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SCIENCE, EDUCATION AND TECHNOLOGICAL DEVELOPMENT IN LOCAL COMMUNITY

Abstract: Science, education and technological development are considered to be a unique process firmly interconnected with strong ties which no-one has been able to break so far. Thus, the human kind primarily owes its both material and spiritual progress and transformation to science, education and technological innovations. Without developed science and application of its results or without education, there can be no progress or prosperity of a country or its people.

However, the strategic goals of our education address the issue of the role and importance of science in educational processes only to a small degree or not at all. Speaking of the application of science, there are many basic things that were given a wrong place in the list of priorities. More than 80% of research potential in the developed countries is within the big companies that work on the elaboration and application of results of fundamental work. In our country, almost the entire research potential is at our universities. Universities, on the other hand, are developed almost exclusively as institutions of higher education. If we add to this fact that education according to the Bologna process requires almost 100% engagement of teachers in the work with students, then we see that there is almost no time left for scientific or research work. Likewise, there are no companies in the local community that can accept the results of scientific-research work. Besides, if we take into account that the issue of the criteria for technical-technological solutions has not been adequately solved in our country, and that participation in the world processes in this field requires enormous funds, then it is quite clear where we stand.

Many countries have realized the importance of the role of science, technology and education, therefore they invest more and more many every year. The budget for science in many counties is doubled over a period of 5–10 years. In recent years there is more and more mention of trans-disciplinary studies that require more organized knowledge necessary for solving complex heterogeneous problems. Such problems surpass the boundaries of the existing institutions of one country.

The paper willshow the situation in the filed of science, higher education and technological development in the entity of Republic of Srpska and state of Bosnia and Herzegovina.

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INTRODUCTION

Thus, research system in B&H is decentralised across several governments, each enjoying autonomy of decision-making power. The authority over science and research lies within the entities, FB&H and RS as well as BD. In FB&H, the authority has further been transferred to 10 cantons.

Prior to the disintegration of former Yugoslavia in 1990 s, B&H research system was in full swing. Investments in science and research was as high as 1,5% of GDP and industry was significant, with important industrial companies who had created and developed large research laboratories with several hundred researchers.

In the absence of overall statistics for research and development (R&D) activities in B&H, it is difficult to come up with an exact evaluation of public investment in such activities. According to the Strategy Development for Science in B&H 2010-2015 (STI Strategy), B&H invests around 0.07% of its GDP on R&D however, it is estimated that total investment is as high as 0.1 to 0,14% of its GDP (budget, industry and services sector together) which is far below the EU 27 average of 1.84%. In 2008 the budget of RS for RTD was €3,3 m or 0.07% of its GDP while in FB&H budget amounted to €2.73 m or less than 0.07% of its GDP [1].

Given the specific model of organization and institutional jurisdiction on scientific and research work, the major players in research policy making in B&H are the two entities FB&H and RS. In RS, Parliament of RS defines and approves the national R&D policy framework and its main objectives through the preparation and adoption of legislative acts including the Strategy for development of science and technology on recommendation of the Scientific Council of RS. Overall responsibility for developing and administering R&D funding lies within the Ministry of Science and Technology of RS. In FB&H, the authority over S&T is transferred to Cantons. Therefore, the cantonal Parliaments adopt the legislative acts while the Cantonal Governments through the relevant ministry develop and administer R&D funding, usually Ministry of Education and Science.

The volume of R&D investment reflects the economy's efforts in creating and accumulating new knowledge, which is essential to modern knowledge-based economies. Current R&D levels in the public sector in B&H are too low to maintain a healthy science base. At present, in B&H GERD is estimated at 0.1 to 0.14% of GDP. Funding of R&D activities is substantially lower than the EU average, 1.84%. The Strategy of Science in B&H proposes that B&H should raise its R&D investment to 1% of GDP by 2015. Increase in financial support from the state, entity and cantons and the ability to attract other funding is a challenge for the country policy makers.

THE STRATEGY FOR THE DEVELOPMENT OF SCIENCE IN B&H – 2010–2015

After the consultation process, The Strategy for the Development of Science in B&H – 2010–2015 has been adopted by the Council of Ministers of B&H on the 22 december 2009. The strategy, prepared by the MoCA, specifies actions in line with

the implementation of the Framework Law on Science and the role of the public authorities at each level (state, entity, canton and district). It also identifies priorities for and the main focus of RTDI policy in the coming five years.

At the end of the document nine priority areas are explicitly named as urgent, short-term activity lines and these are:

– Strengthening the Science Department in the MoCA,

– Stronger co-operation with the European Union with the aim of using the Instrument for Pre-Accession (IPA) funds for strengthening the scientific research activities in B&H,

– Participation in the activities of the 7th Framework Programme (FP7) of the EU as well as in other international programmes,

– Planning funds in the budget of the MoCA for co-financing of international projects,

– Establishing a mechanism of collecting statistical data and monitoring scientific activities ministries responsible for science and education,

– Establishment of the Science Council,

– Tax incentives for companies that invest in research activities,

– Possibility of access to scientific information (scientific journals, data bases, etc.) via the Internet and various electronic systems.

INTERNATIONAL SCIENTIFIC COLLABORATIONS

The Council of Ministers of B&H has achieved progress in relation to the country's position in international scientific collaborations. In this respect, the major milestones in the last 12 months were:

– Signing the Memorandum of Understanding (MoU) between the EU and B&H on S&T co-operation (november 2008). It has resulted in the associated status of B&H in the FP7

– Since May 2009, B&H is a full member of the COST**,** an intergovernmental framework for European Cooperation in Science and Technology. The programme provides a platform for B&H to cooperate on a particular project and exchange expertise with European scientists allowing the coordination of nationally funded research on a European level.

B&H has National Information Point status in EUREKA; a pan-European network for market-oriented, industrial R&D. With this status, B&H can participate in EUREKA projects through a network of National Information Points (NIPs), as well as preparing B&H for full EUREKA membership. Also, the NIP-status provides B&H´s industry and research institutes easy interface with EUREKA and facilitate participation in projects.

RECENT POLITICAL EVENTS RELEVANT TO RESEARCH POLICY

B&H is a potential candidate for EU membership. The Stabilisation and Association Agreement (SAA) between Bosnia and Herzegovina and the EU was signed in June 2008. Under the financial assistance, National Programme 2008 under IPA

Component I, entry ticket of €1.0 m was paid for participation of BiH in 7th Framework programme [2]. With this, the B&H scientific community was able to join the European research area and to be involved in international scientific cooperation.

In parallel, through the active role of the MoCA and its department for science and culture, in 2008 positive trends in the B&H R&D system were reported. Namely, in 2008 MoCA had a budget of €250,000 [3] for funding participation of B&H researchers in submitting proposals for FP7 projects, but due to financial restrictions in 2009, the operating budget of the Ministry for supporting S&T activities was cut. With this, MoCA wants to create a foundation for the integration of B&H in ERA and specifically developing and introducing new public services to promote international activities, in particular in the FP7, and in COST and EUREKA, with a view to securing additional funding for research and innovation.

During 2008-2009, the MoCA also has made significant change in regard to the administrative structure of the Ministry. Namely, the National Contact Point (NCP) office has been integrated into the science department of the MoCA which was prior to that an independent office supported financial by Austrian government. The NCP coordinator is the head of the Department of Science. New civil servants have also been recruited in the Science and Culture Sector in the Ministry. The MoCA has already appointed the NCPs for each specific programme of FP7, all of them are located at universities around the country. Hence, B&H has decided to set up a decentralised NCP system. Parallel with this process, FP7 focal points were also developed in each university. In RS, Ministry of science and technology of RS has created a coherent NCP structure that exists at the universities, R&D institutes and the Ministry itself. Ministry of science and technology of RS has a unit for technical support of the whole NCP system in RS (Center for project management).

POLICY GOALS AND PRIORITIES

Research policy in B&H is dealt within the RS and FB&H and its Cantons. Involvement and policy focus at state level is therefore mainly restricted to the role of promoting international scientific cooperation and participation of research institutions from BiH into the FP7. Also, the participation of B&H in the COST and EUREKA programmes, will entitle both SME and academic laboratories of the country to be involved in research and technological development activities over a wider range than the EU. The B&H Ministry of Civil Affairs in accordance to the Framework law on science foresees the funding of B&H participants in these programmes and other international scientific projects.

Research policy in RS and FB&H is mainly generic in character and the support programmes follows the same path, as well. The main policy instruments for financing science consider all research areas equally. The budget allocations for R&D in RS is distributed by the Ministry of Science and Technology while in FB&H by the Ministry of Education and Science through the research projects intended to support all fields of science regardless of thematic area and type of research. It is designed to assure the balanced development of the six main fields of

science: humanities, social sciences, agriculture sciences, medical sciences, natural sciences and engineering and technology. The RS RTD policy can also be characterized as generic. Most of the budget for research is channeled through the universities that have a great deal of freedom to choose the fields of application. However, in RS the engineering and technology sciences receives slightly larger shares of research budget then other fields and these are: energy efficiency, electrical engineering, mechanical engineering and technology [4].

The main elements of the research policy are described in the The Strategy for the Development of Science in B&H – 2010–2015.

Sharing the vision of the Lisbon strategy, the recommendation of the UNESCO-ROSTE report and realizing the important role and the significance of R&D towards the improvement of competitiveness and growth, The Strategy for the Development of Science in B&H – 2010–2015 identifies the main issues concerning R&D enhancement, namely: training of a new generation of scientists, building-up the country's research infrastructures, reinvesting in industrial research in a limited number of sectors and create a general framework for the development of industry-university partnership, The Strategy for the Development of Science in B&H – 2010–2015 defines the strategic goals which B&H should be targeting. As far as R&D is concerned, a number of strategic aims are defined. By 2015, B&H should reach the investment level in research of 1% of its GDP, strengthening the human resources capacities by educating the young generation of scientists, enhancing the technical equipment, computers, information networks, libraries which should provide the scientific community with the capacity to undertake competitive research activities, developing system of evaluation and reporting in R&D.

It is foreseen that the above will be facilitated through the work of a Science Council who will amongst other tasks, „monitor the implementation of The Strategy for the Development of Science in B&H – 2010–2015 and give recommendation on its further improvements" [3].

MAIN INSTRUMENTS OF RESEARCH POLICY

Public–private cooperation is weak in B&H. In spite of this, some first policy documents in RS as well as in FB&H call upon the importance of public–private collaboration (e. g. Development of Industrial Policy in FB&H, Development of Industrial Sectoral Strategy of RS, Strategic action plan for development of education in B&H 2008–2015, Strategic Development of SMEs in RS).

The main forms of research partnerships in B&H are:

– bilateral contracts between public research organisations and enterprises for carrying out ad hoc research projects;

– joint participation by companies and public research organisations in EU Framework Programmes projects;

– financing the study visits of students (most often in the form of scholarships), by firms with an interest in sponsoring the careers of specialists with specific qualifications.

INTERACTION BETWEEN INNOVATION AND RESEARCH POLICIES

Although there are no strategic measures and polices for targeted investments into development of innovation and technology, certain efforts have been made, recently. In 2008 the Government of the Federation of B&H adopted the Information on Development and Limitations in Establishment and Work of Science Parks in the Federation of B&H. It was noted that Science park Mostar and Science park Tuzla operate at the territory of the FB&H in the capacity of companies with limited liabilities while establishment of Science park Zenica is in its last phase. Law on science and research activity of Republic of Srpska defines the possibility and procedure for establishment of science technology parks and defines the goals of their work. RS actively works on establishment of Innovation Center Banja Luka, university entrepreneurship centre and technological park which will be established in accordance with European and global experience in the field.

Institute of Statistic of RS in cooperation with the Ministry of Science and Technology of RS conducted in 2008 the first pilot innovation survey for RS.

The report „Innovation activities in RS 2006–2008" was published in 2009 with the data on investment in innovation sector.

According to the STI Strategy, development of science-technology parks in B&H requires several strategic decision: locations of the parks, definition of state assistance in setting up the science technology parks, acquisition of equipment, legal framework in accordance to the best practice. What needs to be avoided is the setting up of excessive number of science parks and business zones, since current trends point to „potentially hundreds of business zones, since current trends point to „potentially hundreds of business zones in B&H" and dozens of science parks, for which there is no need, and human resources and capital are already very scarce. In order to have better synergy, in the STI Strategy, it was proposed to establish a science park Sarajevo with focus on information technologies, electronics, mechatronics, bio-medicine, Tuzla with chemicals, IT and energy, Mostar with processing of colored metals, agrobusiness, energy efficiency/renewable energy, Banja Luka with electronics and Zenica with new materials, metal and wood processing.

Several suggestions have been made in relation on how the national innovation systems of SEE countries can make possible policy response. The paper „Science and Innovation in the 21st Century; Lessons for European core and peripheral economies" recommends five policy response:

– improving governance systems: building capacities in public sector, public-private partnership, surveys and studies;

– developing the innovation capacities of existing enterprises, industry-science mobility,

– recruitment of 'innovation managers, innovation awareness and management tools;

– gradual boosting of targeted public investment in knowledge creation: competitive grants for centres of excellence, returning researchers;

– linking policies: FDI as means of technology/knowledge transfer; life-long learning policies;

– tailored to skills gaps for innovation and research;

– greater focus on stimulating demand and markets for innovation: looking at the impact of regulations, public perception of science and innovation, promotion of 'innovators', etc [5, 6].

TOWARDS EUROPEAN RESEARCH AREA

European Research Area is addressed in B&H research policy mostly through stimulation of B&H research organizations to participate in the projects within the European Research Area. The primary concern of B&H research policy is to intensify the access to the international scientific networks and knowledge transfer and exchange.

In that respect, the integration of B&H research sphere into the ERA is one of the priorities in the area of international cooperation and as such actively supported by the Ministry of Civil Affairs and especially its Department for Science and Culture. The active participation of researchers in the ERA is called for in the The Strategy for the Development of Science in B&H – 2010–2015 as well as Strategic development of education 2008–2015.

The Ministry of Civil Affairs promotes and informs the B&H professional public about the conditions of co-operation and calls for proposals published by the European Commission. In the light of this, the ministry organized more than 100 public presentations and seminars concerning these calls as well as workshops on methods and conditions for participation in the framework programmes. The ministry took an active part in the formation of the European Research Area (ERA) and the preparation of the 7th Framework Programme (FP7) for European R&D activities.

The volume of R&D investment reflects the economy's efforts in creating and accumulating new knowledge, which is essential to modern knowledge-based economies. Current R&D levels in the public sector in B&H are too low to maintain a healthy science base. At present, in B&H GERD is estimated at 0.07% of GDP. Funding of R&D activities is substantially lower than the EU average, 1.84%. The Strategy of Science in B&H proposes that B&H should raise its R&D investment to 1% of GDP by 2015. Increase in financial support from the state, entity and cantons and the ability to attract other funding is a challenge for the country policy makers.

IMPACT OF EU FRAMEWORK PROGRAMMES

B&H first involvement in the EU Framework programme was through the FP5 and FP6 and the B&H participation was in the form of partners in project consortia. The experience shows that despite very strict criteria and competitive calls there is a „critical mass" of researchers who are able and willing to implement very demanding and complex projects. In the course of implementation of the FP5, in total 14 projects were realized [1]. Sixth Framework Programme (FP6), B&H had 89 applications submitted by 24 B&H institutions (in all cases partners) and par-

ticipating in 32 projects. Thematic Priorities were: Environment, Integrated water management, Waste Management and Health. FP6 Instruments: SSA (20 projects), STREP (7 projects), IP (3 projects), CA (2 projects) [1]. On the basis of data available to the office of the B&H National Contact-Point for EU Framework Programmes, after closing of the FP6 and opening of the first call for application of projects for the FP7 20 B&H institutions applied for 29 projects. Four projects have been approved [1].

In June 2003, the EU Thessaloniki summit approved the „Action plan on science and technology for the countries of West Balkans". This plan aimed at providing special assistance to the countries in the region, including B&H to increase their participation in the EU's research and technology development (RTD) Framework programmes and other European initiatives.

EC funded projects supporting S&T policy formulation and implementation both in the 6th and 7th Framework Programme (FP6 and FP7), e. g. WBCINCO. NET which implements capacity building measures (training, brokerage events, workshops on statistical indicators, etc.), SEE-ERA. NET and SEE-ERA. NET PLUS, which support international research cooperation projects. The SEE-ERA. NET and WBCINCO. NET projects, as well as the Steering platform on research for the Western Balkan countries launched in June 2006, provide support acting as forums for the exchange of experiences and best practices among the Western Balkan countries, as well as through focused and co-ordinated interventions targeted at European Commission services and the EU Member States.

The Austrian Development Agency (ADA) and the Open Society Fund B&H (OSF B&H) have been active for the past five years in supporting the integration of Bosnia and Herzegovina into the European Research Area by providing assistance for the development of a National Contact Point (NCP) system responsible for the provision of information and advice on participation of B&H researchers in the EU's 7th Research and Technology Development Framework Programme (FP7).

According to the evaluation report of the ADA sponsored NCP programme the number of participants from B&H in FP7 has grown, but the quality of the proposals in which B&H researchers are involved has been below the benchmarks of the other Western Balkan countries. The service capacity of the NCP is limited; as the research system is not yet fully competitive and some researchers are not motivated to participate in large-scale complex European projects. The transfer of the NCP to MoCA is a very positive development concerning its reputation and recognition. It is now very important to secure the operational management of the associated activities, such as website and database management, organization of infodays, workshops, trainings, consulting to public and private sector organizations at the same rate of efficiency, in view of the expected growth in volume and depth. ADA will continue providing assistance for the development of a National Contact Point (NCP) system for period of another three years, 2010-2013.

EC Tempus programme provided very significant support to modernization and reform of higher education system in B&H. Since 1997, TEMPUS financed almost 90 projects with the total budget of €24.8 m [7] aimed at promoting the co-

operation with the EU higher education institutions in the area of curricula development, university management and structural reforms. This programme proved to be extremely efficient both for university human resource development and for strengthening capacities in public administration, civil society and economic reform. In the last TEMPUS IV call for applications, B&H had more than 60 applications, out of which 9 were successful for funding. It is also important to emphasise that, in the beginning of 2009, the EU announced that a B&H Tempus projects (led by the University of Banja Luka with project partners from University of Zenica, University of Mostar and University „Džemal Bijedic" Mostar, and with EU partners from Belgium and Poland) was selected as one of the best among the best 30 projects ever in Tempus.

The cooperation agreement between B&H and Slovenia on promotion of cooperation activities in the areas of science and technology is an example of successful bilateral activities. The programme launches every two years competitive grants for co-financing of joint research projects. Project criteria are: importance of research results for economic and social development of B&H, scientific value and/or research applicability, potential opportunities for participation in EU research projects, use of the research results for commercial purposes. On average, every year, 20–30 projects apply to these Calls. Joint Committee for scientific and technological cooperation between B&H and Slovenia evaluates the projects and proposes the best ones for financing.

The field of science is also included in the IPAP – Individual Partner Action Plan that represents one of the partnership for peace mechanisms. It is a bilateral mechanism that provides support in defining of the needed reforms in the partner countries, designed on two-year basis and aimed at uniting different cooperation mechanisms through which partner country cooperates with NATO. IPAP improves bilateral assistance coordination received by B&H in the process of Euro-Atlantic integrations.

Apart from the abovementioned, B&H academic community signed numerous bilateral agreements on international cooperation with foreign institutions (mutual agreements between faculties/colleges, universities, institutes etc.) that also cover the field of science and research, as well as joint projects. This type of cooperation agreements mainly is reflected in individual participation of B&H researchers in research activities. The biggest involvement in this segment is visible in biomedical and technical sciences.

The Republic of Srpska is one of two main political-territorial divisions of Bosnia and Herzegovina. RS is defined in its „constitution as a territorially unified, indivisible and inalienable constitutional and legal entity that shall independently perform its constitutional, legislative, executive and judicial functions" [1].

Under its constitution, Republic of Srpska has a president, parliament, executive (with a prime minister and several ministries), supreme court and lower courts, fiscal policy, direct taxation and postal service. The National Assembly and the Government of RS are based in Banja Luka.

BASIC CHARACTERIZATION OF THE RESEARCH SYSTEM

According to the constitution of RS, all functions and powers shall belong to the RS, with exception of those which were by the constitution of Bosnia and Herzegovina explicitly transferred to its institutions (foreign policy, foreign trade policy, customs, monetary and immigration policies, and the operation of common and international communications facilities). Thus, the authority over science and research lies within the RS. The Parliament of RS defines and approves the national R&D policy framework and its main objectives through the preparation and adoption of legislative acts as well as the Strategy for development of science and technology on recommendation of the Scientific Council of RS. Law on science and research activities of RS (Official Gazette RS 112/07) and its supplement (Official Gazette RS 13/10) is the general political framework for research organizations, institutions and financial support.

The law defines that the overall responsibility for developing and administering R&D funding lies within the Ministry of science and technology of RS. Article 74 of the Law on science and research activities, determines the annual budget for research according to total GDP of the previous year in the range of 1% and minimum of 0.15%. The budget for research in 2008 amounted €2.3 m, with 43% dedicated to R&D activities supporting the projects activities (basic, applied and experimental development). These public research grants comprise the bulk of the research policy resources. They however are not linked to any specific research policy focus. Apart from the funds for research, RS also allocates budget for technology development which includes innovators, conferences, and projects for development of new technologies and development of information society. The total budget in 2008 was €0.65 m.

The large part of public research is done at the Universities and research institutes. There are two public universities (University of Banja Luka and University of East Sarajevo). There are six private universities. In total, there are 140 faculties and 10 academies. The largest human potential in academic staff is registered at the Universities both, public and private ones. As far as research institutes are concerned there are 21 in RS, 15 public and 6 private. [3] There exist the Academy of Science and Arts of RS.

In accordance to the Law on Science and research activities of RS, in 2008 the main financial instruments in support of research are:

– competitive grants for conducting basic research, applied research and experimental development (€1.04 m or 43% of total budget),

– competitive grants for supporting young and gifted scholars for the science and research activity (awarding scholarships for postgraduate and PhD studies, technical preparation of master and PhD thesis) (€0.74 m or 30% of total budget),

– competitive grants for publishing scientific and research publications and journals (€0.14 m or 4.7% of total budget),

– competitive grants for participation in the international scientific conferences and development of scientific cooperation (€0.08 m or 3.5% of total budget),

– competitive grants for acquisition of research equipment (€0.26 m or 10.7% of total budget),

– competitive grants for support of scientific and professional association (€0.002 m or 0.1% of total budget),

– competitive grants for the organization of scientific events (€0.10 m or 4.3% of total budget).

The total budget for innovation and technology in 2008 was €0.65 m. The financial instruments in support of innovation and technology are:

– competitive grants for innovators (€0.04 m or 6.3% of total budget),

– projects for development of new technologies (€0.60 m or 86.3% of total budget),

– project for development of information society (€0.05 m or 7.4% of total budget).

The total volume of funding for research and development (R&D) activities has increased from 0.02% of GDP in 2001 up to 0.07% of GDP in 2008. The investment in the R&D in 2008 is equivalent to investment of € 2 per capita which is extremely low level in comparison to other countries in Europe (€654 Austria, € 192 Slovenia, €72 Croatia or in Serbia approximately € 8). This shows that governmental authorities are not yet aware of the importance of these activities for the future of the country's socio-economic development.

Current situation has the adverse effects on development of higher education competencies in R&D as well as development of industrial research sector. The main advisory body that assist Ministry of science and technology of RS in the strategic development of science is the Science Council, appointed by the Government of RS on the recommendation of the Minister of Science and Technology of RS. The Science Council is a strategic and advisory body for the development and quality control of the overall scientific activity in RS.

Among other tasks, it monitors and evaluates the quality of scientific organizations, proposes the budget for scientific activities.

As it is the case for the whole B&H, in RS there are also no statistical indicators collected on research, including the data on human resources.

However, Ministry of science and technology of RS and Institute of statistics of RS in 2010 have begun the work on the first pilot R&D survey in RS for the three sectors: businesses, government and higher education.

The Institute of statistics of Republic of Srpska, in cooperation with the Ministry of science and technology, publishes data on innovation activity of enterprises referring to the period 2006–2008. These were obtained on the basis of the experimental pilot survey which was carried out. This survey provided data on activities of enterprises concerning innovation of products (goods or service), process innovation, innovation in enterprise organization, and marketing innovation. Most of the data refer to new or significantly improved products and services, application of new or significantly improved processes, logistics and distribution method. On the basis of analysis of obtained data of the observed sample of enterprises, we can note that 32.53% of enterprises of the observed sample introduced product innovation (goods or service). Process innovation was introduced by 41.01% of enterprises, innovation in enterprise organization 31.11%, and marketing innovation by

32.12% of enterprises from the observed sample. The highest intensity of innovation was realised in the field of process innovation, in large enterprises (72.55%), medium enterprises (41.69%), and in small (28.86%).

The Institute of Statistics of RS regularly publish bulletins for education sector. According to the most recent published data [8], The total number of academic staff that works at the Universities in RS is 2456. Out of the total 50% are PhD holders and 15% Master degree holders. There are 1423 permanent (58%) and 1033 (42%) part time staff. The total number of master and PhD holders as well as specialists year by year increases. There are 173 PhD and 57 MA holders obtained their degrees in 2008. According to the rough estimation of the Ministry of science and technology of RS, there are 1.2 researchers per thousand active populations [9].

There are no exact figures about the total number of population who have completed the tertiary education given the fact that there is no data on the number of population. However, the pool of measuring the living standards in B&H indicates approximately that there are 6% of total population in RS having the tertiary education.

Special attention should be paid to rebuilding basic infrastructures premises, scientific equipment, libraries, etc. that have been seriously damaged or are obsolete. The bulk of the research equipment is based at the universities where the most of research activities are done. Today, the equipment instead to be purchased with the goal to have centres of excellence at one place is rather planned without any strategy that lead to scattered facilities.

In the development of research infrastructure, the Ministry of science and technology of RS is currently working on the establishment of SARNET (Academic and Research Network of Republic of Srpska) which aims at building and developing an ICT infrastructure for higher education and RTD which will facilitate the participation in international projects and businesses dealing with ICT technologies. So far, works on SARNET has been advancing with construction of infrastructure (fibre optic cables) between cities in Republic of Srpska. The second phase of the project foresees expansions of the ICT infrastructure within cities as well as connection between all universities and research facilities in Republic of Srpska. At the same time, the Ministry works on the implementation of COBISS system (Cooperative Online Bibliographic System & Services) and E-CRIS system (Current Research Information System).

Finally, the Ministry of Science and Technology currently works on the preparation on new STI Strategy for Republic of Srpska and the new Science Law.

BRIEF DESCRIPTION OF FUNDING FLOWS

In B&H, all state entities independently determine their R&D spending and thus, the State, RS, FB&H and its Canton governments all define their own funding system according to their needs and criteria.

The Ministry of Civil Affairs of B&H through its Department for Science and Culture, had in 2008 a budget of €250,000 [3] for funding participation of B&H re-

searchers in submitting proposals for FP7 projects. The same amount will be available in 2010. With this, MoCA wants to create a foundation for the integration of B&H in ERA to promote international activities, in particular in the FP7, and in COST and EUREKA, with a view to securing additional funding for research and innovation. MoCA every year launches the announcement for competitive grants in the area of innovation and culture.

The entities and Cantons fund their specific policies through the Ministry of their own. No direct funding for university research exists. There is no data available whether business, abroad and private non-profit funding exists.

The Republic of Srpska R&D system is governed by the Ministry of science and technology of RS and the Ministry itself is the funding institution.

Federation of B&H and its Cantons are two separate entities, with their own funding. The former is governed by the Ministry of education and science while Cantons channels their funding through the Ministries of education, science, culture and sports. Both Ministries directly fund institutions and projects from the available R&D budgets.

In the absence of overall statistics for research and development (R&D) activities in B&H (no statistical data collected on R&D), it is difficult to come up with an exact evaluation of public investment in such activities. According to the STI Strategy, B&H invests approximately 0.07% of its GDP on R&D which is far below the EU 27 average of 1.84%. In 2008 the budget of RS for RTD was €3,3 m or 0.07 % of its GDP while in FB&H budget amounted to €2.73 m or less than 0.07 % of its GDP.

B&H was so far eligible only for funds through CARDS, TEMPUS and IPA since 2007, which are not focused on research funding. Instead, they are targeted at capacity building to facilitate B&H accession to EU. However, the Ministry of civil affairs of B&H and other relevant Ministries of education in B&H participated with several projects in the CARDS programme, mainly aimed at education, with approximately value of €7 m.

B&H Universities participate in the TEMPUS programme with a large number of projects (more than a hundred since 1997) with a total value of €20 m. The TEMPUS programme is of high significance in carrying out the higher-education system reforms.

CONCLUSION

This paper paper presents an overwiev of the science and research, higher education and technological development in the state of Bosnia and Herzegovina and the entity of Republic of Srpska. Firstly, the strategy of scientific and technological development for the period from 2010 to 2015 is discussed. Then, the rewiev of the international scientific cooperation has been given. The main instruments of research policy are specially highlihted, emphasizing interaction between inovativeness and research. Finally, the overwiev on the European Union projects that comprised researchers from Bosnia and Herzegovina has been illustrated.

LITERATURE

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