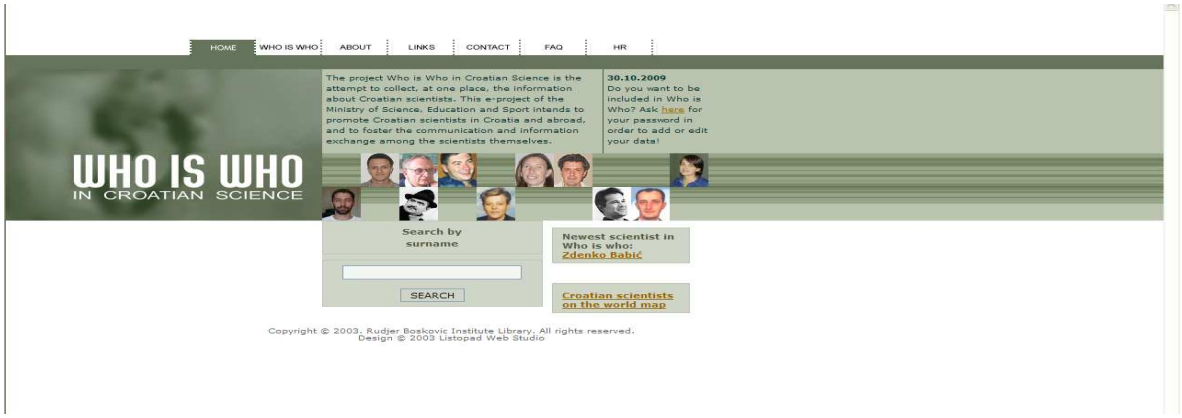
Croatian Scientific Bibliography

Digital repository CROSBI has been collecting bibliographic data of the publications written by Croatian researchers since 1996. The repository currently has over 213.000 bibliographic records with an average of 20.000 records per year. CROSBI serves also as a central open access (OA) repository for more than 5.000 publications. CROSBI records are assigned to the unique identifier of a researcher, institution, research project, and subject field, which assures rich searching and browsing possibilities.



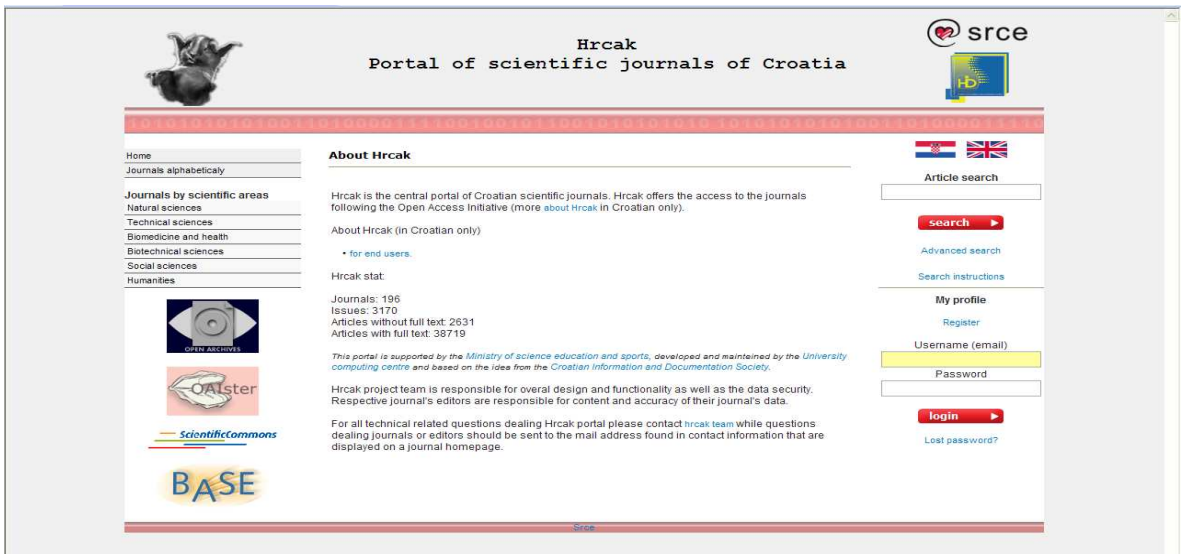
Who is Who in Croatian Science

Who's Who in Science in Croatia provides biographies and link to the bibliographies extracted from CROSBI of Croatian scientists in the areas of business, law, science, medicine, the arts, government, entertainment and more. Project unifies in one place structured data about Croatian scientists. The information about more than 6.000 Croatian scientists is available at the present. The main goal of the project is to promote Croatian scientists in the country and abroad, and to improve communication and information exchange between scientists themselves.



HAMSTER – Portal of scientific journals of Croatia

Croatian Scientific Magazines Portal was built in the year 2006 in cooperation with SRCE and Croatian informational and documentation society (HIDD). HRAČAK offers access to 168 digital versions of Croatian scientific and professional magazines, which follow the initiative of Open Access and support meta-data exchange according to OAI PMH Protocol (Protocol for Metadata Harvesting). Primary objective of this project is to provide publishers with reliable network tool for creation of e-magazines. Currently HAMSTER holds more than 28.000 articles with full-text which are regularly downloaded by other thematic and interdisciplinary OA repositories (**OAlster, Base, Google Scholar, Scopus**).

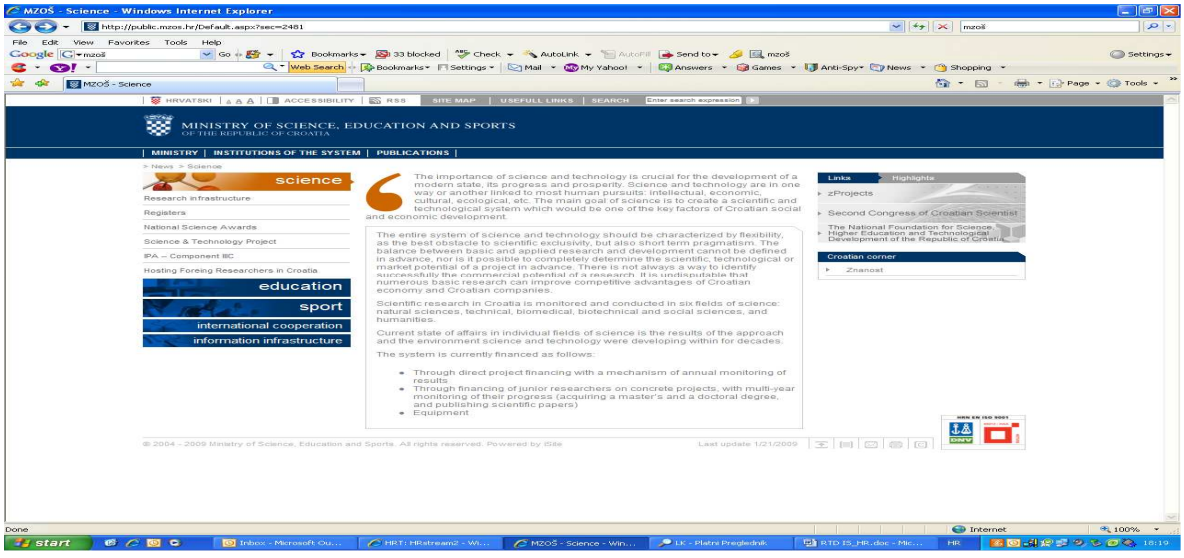


SESTAR – Database of scientific equipment

Interactive database of scientific equipment owned by Croatian research and higher education institutions with the purpose of improving usage and cooperation between scientists. Šestar has been published recently and is still in testing phase.

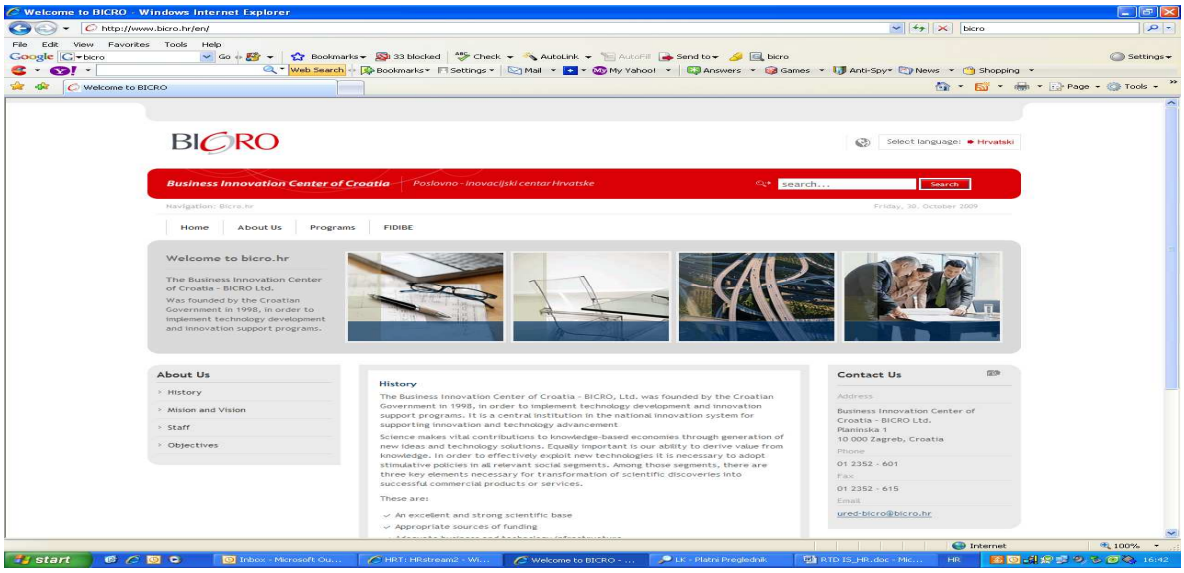
RTD institutional and policy domain portals

The focal point on the RTD informations is the **Ministry of Science, Education and Sports** aiming at administrative and other activities relating to the development of the scientific-research activities and scientific and technical information and communications, harmonization of the financing program of constant research activity and contractual projects for the purpose or realization of the national scientific-research program and scientific programs of special interest, planning, harmonization and implementation of IT development and its interconnection into an integral IT system of the Republic of Croatia, monitoring, recording and realization of scientific, technical and technological cooperation with foreign countries and international organizations.

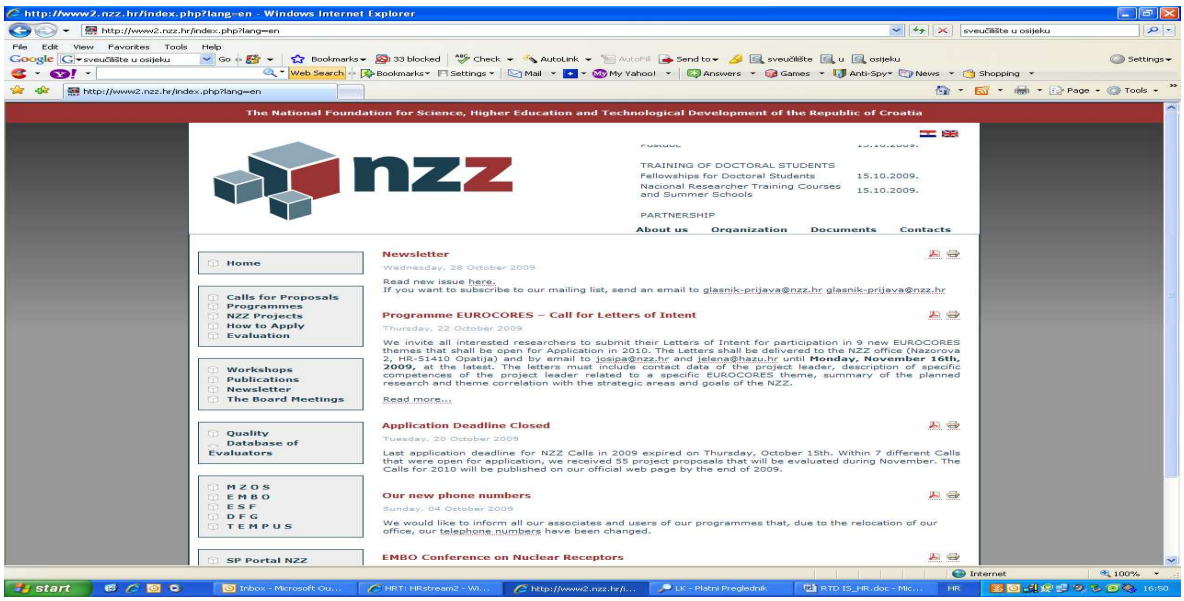


RTD funding possibilites web pages

The Business Innovation Center of Croatia – **BICRO** is the key organisation within the national innovation system whose basic role is development and implementation of government support programs aimed at strengthening technology development as the main generator of sustainable economic growth.

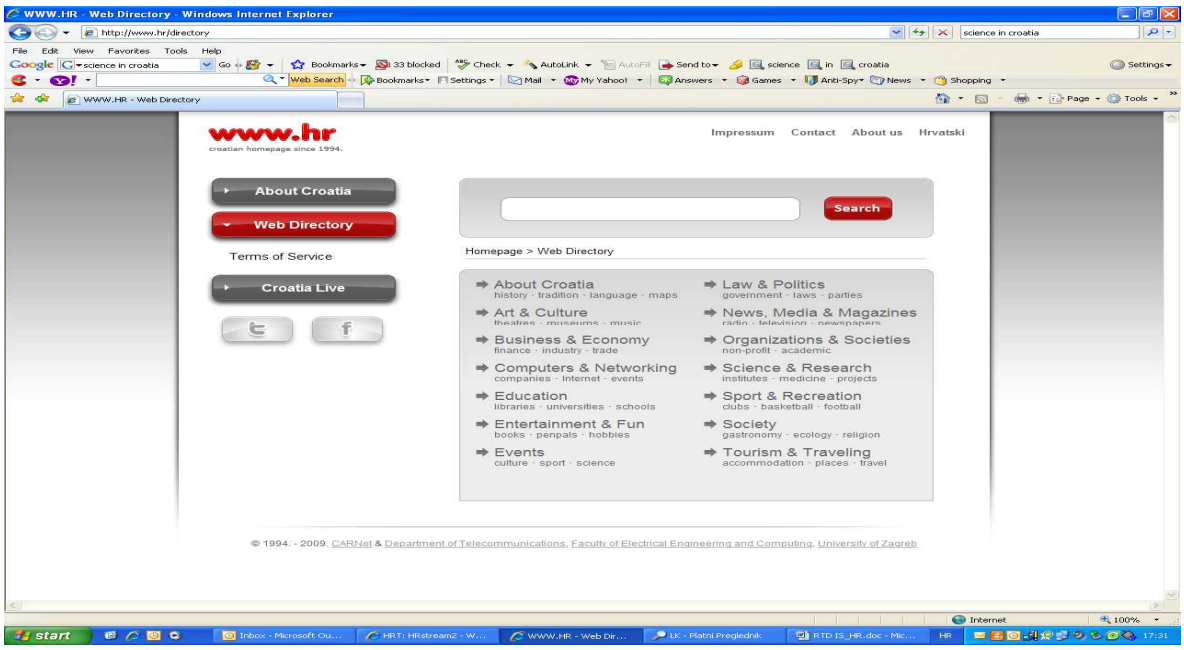


The National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia is funding research, developmental and educational projects that are in accordance with the strategic plans, mission and strategic goals. The projects are funded only through the programmes developed by the Board of the NZZ.



General information on country and its potentials

WWW.HR - Croatian Homepage" is a project funded by **Croatian Academic and Research Network - CARNet**, developed at the Department of Telecommunications of Faculty of electrical engineering and computing (FER), University of Zagreb . This project offers two basic services: Homepage of the Republic of Croatia , with basic information about Croatia, and CARNet's official directory of Croatian's WWW servers. The project was started at the Department of Telecommunications out of the enthusiasm of several assistants on February, 1994.



Evaluation and reccomendations

An online survery conducted among researchers and users of RTD information verified a current state of Croatian RTD information systems. The majority of persons surveyed agree about RTD information systems being:

- unsatisfactory,
- fragmented,
- containing mostly the information on bibliographies of researchers and on-going research projects,
- not interconnected,
- not updated,
- not checked for quality,
- developed locally,
- in national language only.

As a result, RTD information is mostly used by RTD stakeholders and visibility of researchers and RTD potential is poor. The government is expected to coordinate further development and upgrade of existing RTD information systems (**Croatian Scientific Portal, Croatian Scientific Bibliography, Who is Who in Croatian Science**..), but no one is aware of any plans for further development of the systems, meaning there's no strategic long-term planning and recogniton by the government. In the context of on-line survery responses, majority of surveyed person perceive the potential for higher interoperability between national RTD information systems at the level of Western Balkan region, interesting but difficult to achieve.

Another important element has been pointed out in interviews with the relevant national officials and IS experts with regard to funding systems. Existing databases have different financial support. Databases in National and University Library in Zagreb are part of regular library activities, as well as the databases at Central Bureau of Statistics, universities and institutes. Databases within Croatian Scientific Portal are the most promising and used more than other databases, are developed at Ruđer Bošković Institute, with the support of the Ministry of Science, Education and Sports and large amounts of enthusiasm. Those databases could be integrated and upgraged, and the sources of funding could be centralized aiming at development of better solution. Beside the existing databases on national scientific output, scientific journals, scientists, and infrastructure, the structured information systems with national and international funding opportunities is still missing.

The initiator and moving force of the „Croatian Scientific Portal" project, mr.sc.Jadranka Stojanovski emphasises the importance of such a portal at national and international level. When counting the number of every day visits and constant acknowledgments coming from academic community, the portal exceeded current organizational and funding concept. Without the continuous source of funding it is impossible to maintain the system and develop new sophisticated services. It is necessary to connect the Croatian Scientific Portal with EU-CRIS and through this interconnection the information on Croatian science would become a part of European network. In order to improve the accuracy, transparency and usefulness of the databases, certain upgrades related to current trends in European science are needed. It is necessary to encourage the RTD institutions, project leaders and scientists to use the data from Croatian Scientific Portal on their web pages, for example when presenting the bibliography of their institution. department or project. This would enable the development of interfaces to the whole texts of publications currently presented at the non-profit and commerical databases such as **Web of Science**, **Scopus**, **ScienceDirect** etc. Because of better interconnection with the European scientfic databases, the Croatian Scientific Portal need to improve and simplify data entry by complete or partially input of bibliographic information from the available sources. In the future the Croatian Scientific Portal should include a number of interoperable databases containing information on scientific output, projects, RTD funding, equipment and other information relevant for science and education in Croatia. Large majority of RTD data should be taken from repositories to be developed at RTD and educational institutions, and other part will continue to be collected centrally.

On national level, the advantages of integration of RTD information in Croatia are numerous:

- a unique information service that could be used by all public institutions for researchers promotion, evaluation of scientific output, national evaluation and accreditation, as well as for projects funding recommendation; furthermore the integrated database could serve also as tool for evaluating the scientific performance of the universities, presuming that a criteria for funding will not be only a number of students, as it is a current practice;
- a better investment of public money by using an integrated information system where all the measurable scientific information would be accessable and searchable; as previously elaborated, some databases are partially integrated (for example **Croatian Scientific Bibliography** and **Who is Who in Croatian Science**); implemenation of a standard as CERIF (Common European Research Information Format) is expensive and demands extra investmenst in infrastructure (broadband Internet access), equipment (high

performing servers) and human resources (additional correction of data, normative control etc.); integration of existing databases would reduce and rationalize efforts and expenses, aiming at implementation of new useful services;
- transparency of scientific ouput of Croatian scientists and scientific institutions;
- production of statistical analysis of Croatian scientific results.
-

On international level, the advantages of having an RTD integrated information system are as follows:

- promotion of Croatian scientists and RTD and innovation potential with the aim of their involvement in economics and other needs of society,
- increased access and quality of data,
- improved communication and information exchange between scientists,
- faciliation of participation of Croatian scientists in European projects and broad international networks,
- identification of RTD priorities and centres of excellence,
- easy comparison to other scientific communities that use similar or same standard, for example CERIF.

Roles of RTD stakeholders in development of integrated RTD information system

Development and maintenance of the integrated RTD information system can not be sustainable without a commitment and active involvement of all RTD stakeholders (ministries, science boards, science foundations, RTD agencies, academies, researchers) and RTD users (business community, local/national/regional authorities, general public, potential international partners).

In order to encourage development of integrated databases with information on Croatian science and scientific performance, the Ministry of Science, Education and Sports should invest more in databases that have potential and high quality, but are not recognized as a brand and official national source of scientific information. By ensuring the integrity and interoperability of such RTD information system, the scientists would become highly motivated to use the system.

The National Council for Science and Agency for Science and Higher Education should be responsible for support and control of all changes in Croatian scientific information system. The Ministry of Science, Eduaction and Sports has limited human resources and therefore has established different agencies with aim to distribute the workload and assure the efficient operation of Croatian scientific and education system. The National Council for Science and Agency for Science and Higher Education should monitor financial support to the development of integrated RTD information system, and results of that development, in order to avoid duplication of efforts and financing same systems in different institutions. A certain format of data should be entered only once, then checked and confirmed, and afterward becomes accessable through different resources and services.

The RTD institutions should have at least one person being reponsible for scientific statistics. They would be able to set up the adequate data collection and ensure the interface to integrated scientific information system. They would also perform quality check of the data that scientists enter into the integrated system. The RTD institutions and their management should answer for the content of the information system at the institutional level.

Finally, the researchers should recognize the importance and responsibility of regular entry and update of data about themselves and their work (papers, projects, lectures, etc.) as the integrated RTD information system would become the only system used by the Ministry of Science, Education and Sports for promotion and evaluation of researchers and institutions. This simple and accessable way of dissemination through the scientific portal would promote science in Croatia and scienfitic results both at national and international level. Science by nature requires an exchange of ideas and cooperation that crosses borders. Whereas in the past science was primarily a national agenda item, it has now assumed a more international dimension, reflecting a more interdependent and globalized world. Step forward in the development of RTD information systems, should be better connectivity of national systems within the region by integrating regional systems and research capacities, thus enabling participation of WBC research groups in European Research Area in the best possible way.

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- Tempus JEP project „Capacity Building for Research in Croatia“ (CBRC)
- www.znanstvenici.hr
- www.mzos.hr
- www.bicro.hr
- www.nzz.hr
- WWW.HR

4. KOSOVO UNSC Resolution 1244

Report prepared by: Hysen Bytyqi & Linda Grapci, The University of Prishtina – Kosovo
October 2008

1. Introduction

Research Technology Development (RTD) information system is the strength of each society's innovation system. New and innovative ideas derive from up to date research information and solutions to problems that a society faces are addressed by developing new sources of information and methodology. In general, universities and research institutes still contribute the most important share on national RTD information system by producing new ideas, knowledge, and technological innovations. Having mentioned these facts, it is highly important to note that national RTD information system provides sufficient outputs to fulfill development need for society.

The research technology development information system of the former Socialist Federal Republic of Yugoslavia was of good quality for that period although not distributed equally over the country. However, due to conflict recent events and split up and economic slow development, nowadays the national RTD information systems of most former Socialist Federal Republic of Yugoslavia and Western Balkan countries can not compete with those of developed countries like Western Europe and the United States.

Besides, the lack of RTD information system infrastructure, a clear RTD information strategy is the main factor for the continued enhancement of research activities and a low use of such facilities at national and broader level.
In order to identify the main institutions and support the RTD information system in different Western Balkan countries in fulfilling the central role in their national information system the WBC-INCO.NET project is addressing some problems and aims to improve RTD system in these countries closer to European standards.

For this purpose among other tools, the questionnaire for the collected information was used to prepare an evaluation document with identified shortcomings and advantages of the RTD information systems of the seven WBC-INCO.NET countries.

The data collected in the frame of this assessment will serve as starting point to enhance the current RTD information system in Kosovo and for the creation of information strategies, in future.
The report is structures in several parts, each of them giving a closer view of the RTD information system environment and presenting general indicators within Kosovo.

2. Survey design and methodology

The present survey has been conducted in October 2009. The aim of the assessment survey was to perform an assessment in different institution and potential researcher's in Kososvo in terms of RTD information system facilities and structures. In order to obtain a reliable picture of the situation two parallel methods were applied:

1. In-depth interviews with government officials and other active stakeholders (science boards, RTD agencies, academies, science foundations, etc.) who have an influence on RTD information flows in Kosovo, and

2. Conducting an on-line survey among active researchers and users of RTD information.

The questionnaire was developed in order to enable and identify RTD information systems in the country in regard to:

- Assess current status of RTD information system performance in Kosovo.

- Create a common base of knowledge and identify the comparability institutions leading the RTD information system facilities with the country, and

- Possibly create basis for development of national RTD information strategy in future in Kosovo.

2.1. General structure of assessment process:

Sample selection was made according to the guidelines of the organization 5-10 in-depth interview with main RTD institution in the country and minimum 30 on-line conducted questionnaires among researchers and users of RTD information system.
For the in-depth interviews seven separate questionnaires had been completed by managers of institutions as follow:

- Ministry of Education Science and Technology of Kosovo
- University of Prishtina
- Institute of History of Kosovo
- American University of Kosovo
- Economic Chamber of Kosovo
- Institute Ri-invest
- Institute of Public Health of Kosovo
- Institute for Business and Technology

While for on-line survey were conducted by 9 researcher and users of RTD information system. In total for this survey, 48 valid on-line questionnaires were completed while about 20% of them were filled by Kosovar respondents.

In general, the survey was focused in regard to the information on the situation of RTD information system in Kosovo and each questionnaire has been composed covering the following topics:

A) Main characteristics of the existing national RTD information systems
B) Usefulness of information system and its openness for integration

3. Data analysis and discussion of results

Using both methods of data collection (in-depth interviews and on-line survey), further analysis has been performed using MS Excel for statistics as well as for graphs.
During a project conference in Maribor, 12th November 2009, results of this assessment were widely discussed and comments were integrated into final version of this report.

3.1 Main characteristics of the existing national RTD information systems:

In regard to the question whether Kosovo has accurate, reliable and up-to-date information system(s) providing the national and international public with sufficient information about RTD environment and potentials?, majority of the respondents declared that such a system do not exist, while few of them said that it exist but it is not satisfactory. In regard to this matter, very much the same opinions were given by the on-line RTD information system survey respondents, covering region of the Western Balkan countries. About 37% of them declared none existing any RTD information system while about 44% said that it exists but is not satisfactory.

The major relevant portals, websites, databanks and other information systems in Kosovo seem to be: Statistical Office of Kosovo www.ks-gov.net/ESK/eng/, Central Bank of Kosovo www.bqk-kos.org/, Ministry of Education, Science and Technology of Kosovo www.masht-gov.net, University of Prishtina www.uni-pr.edu, Austrian and Kosovo partnership www.aei-austria-kosovo.com, etc.

From both questionnaires (on-line and interviews) the type of information which are contained in the existing system are mostly RTD organizations, on-going research projects, bibliographies of Researchers, Participation in EU funded RTD programmes, and areas of specialisation and excellence.

The results show that existing information are not or partly linkages and interoperability between existing bases established and are found mostly in national and English language. Seem that the same situation in this regard is in whole region of Western Balkan. The online survey shows that about 60% of existing information systems operating are in both languages (national and English).

In regard to evaluation system majority of respondents score it as a dissatisfactory and/or low level of satisfaction, which shows very poor and/or partly interoperability of between existing bases established.

3.2 Usefulness of information system and its openness for integration:

In general, the main users of the RTD information system are the RTD stakeholders, general public and potential international partners, and to some extant the private sector and policy makers, as well. The visibility of researchers and RTD potentials reached by using these information systems is shown to be poor. The online survey shows that about 50% of respondents consider poor the visibility, while only 25% of them say that is acceptable, and 25% did not know.

Almost all institution and RTD information system users are aware of plans for further development of the system(s) in the country of Kosovo, which is not the case for on-line survey respondents.

Creation, co-ordinate of the efforts to develop or upgrade of the database of Kosovo researchers is expected to be taken by government authorities and a public-private partnership. Looks the same expectations derive from the on-line respondents which come from the region (Western Balkan countries).

Perceive the potential for higher interoperability between national RTD information systems at the level of Western Balkans region most of institutions see it as an interesting, but difficult to achieve and potentiality useful, but practically unrealistic.

4. Main findings about RTD information system in Kosovo

According to the results findings the RTD information system in Kosovo there is an immediate need for improvement in regard to:

- The development and further upgrade of the RTD information strategy.
- The use of RTD information systems from the past and present to identify expected future information viabilities.
- A detailed assessment of the existing RTD information system and research users positions/activities.
- The Identification of the individuals/companies performing RTD information system activity.
- The analysis of the importance of each RTD activity.
- The assessment of positions needed to implement future RTD information system strategies in Kosovo.

5. Benefits and future perspectives of the RTD information system in Kosovo

The efficient and proper development of the RTD information system in Kosovo will enable a better view of the RTD information dimensions for all users, lower research and business costs through better RTD information system management, and provide the efficient for anticipate in research and business workforce diversity.

5. F.Y.R MACEDONIA

Prepared by:
Mrs. Stanka Petkovska, Ministry of Education and Science
Mr. Miodrag Dadasovic, National and University Library "St. Kliment Ohridski" – Skopje

October 2008

RTD Information systems in the F.Y.R Macedonia

The main goal of the scientific and research & development activities is to enrich a general sum of human knowledge and its application. In the achievement of this goal it is necessary scientific research activities results to be based on the relevant knowledge and as well to be included the generated results, and as such, should become integral part of the general sum of human knowledge. Thai is not only the main goal, but we can freely state that this is *the reason for the existence* of *scientific research* in general.

To be considered as authentic, the scientific, research & development results should necessarily be supported by and integrated in the system of *solid* knowledge. In other words, it is necessary to provide the open flow of scientific information, such as:

1. From world science towards each individual researcher or research team , and
2. From researcher or research team, and eventually, towards the direct user of the research results (in this case towards the applied researches)

Without existence of both components (generated scientific information and utilization of the existed information), researchers are condemned to be unproductive and irrelevant, and as such may become unnecessarily at all.

RTD databases in the F.Y.R Macedonia

There are a few databases which are determining the current RTD Information system(s) situation in F.Y.R Macedonia: researchers, research institutions and researcher's bibliographies. Researchers, research institutions and researchers bibliographies are included in the national scientific database E-CRIS.MK, COBBIS.MK and the Database of Research Potentials in F.Y.R Macedonia.

E-CRIS.MK

E-CRIS is a Web application which enables the establishment of a national research information system including databases on researchers, research organizations and projects. The data structure is in compliance with the CERIF (Common European Research Information Format) recommendations.

In Europe, information systems with the generic name CRIS (Current Research Information Systems) have been built for decades.

Format is one of the universally accepted recommendations, which not only defines the structure of data concerning research projects, but includes recommendations related to research organizations, departments and researchers.

In compliance with the CERIF recommendations, the web application E-CRIS was developed. The Institute of Information Science (IZUM) offered it to all users of COBISS applications free of charge in order to establish a register of researchers and organizations within the national library information systems, included in the COBISS.Net network. The register is essential for the creation of bibliographies for researchers and research organizations. The following entities are currently presented in E-CRIS.MK: 78 research organizations, 236 research groups, 2013 researchers and 0 research projects (data are available via the COBIB.MK system and searchable via the COBISS/OPAC).

All the databases are interlinked and most data is available in both Macedonian and English. It is possible to search by all key fields. E-CRIS.MK is also connected to the COBISS.MK information system and the bibliographic database COBIB.MK, which enables a direct insight into the researchers' bibliographies.

E-CRIS.MK DATA STRUCTURE

- The *ORGANISATIONS* database contains information on all research organizations (faculties, institutes, and research & development departments) carrying out scientific projects: Organization's name, Contact information (address, telephone, FAX, e-mail address, URL - if any), Research groups listing, Researchers listing, Projects listing, Number of employees, Activity classification, Other supplementary data.
- The *GROUPS* database contains basic information on all research groups within the research organization: Name of group, Research group structure (head, members), Contact information (address, telephone, FAX, e-mail address, URL - if any), Research work content (keywords, classification scheme), Listing of the research projects currently being carried out.
- The *RESEARCHERS* database includes: Basic identification data (name, qualification, research organization, group), Contact information (telephone, FAX, e-mail address, URL), Data on researcher's previous employment (organization, research group, date of employment, place of work, job title), Listing of research projects, in which the researcher has taken part, Research area and description of the expertise (keywords, classification scheme, qualification, language skills), Representative bibliographic units.

  In order to protect personal information, data are available only on the researchers who agreed on its publication.
- The *PROJECTS* database contains data on projects carried out by the research organization: Project identification (title, start date and anticipated end date), Project financial resources, Project manager and participating researchers (name, researcher's code), Contact person (name, address, telephone, FAX, e-mail address), Research organization within which the project is either being or was carried out, Research group registering the project, Participating research organizations, Project contents (abstract, description of project objectives, keywords, classification scheme, interim results), Possible link to the project web page (URL). Projects data are available via the COBIB.MK system, and searchable via COBISS/OPAC (http://www.vbm.mk/cobiss/).

COLLECTING DATA METHODOLOGY

Initially, data has been collected by the National and University library "Sv. Kliment Ohridski" – Skopje, Referral centre. Further database development is organized in coordination of the Ministry of education and science of F.Y.R Macedonia and the National and University library "Sv. Kliment Ohridski" – Skopje, Referral centre. Data entries to E-CRIS.MK are made online. Later, the updating of particular data can be taken over by the individual research organizations and/or the researchers themselves.

COBISS.MK - Co-operative Online Bibliographic System and Services of the F.Y.R Macedonia

COBISS.MK represents an organizational model of joining libraries into a uniform library information system with shared cataloguing, the COBIB shared bibliographic database, i.e. union catalogue, and local bibliographic databases of participating libraries, the COLIB database on libraries, the CONOR authority database, together with a number of other functions of the so-called virtual library. Functioning of the system is preconditioned by the Standardized and shared processing of library materials as well as the uniform management of catalogues and bibliographies, adequately skilled cataloguers and linking of libraries via computer and communications network.

COBISS/OPAC - Co-operative Online Bibliographic System and Services Online Public Access Catalog

COBISS/OPAC is a network application that allows libraries and end users online access to the bibliographic databases within the COBISS system (COBIB and local databases);

COBIB.MK - the union bibliographic/catalogue database:

No. of records: 429.004 (as within the date of the 28th of October, 2009.)
Members: 39 member libraries: The National and university library "St. Kliment Ohridski" – Skopje, 17 university and research together with 21 public libraries.

Database of Research potential in the F.Y.R Macedonia

The Ministry of Education and Science of F.Y.R Macedonia, in accordance with the positive legislation, has developed a database of the scientific researchers and research organizations. This database includes registration data of the scientific organization and researchers.

The research organizations, both public and private, are registered in the Registry of research organizations and Registry of the technological development organizations. The collected data on the research organization includes general data, the number of employees, available working space and the equipment.

The database on the teaching staff includes only the researchers employed in the public research institutions (universities, scientific institutions). Each researcher is legally obliged to be registered in the database; otherwise he is considered as not eligible to apply for financial support for national and bilateral projects as well as for study stays and attendance on international conferences.

The database is comprised of 24 research organizations and 350 records on researchers. So far, about 30% of the total number of researchers from the public research organization is registered in this database. In spite of the legal obligation for registration in this database, the interest is not satisfactory and only the small number of researcher is registered in such database. Usually, the database is used for the selection of evaluators for research projects and for information dissemination to the scientist (such as, info days, presentations, conferences, etc.)

In June, this year, Ministry of Education and Science undertook the initiative for data collection for the researchers from private universities and scientific institutions with the purpose to be increased the list of the potential evaluators.

Research organizations data include the following: data on the research organization, organizational structure, and data on owned or used buildings and the land.

Researchers data include the following: basic data for the researcher, current skills and its upgrading, scientific research activity, participation in research and development projects, published works and other publications.

Advantages: Covered R&D institutions and R&D personnel, bibliographic data, ongoing projects.

Disadvantages: The database is not for public use, so the researchers have no access to its information. Also, only small number of researchers is registered, merely from the public research organizations.

Access to International Databases of scientific information

The Ministry of Education and Science within its responsibility to support and stimulate the scientific and research activity in 2006 has been provided an access to Scopus Database. The Scopus is a database of abstracts and citations for scholarly journal articles. It covers nearly 18,000 titles from more than 5,000 international publishers, including coverage of 16,500 peer-reviewed journals in the scientific, technical, and medical and social sciences (including arts and humanities), 27 millions abstracts for the last 40 years and a 180 millions of web addresses.

Access to Scopus database was provided only for public research institutions (universities and public research institutes, Macedonian Academy of Sciences and Arts, and the National and University Library “St. Kliment Ohridski”).

Also, in 2009, Ministry of Education and Science has provided an access to 50 Academic One File's scientific e-journals with high impact factor, to public universities in the F.Y.R Macedonia through the Info Technology Supply Limited, UK. The chosen titles cover more than 20 scientific disciplines. Gale's Academic One File is a premier source for peer reviewed full text articles from the world's leading journals and reference sources.

The current state of the art of access to scientific journals with impact factor is not satisfactory and is not responding to the needs of the scientific research staff in the F.Y.R Macedonia. The access to the above mentioned journals will contribute to the overall efforts for improvement of the conditions for further development of the overall scientific and RTD research activity in the F.Y.R Macedonia.

The RTD community have also an access to 13 Databases of EBSCO Publishing which enables research of some 17.000 full text journals and further 30.000 indexed e-journal titles via the Macedonian E-Libraries (MEL) - a national library consortia.

Access to another 1.500 full text e-journals has been enabled by electronic services: Cambridge University Press-CUP, Oxford University Press-OUP, SAGE and Institute of Physics-IOP, provided also by MEL.

Access to more than 600 Databases via the Dialog information service is enabled within the Referral Centre of the National and University Library "Ss. Kliment Ohridski" – Skopje.

The Ministry of Education and Science of the F.Y.R Macedonia has undertaken measures for encouragement of publishing results of the researchers' scientific works. In amendments of the legal regulations, starting from 2010, the Ministry has been foreseen the researchers' salary increase of 20% as a stimulation measure for those researchers who publish their results in scientific journals with an impact factor.

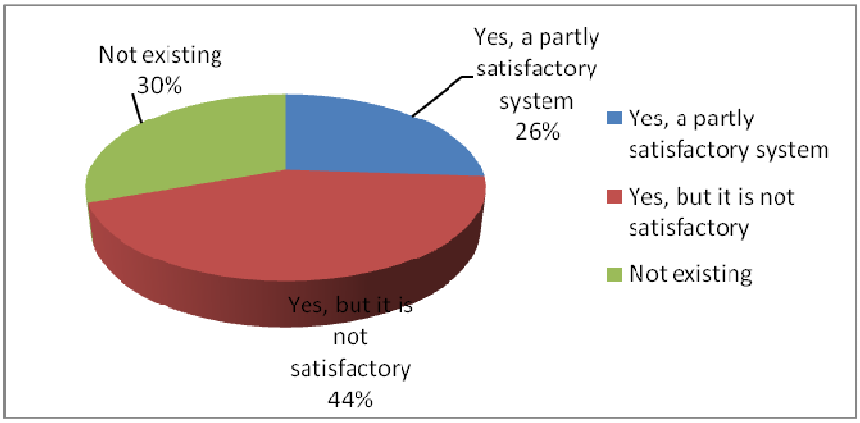
Online Survey and in dept interviews with government officials and other stakeholders analysis

During October 2008 an online survey and in depth interviews of policy makers and stakeholders has been taken regarding the present RTD information systems in the F.Y.R Macedonia. Twenty four representatives from research institutes, universities, and company research units have been covered by the surveys and the interviews.

Existing RTD information systems characteristics

The existing RTD information systems have been evaluated mainly as an existing (70%), but not on satisfactory level (44%). (Figure 1.)

Figure 1. Characteristics of the existing RTD information systems

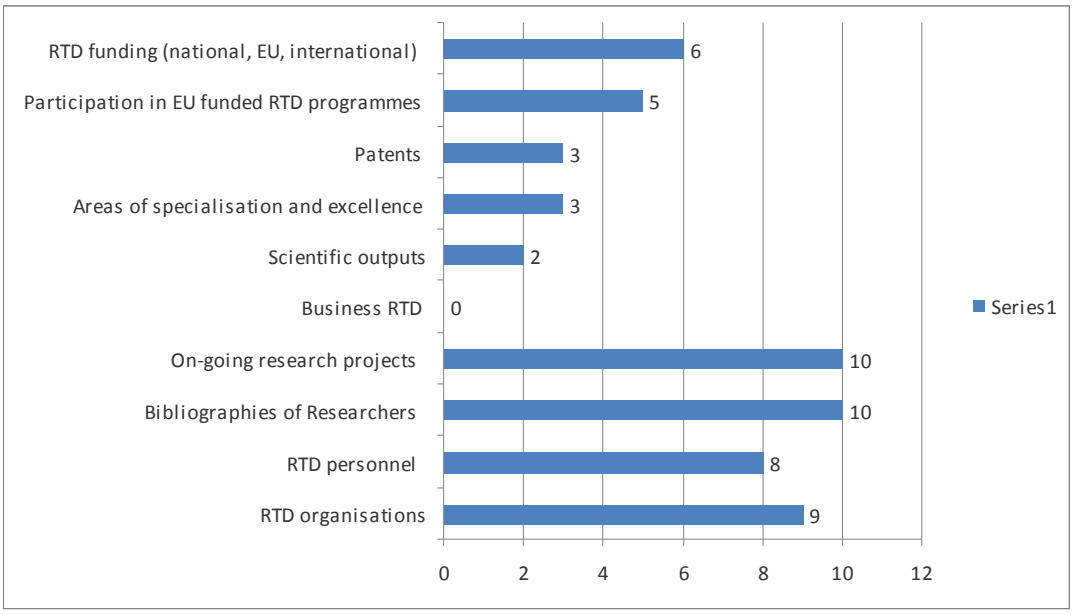


The national RTD information systems are consisted of the following systems: E.CRIS.MK – National database of scientific researchers and scientific institutions, COBBISS.MK - Macedonian union bibliographic catalogue and the Database of Research potential in RM. Also there are government ministries, universities and international organizations (USAID, NATO, UNDP, and JRC) which are providing national and international RTD information to the scientific communities in R. Macedonia and abroad.

The types of information which are contained in the existing system(s) are categorized as: RTD organisations, RTD personnel, Bibliographies of Researchers, On-going research projects, Areas of specialisation and excellence, RTD funding (national, EU, international) and Participation in EU funded RTD programmes.

Included information were categorized as Bibliographies of Researchers, On-going research projects, RTD organisations, RTD personnel, Areas of specialisation and excellence, Patents, RTD funding (national, EU, international), Participation in EU funded RTD programmes, Scientific outputs and none as Business RTD information. (Figure 2.)

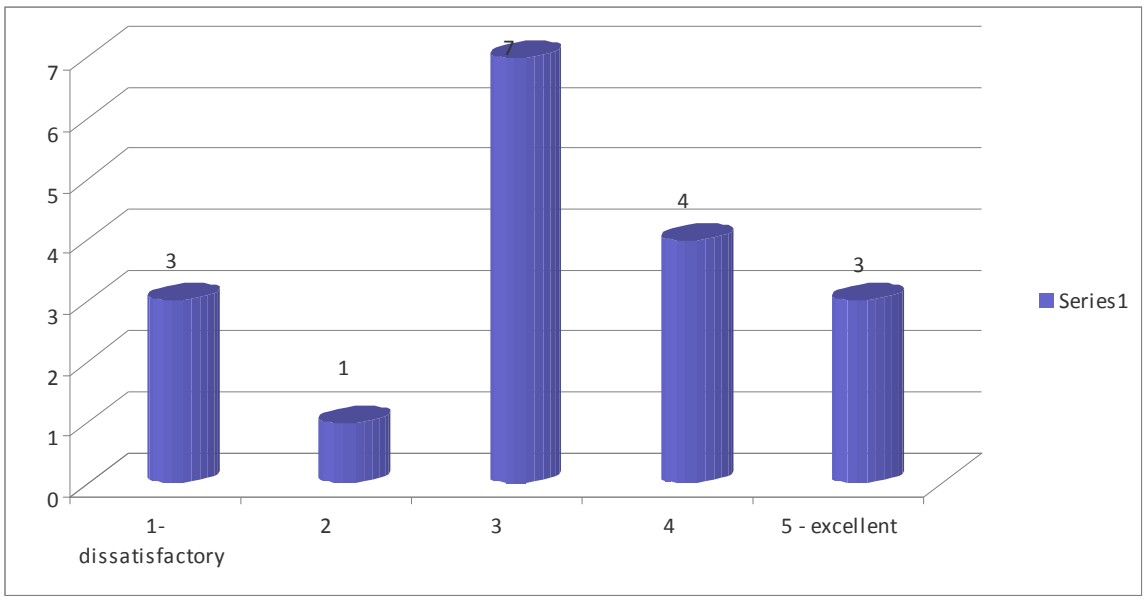
Figure 2. Types of information are contained in the existing system(s)



Major existing RTD information systems have been evaluated as inter operable, and inter connectible, with a national coverage level and with broad availability.

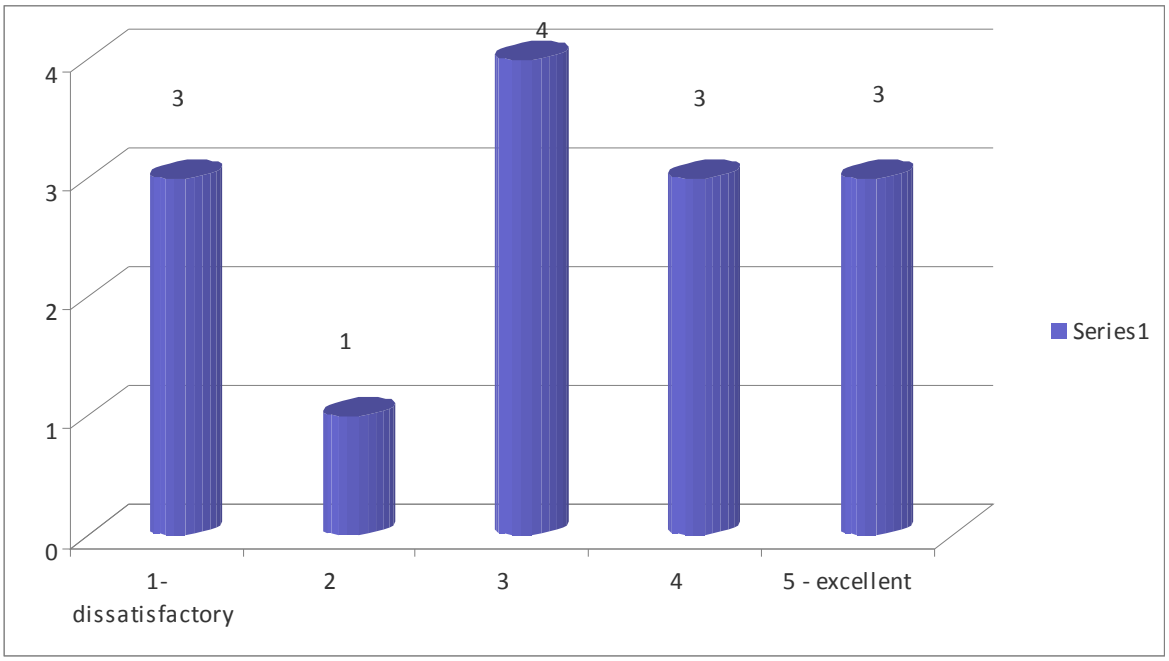
RTD organisations and RTD personnel, Generating Biographies and Bibliographies of Researchers and On-going research projects via VBMK Advantages: Covering bibliographies of the Researchers For COBISS: Adv: a lot of useful information for registered scientists Disadvantages: not obligatory for all scientists - very limited number included. (Figure 3.)

Figure 3. Score for information system I



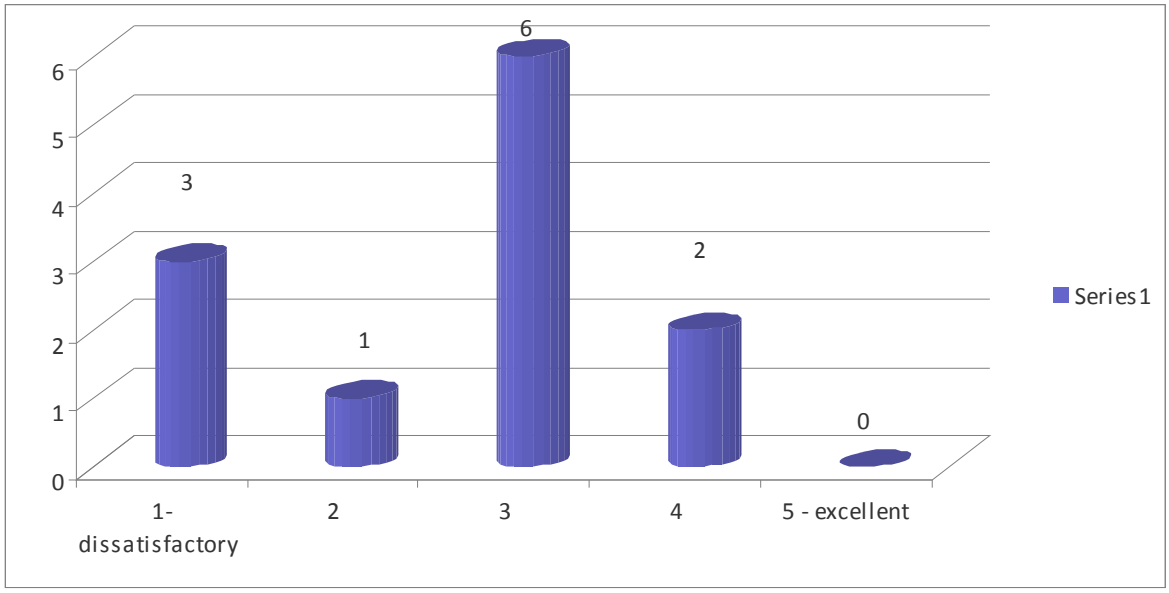
VBMK - Virtual Library of Macedonia: Union cataloguing. Making National bibliographies, Processing Bibliographies of Researchers, Ongoing research projects, Master thesis and doctoral dissertations Advantages: Cover RTD Personnel, bibliography of the researchers and specialisation. Disadvantages: Still is not for public or not existing. (Figure 4.)

Figure 4. Score for information system II



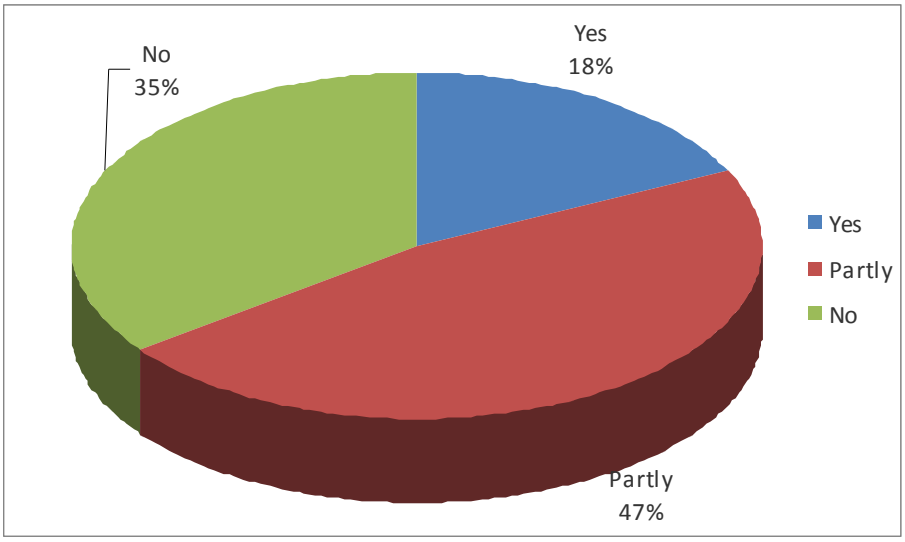
As a major disadvantages mentioned were an inadequate or partly linkage degree between the E-CRIS.MK with bibliographic COBISS data and incomplete coverage of libraries in Macedonia with the system. (Figure 5.)

Figure 5. Score for information system III



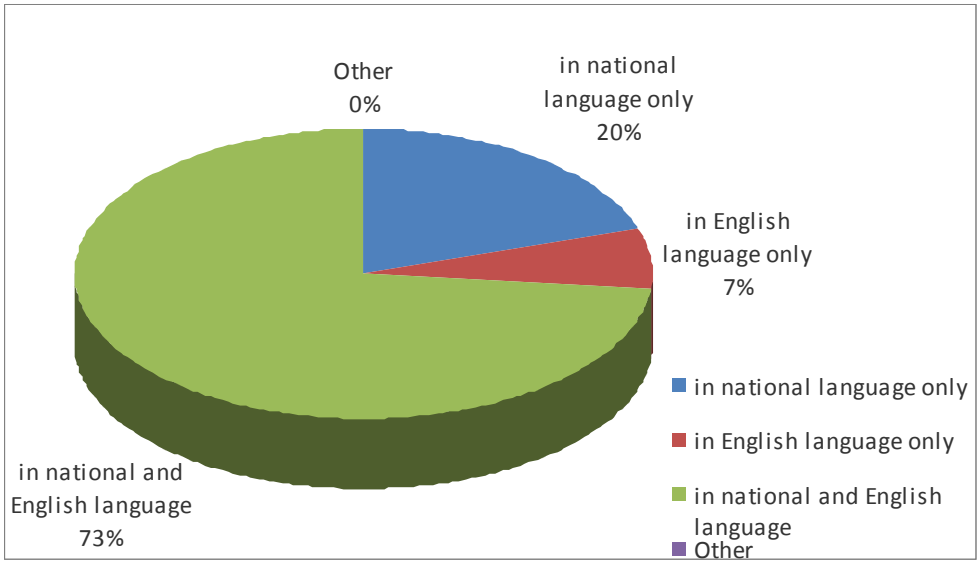
Databases linkages and interoperability mostly marked as existing, of which 47% partly and 35% not linked. (Figure 6.)

Figure 6. Databases linkages and interoperability



Information systems are available on both national and English language.(Figure 7.)

Figure 7. Information system(s) language(s)



The national information system E-CRIS.MK is harmonized with CERIF and FRASCATI international classification standards and is connected with the European scientific information system – CRIS. E-CRIS.MK and COBISS.MK are interconnected through one system – E.CRIS.MK enabling one place data on the science in F.Y.R Macedonia.

Initiators, promoters and financiers of the systems

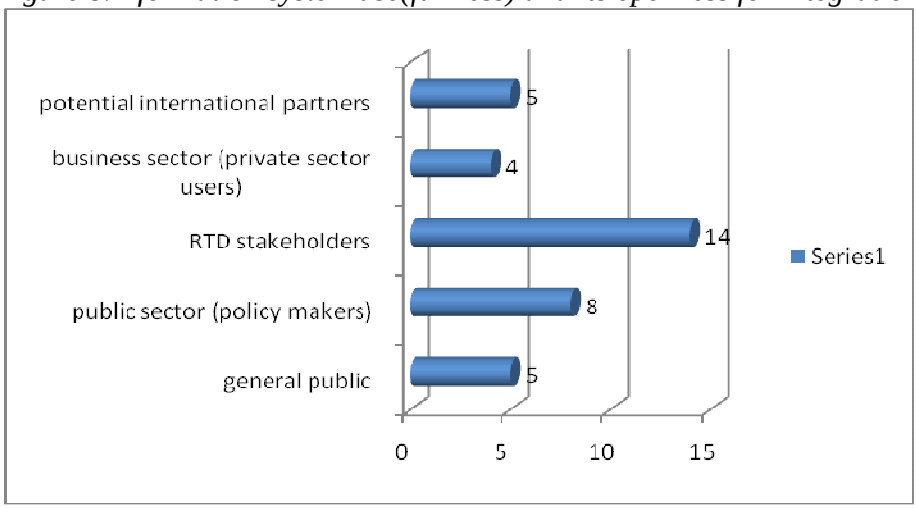
The government of F.Y.R Macedonia is an initiator of a development of the national scientific information system and supported by the RTD entities.

The Ministry of education and science of RM and the National and university library "Sv. Kliment Ohridski" – Skopje are responsible for development, maintenance and sustainability of the national RTD systems and approximately 25.000 euro of public funds has been spent annually as a support for the existing scientific information systems. The Institute of information science in Maribor – IZUM, has been granted the ECRIS software.

B. Use(fullness) of information system and its openness for integration

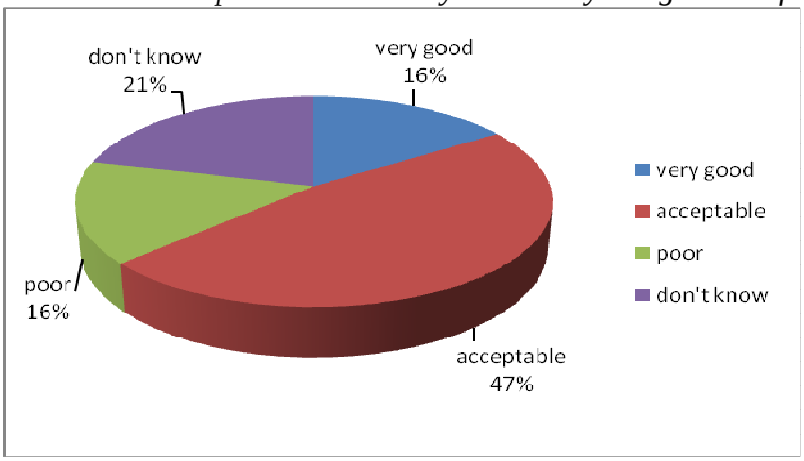
As a main user of the national RTD information systems there are RTD stakeholders, policy makers, general public and potential international partners and the business sector as the last one. (Figure 8.)

Figure 8.Information system use(fullness) and its openness for integration



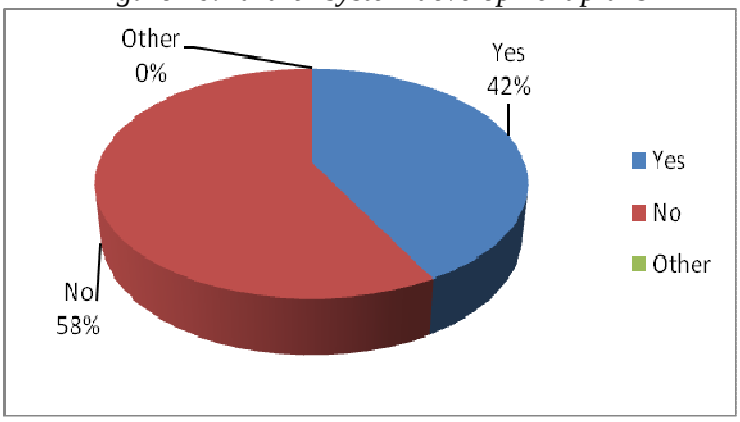
Researchers and RTD potentials are good visible and could be reached by using of the RTD information systems. The problem of visibility is mainly connected to the non inadequate knowledge about the national RTD services existence.

Figure 9. Rresearchers and RTD potentials visibility reached by using these information systems



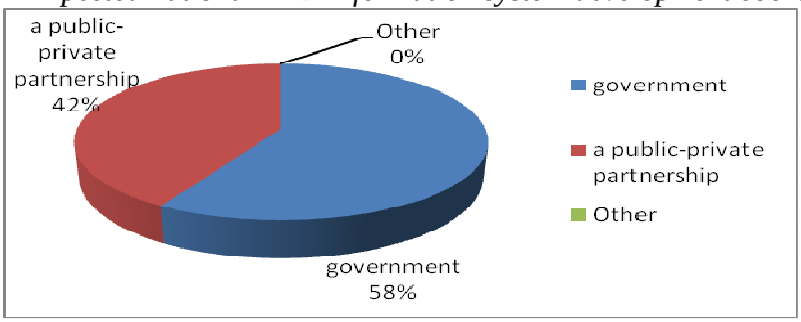
Awareness about the plans for further development of the system is not recognizable by major of the surveyed persons (58%), but the rest of 42% have information on the RTD system evolving. (Figure 10.)

Figure 10.Further system development plans



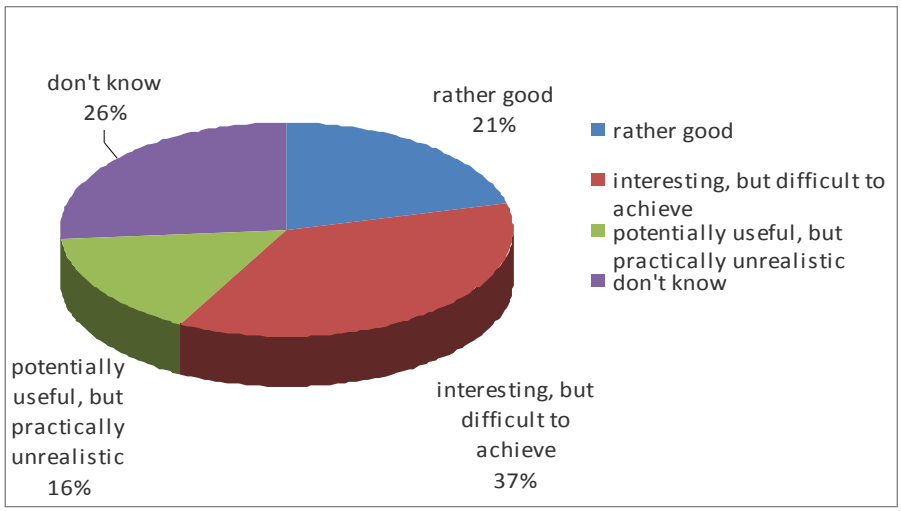
The Government of Macedonia mainly, together with the public-private partnership were marked as responsible for coordination the activities and the efforts for developing and upgrading the national RTD information system. (Figure 11.)

Figure 11 Expected national RTD information system development coordinators



The potentials for higher interoperability between the national RTD information systems at the level of Western Balkans region are interesting, but difficult to achieve and marked as rather good especially regarding the European CRIS system, which the WBC national E-CRIS systems are part. (Figure 12.)

Figure 12 National WBC RTD information systems perception



Conclusons and Recomendations

RTD information system in the F.Y.R Macedonia is not integrated at a necessary level. Lack of financial funds as well as the subjective factor, act as the present unfavorable state's main reason, because untill now the RTD information system was not acting as a priority in the Ministry of Education and Science. There is no organized access toward the scientific and research activities improvement in the F.Y.R Macedonia.

It is necessary for the Government to take larger initiative on integrated strategy for RTD information system making. A good basis of further RTD system developmnet are E.CRIS.MK and the VBMK information systems. There is a strategic planning and predictions on improvement for a long-term development of the National Integrated RTD system, established and organized between the Ministry of Education and Science and the Referral Centre in the National and university library "St. Kliment Ohridski" – Skopje. The improvement includes: unification of the database data, input data quality control, organisation and data collecting, evaluation and data updating, maintenance, promotion of the system and organizing scientific audience's systems output data service.

There is a need for the promotion of existing information systems by the Governmental bodies and the media, because some of the interviewed persons have no knowledge of their existence.

Within the National and university library's Digital Library in the next time period, a virtual library concept is planning to became alive, accompanied with an open access to different e-contents: manuscripts, rare books, maps and periodicals, contemporary Macedonian authors, as a part of the European Digital Library.

Access to the international information systems and database services should be maintained, accompanied with its broadening to new scientific and research e-contents, covering all necessary sciences and scopes of interests of the Macedonian scientific community.

The Government should make stronger efforts toward the top scientific reasearch results popularization within the national as well as the international scientific milleu.

The Government also should find a mechanisms for permanent informing and education of the scientists and researchers about the World's scientific information services access possibilities. In order to reach this goal, the Government should intesify the activities of the Referral centre within the National and university library "St. Kliment Ohridski" - Skopje, accompanied by an adequate financial support of its action scopes.

Further ECRIS.MK development and interconnectivity with VBMK will represent more efficient and more accurate source of RTD data in the F.Y.R Macedonia. That will enable greater transparency of national RTD to the international community.

6. MONTENEGRO

Prepared by

Mr Sasa IVANOVIC, Ministry of Education and Science

Ms Branka BOSNJAK, University of Montenegro

6 November 2008

General information

In the process of joining the European Union, one of the most important segments that need to be harmonized with European standards is the information society. Southeast European countries have recognized the importance of the introduction and development of ICT, and they are very active at the regional level.

Taking the obligation to progressively work on activities that are identified as significant in order of knowledge-based society development, according to the signed eSEE Agenda, for the period 2002-2007, Montenegro has expressed readiness to persist in the process of transformation from industrial to information society.

In an effort to be part of a single information area of South East Europe, Montenegro must introduce innovation and invest in education and research in the field of information communication technologies. On the way of knowledge-based information society is still necessary to reduce the digital gap, set to expand services and introduce a central system and e-government portal. Analogue to this, in the specifics of the environment of South East Europe, are identified the three key priorities: a unique information space, innovation and investment in ICT research and education and inclusive information society (information society for all).

In this regard, the activities will be directed to: improvement, regulation and stimulating the development of digital content and services in the areas of general interest - culture, health, scientific and educational content.

In compliance with these segments, in RTD area each of our countries need an integrated research information system with complete information on R&D institutions, researchers, research projects and various research results.

Researchers could use system as a place, where they can submit applications for grant competitions, read news and chat in the forum about research. R&D institutions can submit

through such system applications and introduce their research results more widely. It should be also used as internal research information system for research funding organisations which could be used for evaluation process and for processing applications and giving feedback. All these segments need a lot of effort an work to do in the all levels of the system.

Questions that should give good information system are:

- *WHAT* is being done,
- *WHO* is doing it,
- *WHERE* it is being conducted,
- *WHEN* it is performed,
- *PROGRESS* achieved,
- *IMPACT* expected, and
- *PUBLICATIONS* produced.

Existing RTD information systems and databases

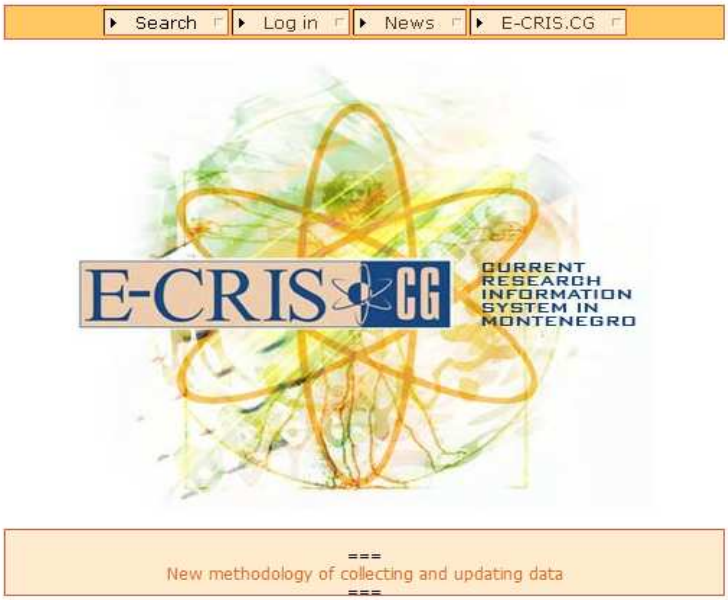
Ministry of Education and Science (MPIN) is the main institution for managing public investments in research activities. Fifteen years ago, Ministry developed local systems for computerized information on projects and researchers, but these databases cannot be reached through the internet. “Projects” database is collection of information on national projects financed by MPIN since 1970, and other database disposes data on researchers (with PhD and master degree) which worked in Montenegro from past period until now. Both databases are used for internal purposes and they have never been published. From 2009, the E-CRIS.CG system is functioning as the National E-CRIS Centre established in the Ministry of Education and Science.

Regarding libraries in Montenegro, a new system of mutual categorisation among them was established in December 2001 using the COBISS system, as well as a mutual bibliographic base (COBIB CG), combining the local University Library, and the Central National Library of Montenegro.

Table – IS and databases in Montenegro available online

Title	Link	type of information
E-CRIS.CG	http://e-cris.cg.cobiss.net/default.aspx?lang=eng_cg	RTD organisations, RTD personnel, Areas of specialisation and excellence
COBISS.CG	http://vbcg.vbcg.me/cobiss/	Bibliographies
COLIB.CG	http://vbcghome.vbcg.me/cg/cg_libraries/default-EN.htm	libraries
COBIB.CG	http://vbcg.vbcg.me/scripts/cobiss?ukaz=getid&lani=en	bibliographic/ catalogue database
University of Montenegro	http://www.ucg.ac.me/cg/clanice.htm	University units
	http://www.ucg.ac.me/radovi/ByAuth.php	publications
	http://www.cis.ac.me/	Employees/students
	http://www.ucg.ac.me/cg/uni_bibl.htm	Link to publications
FP7 NCP	http://www.mneresearch.ac.me/cg/index.php	FP7 projects
Tempus	http://www.tempusmontenegro.ac.me	Tempus projects

E-CRIS.CG - Current Research Information System in Montenegro



In Europe, information systems with the generic name CRIS (Current Research Information Systems) have been built for decades. In the past, the integration and expansion of CRIS were often made difficult by uncoordinated methodologies. For this reason, in recent times there has been a strong tendency to move towards standardisation. CERIF (Common European Research Information Format), maintained and developed by euroCRIS, is one of the universally accepted recommendations for the structure of research data.

In compliance with the CERIF recommendations, the web application E-CRIS was developed at the Institute of Information Science in Maribor (IZUM), which offered it to all users of COBISS applications within the COBISS.Net, network free of charge in order to establish in individual countries, as comprehensive as possible, the register of research and development providers. The register is essential for research monitoring and evaluation. National CRIS systems are linked to national COBISS library information systems, thus allowing direct access to the bibliographies of researchers and institutions. National E-CRIS systems include interconnected databases comprising data on research organisations, researchers and research projects. Most of the data is in English.

During the trial period from 2006 to 2008, initial data on researchers and research organisations in Montenegro was collected and entered into E-CRIS.CG by the University Library in Podgorica. Nowadays, E-CRIS.CG is respectively linked to the COBISS.CG current research

information system and its COBIB.CG database. The latter comprises bibliographic records for researchers' bibliographies, which have already been created by some libraries in Montenegro.

Since 1 January 2009, the E-CRIS.CG system has been managed by the Ministry of Education and Science functioning as the National E-CRIS Centre. At the same time, also the methodology of data collecting and updating has been changed. The National E-CRIS Centre is responsible for organising and coordinating the collection of data within the E-CRIS.CG system, checking registration criteria and supervising the quality of data sent by research organisations and researchers.

Data on research or development providers in Montenegro is entered into the E-CRIS.CG information system provided that they meet the following conditions:

- *Research organisation* is either a university or its organisational unit (faculty, institute, etc.), or any other legal entity of a public or private sector with registered research or development activities and at least one researcher employed;
- *Researcher* is a natural person holding at least a university degree, who carries out research or development and undertakes to manage his/her bibliography in the COBISS.CG system.

Data entry into the E-CRIS.CG system is mandatory for research organisations and researchers participating in the publicly funded research projects

The entry of data to the E-CRIS.CG system does not mean that an organisation (or a researcher) meets the conditions required to carry out the projects financed from the budget and determined by the Ministry of Education and Science, and in a future period is planned to include all relevant RTD institutions and researchers in Montenegro.

Research organisations, which have not been added to the E-CRIS.CG system yet, but meet the requirements for inclusion, appoint a contact person, who will be responsible for entering data on the research organisation to the E-CRIS.CG system and keeping it up to date.

COBISS.CG - Co-operative Online Bibliographic System & Services

COBISS.Net is the name of the network that connects autonomous (national) COBISS library information systems of different countries and their current research information systems. From a technical perspective, COBISS software enables users to download records from any of the COBIB shared bibliographic databases, the OCLC catalogue (WorldCat) and other databases. The Agreement on the establishment of the COBISS.Net network and the free exchange of bibliographic records, created in autonomous library information systems of Bosnia and Herzegovina, Montenegro, Macedonia, Slovenia and Serbia, was signed in Belgrade in February 2003.

ONLINE ACCESSIBLE DATABASES AND CATALOGUES

In the COBISS.CG system you can choose between the following databases:

- The COBIB.CG union bibliographic/catalogue database
- Local databases of the libraries participating in the COBISS.CG system
- Data on Montenegrin libraries - COLIB.CG

The COBIB.CG union bibliographic/catalogue database

The COBIB.CG online union bibliographic/catalogue database is the result of shared cataloguing. It contains over 100.000 (June 2007) bibliographic records on book and non-book materials

(monographs, serials, articles) and offers the option of a multimedia presentation. For drawing up bibliographies of Montenegrin authors, it also includes records on performed works. In addition, it contains information on where, i.e. in which library in Montenegro individual items are located, which gives it the function of a union catalogue. The COBIB.CG database is of vital importance to the COBISS.CG system, because it performs the central function in the shared cataloguing process and in searching: for bibliographic information and information on the location and availability of publications.

Local databases of the libraries participating in the COBISS.CG system

The local databases of the libraries included in the COBISS.CG system contain over 110.000 bibliographic records with numerous data, referring to individual copies. The accessibility of the data on the available materials in an individual library depends on how many library units the participating library has processed automatically so far.

Data on Montenegrin libraries - COLIB.CG

COLIB.CG database makes part of the COBISS.CG system. It contains all significant data on libraries participating to the joint cataloguing system COBISS.CG. COLIB.CG is a factual immediately updated database.

The database, which is continuously updated, is built by VBCG Centre (Virtual Library of Montenegro) as part of CNL (Central National Library of Montenegro “Djurdje Crnojevic”).

The COLIB.CG database constitutes a part of the COBISS.CG system. It contains mainly data on libraries which participate in the COBISS.CG system, as well as data on other Montenegrin libraries.

Link : http://vbcg.vbcg.me/scripts/cobiss?command=CONNECT&base=COLIB

VIRTUAL LIBRARY

MONTENEGRIN VIRTUAL LIBRARY (MVL) Project implies networking libraries in Montenegro into a unique information system, thus providing to library users - in an organised and rational manner – access to information and documents in electronic form, whether created in the very (autonomous) system of Montenegro or providing via it the access to joint COBIB database (in the COBISS.Net – including the cooperative systems of Bosnia and Herzegovina, Serbia, Macedonia, Slovenia and Montenegro), or acting as an intermediary to access specialised information at any internet based computer database.

Montenegrin libraries are grouped into six categories: the national library (Central National Library of Montenegro "Đurđe Crnojević"); higher education libraries (University Library and libraries of specific faculties within the University of Montenegro); special libraries (the Library of the Montenegrin Academy of Arts and Sciences, then the libraries of scientific institutes and similar research organisations); public libraries (public lending libraries); school libraries (libraries of primary and secondary schools) and libraries of non-governmental organisations.

At this moment in this system is registered 26 libraries. In later stages there is the possibility of including school libraries, libraries of non-governmental organisations...

The limiting factors in the MVL development was the absence of the MVL Centre, considering that it is supposed to perform the following functions: represent the system and all participants in the MVL project; perform the legal, administrative and other tasks related to the MVL project; plan the system development and expansion; conclude agreements and cooperate with software package supplier; maintain the central electronic catalogue and monitor the system operation; define professional, technical, information and financial conditions for access to the system; system expansion and concluding agreements for the inclusion of new members; coordinated training and professional development for working in the system; administration, statistical monitoring and supervision of the system operation; cooperation with other compatible joint cataloguing systems in the region, Europe, worldwide... The establishment of the MVL Centre (COBISS Centre) within the Central National Library of Montenegro "Đurđe Crnojević" opens opportunities for the system expansion and implementation of further project stages.

Conclusions and recommendations

International integration and regional cooperation is the key to stability and prosperity of the Western Balkan region. Regional cooperation and coordination on all levels of the RTD system help the countries to unite their strengths and have a stronger international voice.

Regarding current situation of RTD information systems in Montenegro, situation is not at zero level. The insufficient national financial support and the low level of library documentation remain one of the main obstacles for RTD in Montenegro.

In COBISS.CG and E-CRISS system, at this stage just a part of information is available, but it is a process which is under development. Currently, information from private sector is completely missing which is very important sector for financing R&D activities and also for monitoring of their activities and results. Also, limited statistical R&D indicators are available. However, the process of S&T statistical reform has started, where MONSTAT (*Statistical Office of*

Montenegro) and Ministry of Education and Science have formed a joint group that will actively work on these matters. So far, several activities have been undertaken (TAIEX expert mission, WBC-INCO.NET workshop and expert mission), and, in line with the devised plan of activities, it is expected that in 2011 the first survey using the recognized RTD indicators will be available.

Different activities have to be done especially on first stage with improvement of national R&D legislation, which will provide necessary conditions in order to have updated system. All those things need stronger involvement of government in this process and cooperation with countries which have already overcome this phase and have more experience. Slovenian IZUM, developed COBISS and E-CRIS applications and offered them to our countries in the region for free use, also offers and provides all necessary professional support and help in order to establish in individual countries, as comprehensive as possible, database of research and development providers.

In order to improve RTD systems in our countries, local governments should:

- establish conditions in research organisations for successful commercialization of results of their own R&D activity
- improve the system for R&D results awareness building,
- improve promotion and popularization,
- develop further the system of evaluation (especially through the use of foreign experiences)
- raise the effectiveness of the R&D support from public funds.

This could help to avoid costly duplication of publicly-funded work, and this will help to establish valuable contacts within the research and education community.

REFERENCES:

- E-CRIS.CG http://e-cris.cg.cobiss.net/default.aspx?lang=eng_cg
- COBISS.CG http://vbcg.vbcg.me/cobiss/
- eMONTENEGRO - Strategy for Information Society Development (2009-2013) http://www.gov.me/files/1235731125.pdf

7.SERBIA

Prepared by: Pero Šipka, University of Novi Sad, Novi Sad and Centre for Evaluation in Education and Science, Belgrade

October 2008

Abstract: Based on previous analyses of the author and opinions of a group of experts interviewed for the purpose of this report, a critical assessment of the state of the art of RTD ISs in Serbia was made. The focus was concentrated on the level of integration and boundaries to integration. The overall quality of ISs was estimated as satisfactory. The critical shortcoming of the system as a whole was judged to be its fragmentation and unrelatedness, indicating lack of strategic planning. The other general weakness is the lack of internationality. Hence, the integration of individual resources at the national level and connectivity and interoperability at regional and European level are seen to be the natural next steps in further developments of the system of R&D information in Serbia.

1. Introduction: Methodological Remarks

This report is based on:

(1) the previous report by the same author prepared in 2007 for joined euroCRIS –SEE-ERA.net session [1];
(2) developments in the last two years as scanned by the author;
(3) analysis of the state-of-the-art of integration of bibliographic RTD systems in Serbia performed for the SNTPI 2009 – the annual conference on scientific, technological and business information;
(4) CEES report "Scientific Performance of Serbia in 2008" prepared for MSTD; and
(5) expert opinions of five top national information scientist specialized in scientific information systems interviewed in October 2009 for the purpose of this report.

Evaluation of the individual systems was made by comparisons with analogues national systems in the countries of EU, not with the situation in other WBCs. Value judgments might be biased by the fact that the author is better familiarized with some applications, most notably the ones developed by the CEES as his own institution. Also authors selection of experts is correlated with the level of cooperation with various specialists active in the field.

The report is not concerned with the perception of the RTD system under consideration by individual researcher and decision-makers. This was left to another report describing situation in Serbia. However, in discussing prospects for integration of information systems in the

country and in the region, some governmental documents and public attitudes of government officials have been taken into account.

Only RTD information systems produced in Serbia were submitted to the analysis. Mapping and evaluation of international products which are not intended to exclusively serve domestic academic community, such as citation or full-text journals databases have not been regarded as a matter of interest for this report. Consequently, services providing access to such resources, have not been treated as RTD systems, although some of them e.g. KOBSoN services, are of utmost importance for the national R&D. For the same reasons regional pilot databases e.g. ERA West Balkan RTD Database were found to be uninteresting for this overview and evaluation.

2. Mapping Serbian RTD Information Systems

2.1. Inventory of existing databases and information systems on RTD capabilities

RTD information systems in Serbia are normally produced by small self-organized groups, mostly informal, rather than derived from the national R&D strategy and initiated by the government. The Government of Serbia traditionally saved its efforts for building ICT infrastructure, and other related priority programs, such as provision of international journals and databases. System of Science and Technological Information of Yugoslavia (SNTIJ), a large-scale project launched before this country disruption and continued in Serbia for some time in its survival form (as SNTIS), was concentrated on building infrastructure and library system support, leaving databases development literally “to interested parties within the academic community”.

In recent years, some of the individual projects earned the trust and support by the Ministry of Science and Technological Development (MSTD), or the Secretariat for Science and Technological Development of Autonomous Province of Voivodina (SSTD). Most of the resulting databases, repositories, registries, and online services are still in developing phase, some are at the early beginning of public exploitation, and only few of them entered the stage of mature development, stable financing, and regular maintenance (table 1).

The existing web-based databases, services, and registries in Serbia do not always meet criteria for modern ISs. Some of them are not robust enough or easy to use, while the other are not extensible or “future proof”. Still, their general quality and adequacy exceeds the level of their exploitation, especially by the decision makers. Some of the services e.g. MiuWOS are extremely popular in the country, while the other, such as SCIndeks are more visited by international users. Some of the ISs , e.g. Journal Bibliometric Report are explicitly built into the acts of the MSTD regulating RTD activities as a ground for decision-making.

Table 1. Web based RTD databases and services in Serbia

title and location	publisher	content	size	status	CERIF complianc
Science and Research Organizations http://1 47.91.1 http://1 47.91.1 85.4/nio/instituti.asp	MSTD	accredited instution	small (127 entries)	under development	none

Serbian Scientists Abroad http://nasiusvetu.nauka.gov.rs/index.php?lang	MSTD	persons	small (307	under developme	none
Capital Equipment	MSTD	equipment	small (376	under developme	none
PhD Repositories at the University of Novi Sad, Niš and Kragujevac http://diglib.ns.ac.yu/frontOffice/index.jsp http://oramiror.junis.ni.ac.yu/docr web/plsql/-doc pretraga.pocetak http://www.kg.ac.yu/dokd.asp	Universi ty libraries	PhDs	small (165+ 647+ 1 33entries)	under developme nt	none
Researchers Files http://apv-nauka.ns.ac.yu/vece/indexd.jsp?zd 80&Oblast=1 3	SSTD	persons	mediu m (aprox .	irregular maintenanc e	partial
E-CRIS-SR: Information System on Research Activities in Serbia http://e-cris.sr.cobiss.net	IZUM, UBSM	persons, institutio ns	large (7657 persons, 91	under developme nt	partial
SCIndeks: Serbian Citation Index http://scindeks.nb.rs/	CEES	locally publishe d journals	large (more than million reference s from more than	updated weekly from 2008 on	indirect

title and location	**publisher**	**content**	**size**	**status**	**CERIF complianc**
DOPISNIca: Digital Online Portal of Integrated System of S&T information http://dopisnica.ceon.rs/	CEES	projects, persons, institution s, funds, and journals	large (10.51 5 persons , 186 institution s, 1.626 projects, 8 funds, and 483	beta version, evaluation data update d weekl y	full
Journal Bibliometric Report http://scindeks-	CEES	journals	large (523 national journals)	regular annual publishin g since 2002 on	indirect
MIuWoS http://kobson.nb.rs/nauka u srbiji/nasi u	NLS	Articles of Serbian authors publishe d	large (more than 21.00 0 articles)	regular update from 2000 on	none
NLS Repository	NLS	national journals, archived	large (590 journals)	regular update from 2002	none

doiSerbia: Digital Object Identifier Repository http://www.doiserbia.nb.rs/	NLS	Cross-Ref national journals	small (48 journals)	regular update from 2002 on	none

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given by five experts on five-point scale**; MSRS**: Ministry of Science and Technological Development; **SSTD**: Secretariat for Science and Technological Development of Voivodina; **NLS**: National Library of Serbia; **CEES**: Centre for Evaluation in Education and Science; **IZUM** Institute of Information Science, Maribor; **UBSM**

Most of the RTD ISs in Serbia don't follow international standards. Practically, only DOPISNIca is fully CERIF (Common European Research Information Format) compliant. Obviously, they are almost exclusively intended for domestic users. Only a few of them have a proper English interface and professional Help, and some are even accessible only for the users of the Academic Network of Serbia. This is somehow in discord with the fact that Open Access is well accepted in Serbia. Namely, almost all of the national scientific journals are now published in OA regime, and there is also several comprehensive and regularly updated institutional repositories.

All ISs listed here, except DOPISNIca, E-CRIS-SR and PhD Repositories, are supported, either by the MSTD or SSTD. There is some duplication of ICT projects supported by the two governmental bodies indicating lack of strategic planning and coordination. It seems that R&D authorities and information scientists in Voivodina tend to gather and publish information about R&D activities in the region which are already contained by the ISs developing for the national level, which is a classic case of duplication of efforts

2.2. Coverage of various R&D entities

Not all CERIF entities are evenly covered by the existing RTD ISs. As evidenced in table 2, bibliographic products of individual researchers are generally best covered. Other data on individuals, especially their technical skills and research interests are less available. The most poorly represented are data describing research organizations, most notably information on their capacities (equipment, facilities).

There is also a visible discrepancy between data availability and data quality. As to the quality, up-to- dateness is the chronic problem. Also reliability of data in many applications are below standards. Generally resources used for evaluation purposes are of highest reliability. Journal Bibliometric Report and SCIndeks contain more accurate information then their famous international counterparts, Journal Citation Report and WoS.

Table 2. Coverage of various CERIF R&D entities

	Data Availabilit	**Data Quality**
Persons: Conact, CVs	++	+
Persons: Skills, Interests on cooperation	-	
OrgUnits: Contact, Basics	++	+
OrgUnits: Facilities	-	

OrgUnits: Equipment	+	-
OrgUnits: Services	-	
Ongoing Projects	+	-
Results: *WoS* publications	+++	++
Results: *WoS* citations	+	+
Results: Local publications	+++	+++
Results: Local citations	+++	++
Results: Monographs	+	++
Results: PhDs	+	+
Results: Patents	-	
Results: Products	-	
+++ very good; ++ good; + satisfactory; – non-existant		

2.3. Conclusion

In conclusion, individual web-based RTD ISs in Serbia are generally of a good quality. They suffer the problem of non-timely maintenance, they also vary in data coverage and reliability, but taken together, they meet basic needs of the members of academic community. Also, they offer decision makers more than they are presently ready to utilise for evaluation, quality control, and strategic planning.

What Serbian ISs lack the most is friendliness for users outside national academic community, both international and those coming from industry. To achieve the former, developers of ISs have to ensure multilingual interfaces, common exchange formats, and international classifications. In years to come, this challenge will be difficult to meet without more coordination, or even centralisation, ending with an integrated national RTD information system, entirely incorporated in the European system of information exchange. This task would be easier to achieve if undertaken within international projects.

3. RTD Information Systems Integration in Serbia

Considering the scope and quality of the few already operational systems and the importance of existing in-house databases of the MSTD and SSTD, building national RTD information system from the scratch is not necessary. Instead, an integration of all present databases and registries into a modern distributed controlled system (DCS) is a more feasible solution to the problem. In a paper prepared for the Annual Conference on the System of Research Technological and Busyness Information integration of RTD information systems in Serbia were analyzed from developmental point of view, within the context of building e-Government in Serbia [2]. State-of the art of such systems was mapped with the focus on bibliographic information.Results achieved and barriers to further integration were discussed. Almost all findings are directly relevant for this report.

It was claimed that in Serbia, a relatively high level of integration of the bibliographic information systems has already been achieved. At least some of the existing applications can be said to have been developed within e-government, since they are funded by the Government, i.e. MSTD or SSTD, and have been utilized in their decision support systems.

3.1. The transition model for the national system of scientific information: CRIS-TraM

The present level of integration of RTD ISs in Serbia was achieved under CRIS Transition Model (CRISTraM) developed within the Centre for Evaluation in Education and Science (CEES). The only purpose of CRIS-TraM is to serve integration of domestic SSTI and its harmonization with European standards. It is a custom version of CRIS (Core Relating Information Systems; also Current Research Information Systems) based on CERIF.

The main difference between the general model of CRIS and CRIS-Tram is in a position of national journals as entities. In CRIS journals are not treated as a separate entity, while in CRIS-Tram they are given the status even of the core entity. Privileged position of the local journals in CRIS-Tram comes from their special role in the development and evaluation of science in Serbia, both in the past and in the transition period.

Other differences are mainly related to the use of different classification schema for the description of S&T entities that are officially used in Serbia, and can not be abandoned without changing the respective national legislations. The solution to this problem was found in the double, mutually convertible metadata descriptions, one of which are used for domestic and other for international needs. Such a procedure (called “double accounting”) was conceived as a temporary solution. It should be used only during the transition period, until domestic R&D sector is fully harmonized with practices within the European research area.

3.2. The level of organization: integration of CEES resources

Based on the CRIS-TraM an application called DOPISNIca (Digital Online Portal of Integrated System of Scientific and Technological Information) was developed. DOPISNIca contains information on research institutions of Serbia, their projects, employed researchers, and programs under which they are financed, as well as information on the locally published scientific journals. It also contains information on performance of all subjects in WoS and SCIndeks, as the two most relevant evaluation databases. In the present stage of portal development, only information concerning the projects, journals and researchers are available to a satisfactory extent. Information on organizations, especially those that are subject to frequent changes, are missing or are outdated. The process of their regular update is suspended until the decisions of the competent ministries on support for further development DOPISNIca are made.

DOPISNIca was made integrated with SCIndeks (table 3). To ensure the full integration, SCIndeks data model was redesigned to be entirely compatible with CERIF. Data on bibliographic performance of researchers are in DOPISNIca given in the same format as in the MSTD act regulating evaluation and promotion of scientists. Thanks to integration with SCIndeks (and WoS) the Results Table of researchers and organizations in DOPISNIca are updated online, on weekly basis, as soon as the new records appear in the two evaluation databases.

In addition, tools for the transfer of data from the MSTD registries on accredited institutions (SRO/NIO) and capital equipment (NIP) were developed and utilized in DOPISNIca initial data inhabitation. SCIndeks was recently integrated with Open Journal Systems, an open source platform for journal editing and publishing. The result of this operation, the system called Electronic Editing (e- Ur), is in testing stage. Development of separate module for extracting from e-Ur information intended for evaluation of journals is in due course.

Finally, CEES is about to finish the development of a system for cross-checking originality (vs. plagiarism) of papers submitted to SCIndeks journals. The system includes a home-made tool for screening and subsequent automatic use of iThenticate, the leading plagiarism detection system also implemented in the CrossRef system. Otherwise, SCIndeks is linked with several international disciplinary base and services in a way that significantly raises the reliability of information and user comfort.

Table 3. Integration of bibliographic RTD information resources in Serbia

		Type of integration initiatives	
		Program specific	Enterprise Capacity Building
Organizational level	Inter-Governmental	N IO-SCI ndeks*	N IO-DOPISN Ica* Capital Equipment–
	Inter-Organizational	MiuWoS-BIC, VBS-DOPISN	MiuWoS-DOPISN Ica
	Organizational	BIC-DOPISNIca, VBS-SCIndeks	SCIndeks-DOPISNIca, SCIndeks – iThenticate*

* data exchange established, without full interoperability

3.3 Interorganizational level: Integration of resources of the NLS and CEES

The functional integration of bibliographic S&T resources of the National Library of Serbia and the CEES is achieved to a considerable extent. On the basis of long-term agreement on cooperation which, as a subject, has exchange of scientific information exclusively, the following information resources are interconnected: Repository of NBS, Virtual Library of Serbia, MiuWoS, Journal Bibliometric Report, DOPISNIca and SCIndeks. Integration is achieved to a different degree, at different levels (logical or data layer) and by various technological interventions, depending on the characteristics and requirements of individual services. In some cases it was necessary to make significant changes in the architecture to enable the sustainability of the development process. Due to integration costs of databases maintenance are dramatically reduced, reliability of data significantly raised and user-friendliness of all services. Integration of SCIndeks with Virtual Library of Serbia brings to the National Library of Serbia substantial savings which are reflected in the radical

reduction of costs of bibliographic processing of information from local periodicals. On the other hand, MiuWoS provides DOPISNIca with information on the international performance of local authors and institutions.

3.4. Governmental level: Initiatives towards MSTD

In CEES plans for conjoining of non-bibliographic information (e.g. patents etc.) to already achieved integrative resources are completely worked out. Within the project for further development DOPISNIca initiative has been launched to interconnect existing NLS and CEES databases with registries and internal databases of MSTD. Several successive initiatives towards MSTD aimed at further information exchange and deeper integration have been launched. The responses of the MSTD are slow and unclear, mainly due to budget constrains. However, MSTD doesn't seem to be efficient neither in creating a more favourable climate for capitalizing on potentials of individual groups involved in R&D software engineering. In a previous analysis of national information systems it was suggested that no single institution in the country has the capacity to create a functional, integrated RTD system of a national scale independently. It was suggested that only "joint venture of all the active development groups, supported by experts from universities and innovation centres, coordinated by MSTD can lead to the success" [1].

3.5. Barriers and obstacles to integration

It can be seen from the above brief review that in Serbia an enviable level of RTD ISs integration is achieved, but only in the field of bibliographic information. The results worth mentioning comes from the two institutions only. Integration within a single organization is an easy task, even when it is technologically demanding. Hardly more complex is integration between the two institutions. In the case of CEES and NLS, there was no obstacles since both institutions share the same organizational values and seek the same goals, among which is the dominant open access to scientific information.

Much more difficult is to achieve the integration of applications produced by the number of institutions of various levels of aggregation. According to our insight, such an integration, either horizontal or vertical, has not been accomplished in Serbia so far. Neither it was accomplished at the level of government, i.e. its ministries of science, education and telecommunications, as responsible for R&D, or between them and institutions in their jurisdiction. Only recently such integration appeared in some public projections in creating e-government.

What obstacles lie on the way of integration and thus a higher level of functionality of RTD ISs in Serbia? A reliable answer to that question requires appropriate research. In the absence of findings, some judgments on the subject based on observations might be of help to RTD ISs planners, both local and international.

(1) Real needs for scientific information of domestic origin has still not been fully recognized within the academic community of Serbia. Consequently there is no requests,

at any level, for S&T information integration. The official system of evaluation strongly encourages productivity, not necessarily followed by the quality. And only orientation on the quality would ask for higher impact which, in turn, would ask for higher visibility. Since the quality is not a must, researchers are not sufficiently motivated to urge for better representation of their products. To the contrary, various groups, formal and informal, still exert resistance to the use of impact (citation) data in the process of evaluation. Developers also are not very much interested in integration. Groups that exist within academic community and (in the absence of the real software industry) are engaged in the development of ISs are in mutual relationships typical of competition. The competition is severe, since they share the same scarce development funds. Business strategies of Serbian RTD ISs producers are characterized by closed, secret plans and individual rather than collective application for funding. To change this model of behavior in which all lose including MSTD as the financier, it is necessary to create a climate in which competition remains the ruling principle, but there is a room for co-operation as well. Such a relationship is described in the literature as a cooperative competition – coopetition. Coopetition would definitely be more fruitful model for functioning of software engineering industry in Serbia, since it is operating on a small market and works for a small community of clients. Coopetition as an ambient can only be created by the MSTD as the main sponsor of S&T in the country.

(2) The parts of the Serbian government in whose jurisdiction are higher education, research and development have still not recognized the need for decision-making based on valid information. There is a strong impression that the ministries responsible for implementation of e-government have not accepted the task with sincere enthusiasm. There are also evidences that the level of cooperation of the respective governmental institutions in working on common long-term objectives of this kind is relatively low or even non-existant. At the top levels of administration, e.g. in MSTD and SSTD, there are clear doctrinaire differences. There is no sign of mutual devotion to common goals, as in some good examples of so called joined-up government or citizen-cantered government.

3.6. Conclusion

Access to current scientific information and their sharing is an essential requirement in the process of creating the European Research Area [3]. The best way to achieve it is through integration of resources. In this process interoperability is a crucial tool, change organizational culture is a necessary condition, and policy makers must have a central role [4]. It is evident that Serbian academic community is late in joining European integration. It is also evident that conditions for fulfilling this historic task can only be created by the government, i.e. MSTD which has to overtake full responsibility for the process .

4. Further Developments

4.1. Prospects for National Integration: Policy Context

Political and social integrations are permanent items on agenda of all post-2000 Serbian governments. In draft version of the new strategy of scientific and technological

development of the Republic of Serbia various integrations are set as priority research area for social sciences and humanities. In a separate chapter (4:10) it was stated that "MSTD will develop methods for better monitoring of developments in science and research in the country, as well as the most successful experiences in the world in the domain of scientific and technological policy. Only in this way, based on real and accurate information, valid management decisions can be made. Firstly, work on a database of researchers in Serbia and our researchers in the Diaspora will be completed, as well as work on a database of scientific projects and institutions. Also, by working with the Institute for Statistics, and by modelling after international statistical surveys and analyses (OECD, Eurostat, EC DG for Research Report), the statistical binding forms closely related to the final financial report (final accounts) will be introduced for all the companies. In this way, the next three years (up to 2012t), MSTD will conduct a separate project and appropriate activities, and thus try to map the situation in Serbia and indicators necessary in the process of the Lisbon agenda" [5]. Also, in his introductory presentation of the Strategy, the Minister of science explicitly stated that one of the tasks to be launched was integrated database of researchers, their products, projects and research institutions.

An another strategic governmental document is also dealing with integration processes. "Starting from the analysis of existing situation in all public sectors and considering the objectives and vision of e- government, the aim ... is formation of logical and physical architecture of integrated information system of state bodies of Serbia and creation a detailed resource and time of the annual plans of development activities, including requirements of budget funds. All authorities and public sector organizations will adopt their own more detailed development plans based on this development plan. Established institutional mechanisms will be regularly monitored, evaluated and accordingly modified these development plans at the national and local level [6].

It seems that the strategy of building information society in Serbia is offering even better prospects for ISs developers in Serbia. Although there is a traditional gap between intentions and actions of the scientific state administration in Serbia, the above declarations can be judged as encouraging for all working on RTD ISs development and utilization. More detailed analysis of other recent governmental documents also paint generally favourable picture of the situation. Of course, financing new ISs projects by the government will probably have to wait until the global financial crisis which also severely affected Serbia starts to vanquish.

4.2. Prospects for Regional Integration

Regional integration of the national information systems seems to be first natural step in integration of WBC countries R&D sectors in ERA. In spite of some political reasons against such an orientation, this appear to be the winning solution when discussed with field experts. Efforts in this direction would be easier and should bring immediate effects. The reached level of cooperation and citation exchange among the scientist of WBC countries is a guarantee that common information resources will be accepted as useful. SCIndeks usability statistics clearly indicate that the vast majority of its international persistent visitors come from the region. Official interests in joining SCIndeks, which is purely national database,

were surprisingly expressed by journal publishers from Bosnia, Montenegro, Macedonia, Bulgaria and even Turkey.

However, there are also some reasons for caution. In the recent years there were to many trials to make various regional ISs which failed. Some of them build for the purpose of partnering heavily relied on the work of interested users whose expectations had not been fulfilled. Most of such resources are not maintained at all.

To start a new project on regional RTD IS one has to learn from the past bad experiences. It seems that step-by-step development approach with reasonable ambitions but insisting on sustainability is the most promiseable strategy. Such a project can start with building a regional directory of organizations, ongoing projects, and most particularly on local journals. If filled with shallow data extensible to full CERIF, it would have better chances to be accepted and supported by all.

5. References:

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[4] T.A. Pardo, J. R. Gil-Garcia i G. B. Burke (in press). Sustainable cross-boundary information sharing. In: H. Chen et al. (Ed.) *Digital Government: Advanced Research and Case Studies*, pp. 423- 440, New York: Springer, retrieved from: www.ctg.albany.edu/publications/bookchapter/sustainable/sustainable.pdf on 24.05.2009

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[6] Government of Republic Serbia, Strategy for the Development of an Information Society in Republic of Serbia, 2006.: retrieved from: http://www.nauka.gov.rs/cir/images/stories/inform_drustvo/nauka_strategija_id.pdf on 24.10.2009 (in Serbian)

ANNEX 1: Overview of RTD-related Information Systems in Countries of Western Balkans

Name and acronym of RTD information system	*Web site*	*Initiator of system*	*Type of information included*	*Language*	*Standard of interoperability*	*Development origin*	*Financier of system*
CROATIA							
Croatian Scientific Portal	www.znanstvenici.hr	Jadranka Stojanovski, Rudjer Bošković Institute	Croatian researchers, papers, projects, Croatian magazines and scientfic instruments	Croatian	no	developed locally	Ministry of Science
CROSBI Croatian Scientific Bibliography	http://biblio.irb.hr/index.html?lang=EN	Jadranka Stojanovski, Rudjer Bošković Institute; Ivo Batistić, University of Zagreb	bibliographies of Croatian researchers (170 000 papers)	Croatian English	no	developed locally	Ministry of Science
Who is Who in Croatia	http://tkojetko.irb.hr/en/	Jadranka Stojanovski, Rudjer Bošković Institute	Croatian researchers and their projects (2113 researchers	Croatian English	no	developed locally	Ministry of Science

			from Croatia and Diaspora)				
HRČAK Portal of scientific journals in Croatia	http://hrcak.srce.hr/?lang=en	Croatian information and documentation society	Croatian scientific journals (134 journals)	Croatian	OAI PMH - Protocol for Metadata Harvesting	developed locally	Ministry of Science
ŠESTAR Database of scientific equipment	http://www.znanstvenici.hr/index_en.php?p=o-nama_en	Jadranka Stojanovski, Rudjer Bošković Institute	Croatian scientific instruments	Croatian	no	in development / beta version	Ministry of Science
MZOS Ministry of Science, Education and Sports	http://public.mzos.hr/Default.aspx?sec=2428	Ministry of Science	institutional and policy domain / register of scientific organisations	Croatian (English)	no	developed locally	Ministry of Science
BICRO Business Innovation Center of Croatia	http://www.bicro.hr/en/	Croatian government	RTD funding possibilities	Croatian	no	developed locally	government /state budget
NZZ National Foundation for Science, Higher Education and Technological Development	http://www2.nzz.hr/index.php?lang=en	Croatian government	RTD funding possibilities	Croatian (English)	no	developed locally	government /state budget

Croatian Homepage	WWW.HR	Department of Telecommunications of Faculty of electrical engineering and computing (FER), University of Zagreb	general information on country and its potential	Croatian (English)	no	developed locally	CARNET - Croatian Academic and Research Network

Name of RTD information system	***Acronym***	***Initiator of system***	***Type of information included***	***Language***	***Standard of interoperability***	***Developme nt origin***	***Financier of system***
BOSNIA AND HERZEGOVINA – REPUBLIKA SRPSKA							
NCP FP BIH National contact points for EU Framework Programmes in BiH	www.ncp-fp.ba)	Government	information about EU Framework programmes			Developed locally	Government / state budget
COBBIS CRIS Co-operative Online Bibliographic System & Services Current	Under developme nt	Government	Library information systems and information systems on scientific research activities	Serbian English		Developed outside country	Government / state budget

Research Information System							
MSTRS General information page	(http://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/)	Government	List of RTD institutions, basic info on RTD environment in Republika Srpska and legislative frame for RTD activities	Serbian		Developed localy	Government / state budget
CPMRS Center for project management	(www.cpm-rs.info)	Government	nfo abourt ongoing EU perojecrs	Serbian		Developed localy	Government/state budget
AIDRS Agency for innovation society of the Republika Srpska.	(http://www.aidrs.org/	Government	documents and domestic RTD policy related on ICT	Serbian English		Developed localy	Government/state budget
UNIBL The University of Banja Luka home page	(http://www.unibl.org/)	Government	overview on University of Banja Luka, its technical and human resources, RTD equipment, ongoing national and international RTD projects and similar	Serbian English		Developed localy	Government/state budget

			information				
	http://www.unssa.rs.ba/) -				This web of University of East Sarajevo page provide also com	Developed localy	Government/state budget
BOSNIA AND HERZEGOVINA - FEDERATION BIH							
FEBHRIS -	(http://registar.nub.ba/)	government	*Database of researchers*, *Database of institutions; Database of projects*	English Bosnian			

COBISS.BH Cooperative Online Library Information System and Services E- CRIS Current Research Information System			Library information systems and information systems on scientific research activities	English Bosnian		Developed outside the country	Government/state budget
BIHARNET Bosnian and Herzegovinian Academic Research Network	http://www.see-grid.org/index.php?op=modload&modname=Sitemap&action=sitemapviewpage&pageid=39	government	ICT infrastructure to connect universities and other research institutions			Developed outside the country	Government/state budget

SERBIA							
Science and Research Organizations	http://147.91.185.4/nio/fakulteti.asp http://147.91.185.4/nio/instituti.asp	government	accredited instutions	Serbian		Developed localy	Government/state budget
Serbian Scientists Abroad	http://nasiusvetu.nauka.gov.rs/index.php?lang=eng	government	persons	Serbian English		Developed localy	Government/state budget
Capital Equipment	http://www.nauka.gov.rs/nip/	government	equipment	Serbian		Developed localy	Government/state budget
PhD Repositories at the University of Novi Sad, Niš and Kragujevac		government	PhDs	Serbian		Developed localy	Government/state budget
Researchers Files	http://apvnauka.ns.ac.yu/vece/indexd.jsp?zd_dokumentId=-80&Oblast=13	government	persons	Serbian		Developed localy	Government/state budget
E-CRIS-SR Information System on Research Activities in	http://e-cris.sr.cobiss.net	government	persons, institutions	Serbian English		Developed outside the country	Government/state budget

Serbia							
Serbian Citation Index	SCIndeks http://scindeks.nb.rs/	government	ocally published journals	Serbian English		Developed localy	Government/state budget
Digital Online Portal of Integrated System of S&T information	http://dopisnica.ceon.rs/		projects, persons, institutions, funds, and journals	Serbian English		Developed localy	Government/state budget
Journal Bibliometric Report	http://scindeks-bic.nb.rs/	government	journals	Serbian English		Developed localy	Government/state budget
MIuWoS Konzorcijum biblioteka Srbije za objedinjenu nabavku	http://kobson.nb.rs/nauka_u_srbiji/nasi_u_wos.3.html	government	Articles of Serbian authors published in WoS journals	Serbian		Developed localy	Government/state budget
NLS Repository	http://repozitorijum.scindeks.nb.rs/		National journals, archived				
doiSerbia Digital Object Identifier Repository	http://www.doiserbia.nb.rs/		Cross-Ref national journals	Serbian English			

KOSOVO (UNSC RESOLUTION 1244)

Statistivcal office of Kosovo	http://www.ks-gov.net/ESK/eng/		Statistical Data	Shquip Serbian English		Developed localy	Government/state budget
Central bank of Kosovo	www.bqk-kos.org/		Financial and fiscal system information	Shquip Serbian English		Developed localy	Government/state budget
	www.uni-pr.edu		RTD organisations, RTD personnel	Shquip Serbian English		Developed localy	Government/state budget
	www.masht-gov.net		RTD organisations, RTD personnel	Shquip Serbian English		Developed localy	Government/state budget
Austrian and Kosovo partnership	www.aei-austria-kosovo.com		Information for researchers	English		Developed localy	Government/state budget

MONTENEGRO							
E-CRIS.CG Information system on researchers and research institutions COBISS.CG Co-operative Online Bibliographic System & Services COLIB.CG Information system on bibliographies of researchers	http://e-cris.cg.cobiss.net http://vbcg.vbcg.me/cobiss/ http://vbcghome.vbcg.me/cg/cg_libraries/default-EN.htm		RTD organisations, RTD personnel, Bibliographies of Researchers, Areas of specialisation and excellence	English Serbian		Developed outside the country	Government/state budget
	CIS		Bibliographies of Researchers, On-going research projects, Participation in EU funded RTD programmes				

FYR OF MACEDONIA							
E-CRIS.MK Co-operative Online Bibliographic System & Services	http://www.vbm.mk/cobiss/cobiss_mk-en.htm	government	RTD organisations, RTD personnel, Bibliographies of Researchers, On-going research projects	Macedonian. English		Developed outside the country	Government/state budget
VLMK (VBMK) Virtual library of Macedonia	http://vlib.iue.it/history/europe/Macedonia/index.html	government	Virtual library	english		Developed outside the country	Government/state budget
	www.mon.gov.mk		On-going research projects, Patents, Participation in EU funded RTD programmes, RTD funding (national, EU, international)	English			
	www.ippo.gov.mk		RTD organisations, RTD personnel	English Macedonian		Developed outside the country	Government/state budget
1.COBBISS.MK ;i University National Library Ss. Kliment Ohridsi, Sopje	http://www.vbm.mk/cobiss/cobiss_mk-en.htm	Co-operative Online Bibliographic System &	RTD organisations, RTD personnel, Bibliographies of Researchers,			Developed localy	Government/state budget

2. Database of Researchers in the Ministry of Education and Science		Services E- CRIS Current Research Information System	On-going research projects				
	Database of Research potential in the F.Y.R Macedonia - Register of research organizations - Register of the technological development organizations		registration data of the scientific organization and researchers			Developed localy	Government/state budget
	Access to International Databases of scientific information	government	Full text databases			Developed localy	Government/state budget

ALBANIA							
The Information Resource Center			conditions, opportunities and risks that international trade entails				
ALBIC - Albanian Business Information Centre	http://www.albic.net	Albic - albanian business information center	business information including practical information in all the fields related to business			Developed localy	Government/state budget
SEEbiznet	http://www.seebiz.net/					Developed localy	Government/state budget
WIRAM/GTZ			network of partners for local development			Developed localy	Government/state budget

ANNEX 2: Online questionnaire

Questionnaire on

RTD Information Systems[1] in Countries of Western Balkans

The strength of the European Research Area depends on full integration of RTD potentials from all corners of Europe, including the Western Balkan region– which is characterized by considerable scientific and research & development potential. As WBC-INCO.NET project aims to facilitate these connections it is important to establish what has been achieved so far, and what could be done to upgrade and connect the existing and future information systems at the national level, and look into the possibilities of developing a regional system. Such a system would facilitate partner search within the whole of the Western Balkan Region for interested partners from other parts of Europe and beyond.

Without improved RTD information systems even excellent RTD activities can hardly be noticed, and internationally recognized. Therefore high quality partners have limited chances to be included into the broad international networks linking distinguished researchers from academia and business. In many countries of the region, and indeed around Europe, one can observe fragmented information systems which are often not integrated into *user friendly*, advanced information hubs. International links and interoperability is even worse and the existing information systems do not seem to be very powerful tools for fertilization of research activities in WBC countries.

With this questionnaire we would like to obtain an insight into the existing information tools at the national level. Scanning of these tools and corresponding environments should facilitate their fuller utilization, upgrading, and better connectivity which will require some coordination activities. Naturally, each national system reflects specific national features but for efficient exploitation and better connectivity some joint principles and technical standards will have to be accepted. These developments shall not be a short-term task of a group of people or institutions, but requires a strategic, long-term recognition by governments that investment into RTD information systems is of crucial importance for fuller integration of the country's potential into the European Research Area.

In the questionnaire we are aiming at detecting the national "good practices" and the potential for their dissemination – which will eventually support connectivity and harmonization of the RTD information systems at the level of the WBC Region. As preparation for the Workshop in Maribor, Slovenia taking place on 12 November 2009, this questionnaire will guide national experts in conducting several in-depth interviews with relevant policy makers and stakeholders. Another source of information will be an on-line survey open to a bigger public and intended particularly for users of the RTD information systems.

[1] RTD Information System – refers to any system of storage, processing, retrieval and active dissemination of information on research, technological and development potential of a country or region. Some cases of the system are listed in the Annex.

With the collected information we will prepare an evaluation document with identified shortcomings and advantages of the RTD information systems of the seven WBC-INCO.NET countries.

A -- Main characteristics of the existing RTD information systems

Does your country have **accurate, reliable and up-to-date information systems** providing national and international public with sufficient information about RTD potentials and environment?

❑ Yes, a fully sufficient system;
❑ Yes, a partly satisfactory system;
❑ Not satisfactory;
❑ Not existing.

2. **List major relevant portals, websites, databanks and other information systems** in your country (including their acronym):

Acronym	Full name of the system

3. General assessment of the situation in your country:

Which **type of information** are contained in the existing system(s):

❑ RTD organisations
❑ RTD personnel
❑ Bibliographies of Researchers
❑ On-going research projects
❑ Business R&D
❑ Scientific output
❑ Areas of specialisation and excellence
❑ Patents
❑ RTD funding (national, EU, international)
❑ Participation in EU funded RTD programmes

Evaluate major existing RTD information systems: by brief description and by score: 5 - excellent, 1 - dissatisfactory:

Acronym	Brief evaluation of the system (advantages, disadvantages	Score (1-5)

Are **linkages and interoperability** between existing bases established;
❑ Yes;
❑ Partly;
❑ No.

Has the national information system(s) been **developed locally** by country experts or was it **adapted from existing international solutions**?
❑ developed locally;
❑ adapted from other models;
❑ other (please specify): ----------

Are the information offered by the system(s) available in national **language** only or also in English?
❑ in national language only;
❑ in English language only;
❑ in national and in English language;
❑ other (please specify):
_____
_____
_____

Do your information systems follow any **international standards of interoperability** (e.g. CERIF[2]…)
❑ Yes - which one(s); ----------
❑
None(reasons):_____
_____
_____

Are information systems in the country **connected to regional/international information systems** covering the RTD field?
❑ Yes (connected to which systems); ----------
❑ No (please explain reasons):_____
_____

5. Are all information listed in previous question **accessible through one system** – are databases interconnected?
❑ yes;
❑ no.
Additional comments:
_____
_____
_____

[2] CERIF - Common European Research Information Format.

B - Initiators, promoters and financiers of the systems

1.Who was/is **initiator** of information system development (government, RTD sphere, IT companies, interested individuals)?

❑ Government;
❑ RTD entity or association;
❑ IT company;
❑ Other (please specify):

2. Who is responsible for **maintenance and development** of the system(s)?

Specify by individual systems:

_____
_____
_____

3. Who secures **sustainability as the system care-taker** (quality control, updating of information and promotion/dissemination) of the system(s)?

System acronym	System Care-taker

4. Any idea about how much **public money** is spent *per year* for existing information system(s)?

System Acronym	Public spending on the system (estimate 2007)	Public spending on the system (estimate 2008)

5. Are there **other sources** of funding currently available to cover the costs of new developments of the system(s)?
❑ Yes (please specify):
❑ No;
❑ Don't know.

C -- Use(fullness) of information system and its openness for integration

Who are the main **users** of the information system(s) ?
❑ general public;
❑ public sector (policy makers);
❑ RTD stakeholders;

❑ business sector (private sector users);
❑ potential international partners

How do you assess **visibility of researchers** and RTD potentials reached by using these information systems?
❑ Very good;
❑ Acceptable;
❑ Poor;
❑ Don't know.

Are you aware of any plans for further short-term improvements and/or strategic decisions for long-term **development of the system**?
❑ Yes;
❑ No.
❑ Additional explanations:
_____
_____
_____

Who should **coordinate the efforts to develop/upgrade** your RTD information system?
Government;
❑ A Public-Private Partnership;
❑ Other (please specify): ----------

How do you perceive the potential for **higher interoperability** between national RTD information systems at the level of Western Balkans region?
❑ Rather good;
❑ Interesting, but difficult to achieve;
❑ Potentially useful, but practically unrealistic;
❑ Don't know.

Any other comment: ----------

Thank you for your kind cooperation!

ANNEX TO THE QUESTIONNAIRE:

RTD Information Systems: some good practice cases

Lessons should be taken from **some of the good practice** in several EU member states, including the **Slovenian SYCP system**. In some countries there are existing good practices, but even in these cases it does not work without problems. The importance of joint activities was also

indicated by the respondents to the survey. They expressed the high added value of such cooperation but at the same time realistically assess that there are many obstacles to achieve results which would significantly contribute to optimal use of the knowledge in the region, and contribute to the development of knowledge society in the region. The criteria for selecting the 7 +4 good practice system offered at the end of the questionnaire have been: comprehensiveness of the information system, its interoperability with other national and regional systems, its use friendliness, and frequency of updating.

Slovenia
Slovenia Your Cooperation Partner
www.sycp.si

Czech Republic
Technology Centre AS CR, National Information Centre for European Research
www.czechrtd.info

Austria
AURISS-MM, Austrian Research Information System (project)
http://auris.tuwien.ac.at/

Belgium
Belgian Portal for Research and Innovation
www.research.be

Flanders Research Information Space
www.researchportal.be

Germany (German only, login and password required)
Forschungs Informations System
http://www.forschungsinformationssystem.de/

Finland
Finnish Science and Technology Information Service
www.research.fi

Estonia
Estonian Research Information System
www.etis.ee

Besides national systems, some elements of RTD information are also processed and disseminated through:

1.) Portals of science, education and technology ministries: e.g. www.rtd.si.

2.) Portals of key national RTD institutions (science foundations, academies of science, etc)

Research Council of Norway
www.rcn.no

3.) Knowledge dissemination and consultancy networks
OST, Office of Science & Technology
http://www.ostina.org/

4.) Projects addressing issues of RTD information systems
Enterprise Europe Wallonie (Enterprise Europe network project)
www.wallonieeurope.be

Annex 3: List of the Interviewed persons

ALBANIA		
1	Prof. Dr Dhimiter Haxhimihali	Head of Section of Natural & Technical Sciences, Academy of Sciences of Albania
2	Prof. Dr Gudar Beqiraj	President of Academy of Sciences of Albania
3	Prof . Dr Arsen Proko	Head of Unit of RTD&I Projects, Academy of Sciences of Albania
4	Dr Vilma Proko	Scientific Secretary of Centre of Albanian Encyclopaedia
5	Dr Arben Pambuku	Head of Department of Water Exploration and Environment, Geological Survey of Albania
6	MSc. Edmond Agolli	Head of Scientific Policy and Projects, Ministry of Education and Sciences of Albania
7	Academician Assoc. Prof. Dr Efigjeni Kongjika	Scientific Secretary of Section of Natural and Technical Sciences, Academy of Sciences of Albania
8	Dr Marjana Ymeraj	Director of Library, Academy of Sciences of Albania
9	Prof. Dr Adil Neziraj	general Director of geological Survey of Albania
10	Prof. Dr Tatjana Dishnica	Director of Scientific directorate of Ministry of Agriculture, Food and Consummator Protection, Albania
BIH		
11	Vinko Bogdan	Ministry of Science and Technology of Republika Srpska, Assistant of Minister
12	Srđan Rajčević	Agency for Information Society of Republika Srpska, Director
13	Željko Brstilo	Ac15ademic and Research Netw16ork of Republika Srpska - SARNET, Director
14	Slavko Marić	University of Banja Luka - University Computer Center, Director
15	Vahida Krekić	Federal Ministry of Education and Science, Specialist for IT, Statistics, Analysis and Reporting
16	Salko Kovačić	University “Džemal Bijedić” Mostar, BIHARNET Steering Committee Member

17	Eldin Hodžić	ViBBiH Center (Library and Information Service), COBISS.BH, System Administrator
18	Jasmin Azemović	Faculty of Information Technology, Mostar, Teaching assistant, Database Expert
	CROATIA	
19	Vesna Kotarski	Office of International Projects Institut Ruđer Bošković, Zagreb
	MONTENEGRO	
20	Mr. Saša Ivanović	Ministry of Education and Science of Montenegro
21	Ms. Branka Bošnjak	Adviser for science Rectorate of University of Montenegro
	KOSOVO (UNSC RESOLUTION 1244)	
22	Mr. Kushtrim Bajrami	Head of National Center for International Cooperation in Higher Education, Sciences and Technology
23	Dr. Hysen Bytyqi	R&D SC Manager of. University of Prishtina
24	Dr Linda Grapci-Kotori, prof.ass	University of Prishtina
25	Dr. Jahja Dranqolli	Research Center Manager Institute of History of Kosovo
26	Besnik Bislimi	AUK Research Center, Managing Director, American University of Kosovo
27	Mr.Besim Beqaj	Chairman of the Kosovo Chamber of Commerce
28	Dr.Muhamet Sadiku	Executive Director. The Riinvest Institute
29	Dr.Lul Rakaj	Research Center Manager, Institute of Public Health of Kosovo
30	Dr. Bekim Gashi	Faculty of Computer Science and Engineering, Department of Mechatronics, Institute for Business and Technology

SERBIA		
31	Prof dr Miloš Nedeljković	state secretary, Ministry of Science and Technological Development of the Government of the Republic of Serbia
32	Dr Radosav Cerović	assistant minister, Ministry of Science and Technological Development of the Government of the Republic of Serbia, department for technological development system
33	Prof dr Nada Dragović	assistant minister, Ministry of Science and Technological Development of the Government of the Republic of Serbia, department for human resources development in science
34	Nataša Radović	Sector for International Cooperation and European Integration, Ministry of Telecommunications and Information Society of the Government of the Republic of Serbia
35	Prof Dr Sanja Vraneš	Scientific director, "Mihajlo Pupin" Institute, Belgrade
36	Snežana Pantelić, MSc	"Mihajlo Pupin" Institute, Belgrade
37	Prof Dr Dušan Surla	Faculty of Sciences, Institute of Mathematics, University of Novi Sad, Novi Sad
38	Prof Dr Miodrag Ivković	Telekom Srbija a.d., Belgrade
FYR OF MACEDONIA		
39	Acad. Bojan Soptrajanov	Macedonain Academy of Sciences and Arts
40	Prof. Dr. Zoran Popovski	former state secretary in the Ministry of education and science - MoES
41	Prof. Dr. Victor Stefov	former MoES's Scientific Council President
42	M. Sc. Snezana Bilic Sotiroska	Head of the Scientific and Technological Dept. of the MoES
43	M.Sc. Miodrag Dadasovic,	ECRIS.MK National Coordinator
44	Mr. Vasko Pavloski	CEO ECS

ANNEX 4: Agenda of Maribor workshop

wbc-inco.net
Co-ordination of Research Policies with the Western Balkan Countries

Workshop on Integrating RTD Information Systems in countries of Western Balkans

Maribor, 12 November 2009

AGENDA

9.30 The importance and potential of integrated RTD information systems for the promotion of RTD potential, and lessons from the development of SYCP System (Slovenia – Your Cooperation Partner - dr.Boris Cizelj

10.00 The overview of the situation in Western Balkan countries – dr.Tomaž Boh

10.30 Specific problems and opportunities in the Western Balkan countries – reports by country experts /each country PP presentation about 15- 20 minutes

13.00 Lunch break

14.00 Specific problems and opportunities ……. continuation

15.30 Conclusions and recommendations – dr.B.Cizelj

Closure expected at around 16.00 hours.

In the conclusion of the Workshop some recommendations will be made how to upgrade RTD information systems in the countries and how to better connect them at the regional level.

ANNEX 5: List of experts from the workshop ENHANCED INFORMATION ON RTD CAPABILITIES IN WBC, Maribor, 12 November 2009

Country	Name and surname	Organization
BIH	Mr. Denis Mušić	Faculty of Information Sciences , University "Džemal Bijedić", Mostar
BIH	Mr. Djordje Markez	Ministry of Science and Technology of Republic of Srpska (International S&T cooperation)
MACEDONIA (fyr of)	Mr. Miodrag Dadašević	National and University Library: "Sv. KLiment Ohridski", Skopje
MACEDONIA (fyr of)	Ms. Stanka Petkovska	Advised for Database in Ministry of Education and Science
ALBANIA	Prof.Dr. Salvator Bushati	Scientific Secretary of Academy of Science Tirana, Albania
ALBANIA	Prof. As. Evan Rroco	Agriculture University of Tirana, Albania
SERBIA	Mr. Pero Šipka	University of Novi Sad, Faculty of Philosophy and Centre for Evaluation in Education and Science
SERBIA	Mr Djuro Kutlača	Mihailo Pupin Institute, Belgrade
KOSOVO (as defined by UN SC Resolution 1244)	Mr. Hysen Bytyqi	Head of the University RTD Cooperation Office University of Prishtina
KOSOVO (as defined by UN SC Resolution 1244)	Ms. Linda Grapci	Assistant Proffesor at the University of Prishtina
MONTENEGRO	Mr. Saša Ivanović	Ministry of Education and Science of Montenegro
MONTENEGRO	Ms. Branka Bošnjak	Adviser for science Rectorate of University of Montenegro
CROATIA	Ms. Vesna Kotarski	Office of International Projects Institut Ruđer Bošković, Zagreb

ANNEX 6: Original Members of WBC-INCO.NET Working Group on RTD Information Systems

Country	Name and surname	Organization	Contact
BIH	Mr. Denis Musić	Faculty of Information Sciences , University "Džemal Bijedić", Mostar	denis@fit.ba
BIH	Mr. Djordje Markez	Ministry of Science and Technology of Republic of Srpska (International S&T cooperation)	markezdj@teol.net dj.markez@mnk.vladars.net
MACEDONIA (fyr)	Mr. Miodrag Dadasević	Head of Unit, National Library Ss. Kiril i Metodi	miodragda@yahoo.com
MACEDONIA (fyr)	Ms. Stanka Petkovska	Advised for Database in Ministry of Education and Science	stankapt@yahoo.com
ALBANIA	Prof.Dr. Salvator Bushati	Scientific Secretary of Academy of Science Tirana, Albania	sbushati@akad.edu.al sbushati@yahoo.com
ALBANIA	Prof. As. Evan Rroco	Agriculture University of Tirana, Albania	rroco_evan@yahoo.de
SERBIA	Mr. Pero Šipka	University of Novi Sad, Faculty of Philosophy and Centre for Evaluation in Education and Science	esipka@sbb.rs
SERBIA	Mr Djuro Kutlača	Mihailo Pupin Institute	dkutlaca@labtel.imp.bg.ac.rs
KOSOVO*	Mr. Hysen Bytyqi	Head of the University RTD Cooperation Office University of Prishtina	hysen.bytyqi@uni-pr.edu hysenbytyqi@hotmail.com
KOSOVO*	Mr. Muhamet Sadiku	AAB – Riinvest University, Prishtina	
MONTENEGRO	Mr. Saša Ivanović	Ministry of Education and Science of Montenegro	sasa.ivanovic@gov.me
MONTENEGRO	Ms. Branka Bošnjak	Adviser for science, Rectorate of University of Montenegro	bosnjakb@ac.me
CROATIA	Ms. DinaŠimunić	University of Zagreb Radiocommunications Faculty of Electrical Engineering and Computing	dina.simunic@fer.hr
CROATIA	Mr. Krešimir Delac	University of Zagreb Faculty of Electrical Engineering and Computing	kdelac@gmail.com

ANNEX 7: Table of good practice cases' strengths and weaknesses

Country	Name	URL address	Advantages	Disadvantages
Slovenia	Slovenia Your Cooperation Partner	www.sycp.si	User friendly menus, complete database of all relevant stakeholders concerning Slovenian research and economy, integration of Google Maps	Some contact information need to be updated
Czech Republic	Technology Centre AS CR, National Information Centre for European Research	www.czechrtd.info	Extensive, well organised, simple to use, list of most relevant stakeholders in the Czech Republic concerning research	Limited only to research
Austria	AURISS-MM, Austrian Research Information System (project)	http://auris.tuwien.ac.at	Good database of publications, projects, and other information concerning research	Recently the website has limited access, many of the web pages are no longer accessible
Belgium	Belgian Portal for Research and Innovation	www.research.be	Well organised list of organizations concerning research and innovation and international cooperation, list of documents and other data, references, events, news, interoperability with other databases.	Limited only to research
Belgium	Flanders Research Information Space	www.researchportal.be	Excellent database of organisations dealing with research, menus are simple, and very useful. Furthermore, an extensive list of all Belgian researchers and projects – very unique, not found on any other system.	Limited to research, the researchers are almost exclusively from universities
Germany	Forschungs Informations System	http://www.forschungsinformationssystem.de/	Extensive database of German research and economy (energy sector, etc), lists of stakeholders, various tables and explanations/models of organisation of various sectors	In German language only
Finland	Finnish Science and Technology Information Service	www.research.fi	Interoperability and direct links to other databases of interest, excellent resource of Finnish R&D statistics, a simple but good list of relevant stakeholders concerning research	Limited only to research
Estonia	Estonian Research Information System	www.etis.ee	Offers an online calendar, forum, news, a roadmap, etc. List of personnel involved in Estonian research as well.	The website could use a graphical overhaul