

ISSN: 2038-632X

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*Building-up knowledge based society in the SEE:
a fiction or window of opportunity
through the EU accession?*

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NOVEMBER 2010 | #05

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Abstract¹

The EU has undertaken strong commitment towards the South-East Europe (SEE) within the overall strategy for the region. Three sets of inter-linked issues related to the SEE are on the European agenda: stabilisation, reforms and the EU integration. Renewed consensus over enlargement was achieved ("3Cs") with commitment to the European perspective of the region, while the ratification of the Lisbon Treaty opened the door for further EU enlargement. Major challenges are ahead, such as better governance, state building issues, efficient judiciary and public administration, fight against crime and corruption, lowering unemployment, building infrastructure, etc. However, despite obstacles most countries of the region are progressing steadily towards the EU membership.

Together with the challenges posed by globalisation and world economic crisis, the accession to the EU strengthens the need to foster human resources development in the SEE countries of with the aim to raise their competitiveness. It particularly relates to strengthening education, training, research and innovation policies through reforms, making preconditions for stronger investment in R&D, exchange of experiences and good practices as well as to regional cooperation within the knowledge triangle areas (education, research, innovation). Building-up a knowledge-based society is essential for the region and it relies on a human capacities development. There is a need to improve the scientific infrastructure, increase mobility among academics, attract experts from abroad and reduce the brain-drain. Progress in these areas should help the region to increase its' competitiveness, achieve sustainable economic and social development and facilitate the EU integration.

The EU accession is the most important driving force to implement reforms, foster economic and political changes in the countries of the region. Therefore the needed progress in human resources development, education and research should be stronger incorporated into the EU enlargements instruments and linked to the EU Lisbon strategy goals which consider the mentioned areas as basic priorities. In spite of the weaknesses in implementation, Lisbon strategy could be perceived as a framework for the reforms in the SEE countries at macro, micro and employment level. Addi-

¹ I am grateful to Deana Gulisija from the IMO for her assistance in preparation for the background of this paper.

tionally, there is a need for further fostering regional cooperation in the mentioned areas, prioritising the Lisbon Strategy goals, adopting and implementing the instruments for speeding up the reforms. Such cooperation could contribute to better preparation and coordination of the reforms.

The paper focuses on the SEE countries while some comparisons are made with the EU member states and Turkey. It tries to find out the answer how to foster the relevant national policies through reforms, exchange of experiences, good practices and regional cooperation in human resource development and building the *knowledge triangle*. It aims to identify main strengths and weaknesses, starting from the comparative analyses of the achieved development and key problems. Based on such analyses, the paper draws up some policy recommendations that might help the countries of the region in developing relevant policies.

The paper is based on the available secondary data sources (such as Eurostat) and results of some surveys undertaken within this area (World Bank, national surveys). However, it should be underlined that there is a serious lack of reliable comparative data for the SEE countries in the areas of knowledge triangle which makes the comparative analyses more difficult. Therefore the available data from some executive surveys and regional databases were also taken into consideration (World Economic Forum).

The Western Balkan countries are significantly exposed to the effects of global crisis because most of them are highly indebted abroad, possess insufficient hard currency reserves and experience high balance of payments deficits. Although the first wave of financial crisis (a fall in prices of new financial instruments) was not critical for them, the second wave in the form of credit crunch, collapse of exports and disruption of the inflow of remittances has significant impact. As a result, the economic activity is significantly slowing down in the region, regardless of relative satisfactory tourist season in some of countries in 2009. The negative economic developments will slow down the process of resolving conflicts in the region related to bloody dissolution of former SFR Yugoslavia. Inclusion of the elements of solidarism to their economic systems and policies could ease the catching-up of the region in the process of its reintegration to the developed Europe.

Keywords

Knowledge triangle, competitiveness, EU enlargement, Lisbon Strategy, R&D, innovation, research, education.

1 The EU enlargement facing new challenges

Integration of the SEE countries into the European mainstream is a logical consequence of developments in a modern European history and a necessity in the same time. The countries of the region naturally belong to Europe, and through the process of the EU accession they confirmed their willingness to share the European values and ideas. After the 5th enlargement the borders of the EU have been moved towards the Black Sea and the SEE countries have become closest neighbours of the EU, totally encompassed by the EU member states. So the traditionally understood "east" in the European relations became "west" for the South-Eastern Europe (Samardzija, 2008: 63).

Within the SAP, the EU has undertaken strong commitment towards the region. The institutional framework for the EU integration has been established (Commission of the European Communities, 1999) and further improved. Three sets of interlinked issues related to the SEE are still on the European agenda: stabilisation, reforms and the EU integration. Renewed consensus over enlargement was achieved (the so called three "Cs" – *consolidation, conditionality, communication*) with commitment to the European perspective of the region (Council of the European Union, 2007). The ratification of the Lisbon Treaty in 2009 opened the ground for further EU widening, allowing smooth adaptation of the Union's institutions once a new member state joins the EU. Nevertheless, despite removal of the EU institutional crisis as the integration obstacle, the overall EU attitude towards enlargement is not so much favorable.

On the other hand, the countries of the region have their own responsibility and obligations in the process, not only towards the EU but towards each other. Their response should be to undertake reforms and fulfil the EU criteria, as well as to strengthen efforts in regional cooperation and work together. Involvement of both sides (the EU and the region) together with the participation from donors outside the region and with the leadership by the countries of the region is very much needed. Major challenges are ahead, such as governance, state building issues, efficient judiciary and public administration, fight against crime and corruption, raising employment, building infrastructure, etc.

The enlargement landscape has been significantly changed and widened. The current enlargement encompasses the SAP countries,² Turkey

² The Stabilisation and Association Process covers Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia and Kosovo.

and Iceland. The group is very heterogeneous and has South-Eastern and Nordic dimension. Currently it is a group of „3+4+2" countries, namely 3 candidates (Croatia, Turkey, Macedonia), 4 applicants (Albania, Montenegro, Iceland, Serbia) and 2 potential candidates (Bosnia and Herzegovina, Kosovo). The accession frameworks are quite different. While the countries of the WB are encompassed by the Stabilisation and Association Process, Turkey has individual accession framework and the same is most likely going to happen with Iceland, which brings the Nordic dimension into the enlargement process. However, the continuation of this paper is focused primarily on the SAP countries.

Apart of the similarities between the previous, 5th and the current enlargement, there are several crucial differences. The previous and current enlargements encompass almost the same population but their contribution to the GDP differs. While the 5th enlargement represented 21% of the EU population contributing approximately 7% EU GDP (Commission of the European Communities, 2009b), the current enlargement countries encompass population roughly amounting 20% of EU citizens representing 4.7% EU GDP (with the strongest contribution of Turkey in terms of population and the GDP). Most of the accession instruments basically follow the same pattern (institutional arrangements, strategic approach) but there are crucial differences resulting from the specific situation in the region and the EU lessons learned in the past enlargement.

One of the basic differences is the fact that the EU accession criteria of the SAP countries are tougher as compared to previous enlargement and the negotiation process differs in some aspects. It is evident that the EU integration process became more difficult and time consuming. One of the arguments supporting this statement is the fact that the conditions for entering the EU are becoming a "moving target", having in mind the fact that apart of the Copenhagen criteria, there are the SAP specific criteria and new requirements that were developed during the process (the negotiation opening and closing benchmarks, the suspension clause, etc).

The countries of the region are expected to reach the Copenhagen criteria which also defined the principles that countries must meet to accede to the European Union in the 5th enlargement round. The political criterion means "*stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities*". The economic criteria assume the "*existence of a functioning market economy and the capacity to cope with competitive pressure and market forces within the Union*". Apart of it, countries must also accept the Community *acquis*, namely the ability to take on the obligations of membership, including adherence to the aims of

political, economic and monetary union. (European Council, 1993). On the other hand, the SAP criteria define the country specific conditionality that is linked to the Copenhagen criteria (cooperation with the ICTY, good neighbourly relations, resolving border disputes, etc). The negotiation frameworks are tailor made for the countries,³ the number of chapters increased and there is a possibility of suspension of negotiations. However, the speed of accession depends on the readiness of the countries to implement reforms, based on the "own merits", regatta principle.

The countries of the region moved closer to the EU but, depending on the progress in reforms, there is a significant divergence of the bilateral status of the countries *vis-à-vis* the EU. Croatia is reaching the final phase in negotiations on a full EU membership, being the forerunner in the EU integration. It is expected to conclude the negotiations in 2010, if continues to make progress in meeting the opening and closing benchmarks. The Commission's Financial Package has been prepared while the preparation of the Accession Treaty is expected to start soon. Furthermore, the EU has received three applications from the region (Montenegro applied in December 2008, Albania in April 2009 and Serbia in December 2009).⁴ Macedonia achieved the candidate status in 2005 and is waiting the accession negotiations to be opened, fulfilling the commitments under the Stabilisation and Association Agreement (SAA). The open issue is a tension with neighbouring country Greece on the country's name. The Commission is preparing opinion on the Montenegrin application for membership while the work on the opinion for Albania is expected to start soon. Bosnia and Herzegovina is passing through the constitutional reforms which should permit its institutions to function effectively. The country has recently signed the SAA but needs to speed up key reforms. Serbia made step forward in cooperation with the ICTY, signed the SAA and is unilaterally implementing the Interim Agreement. More constructive attitude towards Kosovo is needed. On the other hand, after solving the status question, Kosovo has been recognised by a majority of the EU member states and the EULEX mission is in place while the reform process is on the top of the agenda (Commission of the European Communities, 2008).

³ There are differences between the requirements in the negotiation frameworks for Croatia and Turkey, reflecting the specific situation in these countries. While the first one underlines the prospect of membership, the latter is seen as an „open ended process“.

⁴ Apart of the SAP countries, the negotiations with Turkey have reached more demanding stage requiring a new impetus for reform. Turkey has started negotiations together with Croatia in 2005. Meanwhile, Iceland applied for membership in July 2009, bringing the Nordic dimension into the current enlargement process.

However, having in mind the mentioned differences between the SAP candidates and potential candidates, strengthened regional cooperation through flow of ideas and knowledge, movement and exchange of people, building networks and other forms of regional cooperation might help the countries in a more effective preparation for the EU membership and above all in human capacity building. Regional cooperation is a corner stone for the successful integration into the EU and it will remain to be a key element in the EU Stabilisation and Association Process. There are many areas where regional cooperation has proved to be successful instrument, ranging from economic development, infrastructure, justice and home affairs, security cooperation, human resources development, exchange of experience in capacity building, etc.⁵ The examples illustrating development of successful cooperation forms and networks are in trade liberalisation and facilitation, infrastructure and energy, transport and telecommunications, investment climate improvement, SMEs development and in the other areas of common interests. These forms of cooperation gave significant contribution to the region's development although their implementation in some areas could be even more efficient.

Therefore cooperation in research, education and transfer of knowledge and innovation is a great challenge for the region. Among other activities, the Regional Cooperation Council (RCC) is working on strengthening regional cooperation in the area of human capital. It established The Task Force for Fostering and Building Human Capital of the RCC⁶ (which provides cooperation and coordination framework in the field of human resources and education in the SEE), as well as the Education Reform Initiative of the SEE. There is also a Task Force Fostering Building Human Capital Mobility Programme for Capacity-Building in Regional Cooperation Management and other initiatives. The RCC is involved to channelling the project on establishment of a Regional Strategy for Research and Development for the Western Balkans.⁷

There are also some important projects supported by the European

⁵ South-East European Cooperation Initiative (SEEI), Regional Cooperation Council (RCC), CEFTA, Energy Community, Transport Community, Investment Compact and numerous other regional initiatives.

⁶ It is chaired by Romania and co-chaired by Austria and Croatia.

⁷ The decision for developing Regional Strategy for R&D for Western Balkans (RSRDfWB) was adopted on a Ministerial Conference – Developing Regional Strategy on Research and Development for the Western Balkans (Sarajevo, 2009). The preparation of the strategy is supported by the Multi-beneficiary IPA programme 2010.

framework programmes⁸ and networking initiatives in the region, aiming to integrate the region into the European Research Area (ERA) and to rebuild once strong regional cooperation. The priorities are to recognise and integrate national science and technology (S&T) sectors into the Pan-European research area, as well as to up-grade the existing cooperation programmes and promote new ones. One of interesting regional incentives is creation of the West Balkan Research database that is funded by the European Commission within the "ERA WESTBALKAN+" project. This online directory provides a database of universities, institutions and companies active in R&D in the West Balkan countries. It allows searching the West Balkan research landscape against all themes of activities defined within the 7th EU-Framework Programme (FP7), organisation type and geographical region for a simple and successful identification of R&D collaboration partners.⁹ However, the potentials for regional cooperation in these areas are still not enough explored and it is important to strengthen the "ownership" of the countries in joint activities and programmes in the area of mutual benefit and regional impact (developing research infrastructure, improvement of human potential, institution building, education and training, innovations).

2 The Lisbon strategy and attempts towards the knowledge based society in the SEE

2.1 *The Knowledge triangle and competitiveness*

Transition towards the knowledge based society is a key prerequisite for speeding up the economic and social development in the SEE countries. Interaction between research, education and innovation (*knowledge triangle*) is considered to be a driving force for economic development and a source of political stabilisation of the region. None of the mentioned three sides of knowledge triangle could be developed isolated. Excellence in research is impossible without quality in education while the results could not be applied in practice without close link between research and innovation. On the

⁸ For example, the FP6 SEE-ERA.NET is a networking project aimed at integrating the EU member states and the SEE countries into the ERA by linking research with the existing national, bilateral and regional RTD programmes. The FP7 WBC-INCO.Net aims at coordination of research policies within the WB countries.

⁹ See: <http://www.westbalkanresearch.net/>

other hand, higher education and R&D contribute to economic growth and competitiveness by providing highly skilled labour force for an open economy and democratic society as well as through the creation, transfer and adaptation of knowledge. Thus education, research and innovation are considered to be part of the preconditions for fulfilling the Copenhagen economic criteria.

The knowledge triangle areas are considered to be among the most relevant issues for raising the competitiveness of a country which is based on complex determinants. Valuable tool for comparing progress of the countries is the Global Competitiveness Report of the World Economic Forum (WEF). The global competitiveness index provides benchmarking tool to identify progress and obstacles to improved competitiveness and thus reflects developments within the competitiveness pillars. Among 12 pillars for measuring competitiveness defined by the World Economic Forum (WEF), three of them are directly related to knowledge triangle: higher education and training, technological readiness and innovation.¹⁰ However, the indicators are only partly based on the hard data. Namely the indexes and scores represent a combination of statistical data and the findings of the executive survey (subjective answers on different aspects of local economy)¹¹. The subjective dimension reflects the weaknesses of the indicators, but also gives the insight into a variety of qualitative aspects of economies which are not accessible by the hard data.

Having in mind the fact that the SEE region is lacking comparative data for the areas covered by this paper, the WEF reports were used as additional source of information. Today's globalised world requires economies to bring up pools of well educated working force, able to adapt rapidly to the changing environment while technology has become important element for competition and prosperity. The education pillar measures the enrolment rates and the quality of education while the technological one measures agility with which economies adopt existing technologies to enhance the industrial productivity. The access to and usage of information and communication technologies (ICT) became essential components of economies' overall level of technological readiness (WEF, 2009).

In 2009, the Global Competitiveness Report was based on comparison of 133 countries, where the SEE countries were positioned in the second part

¹⁰The remaining nine WEF pillars of competitiveness include: institutions, infrastructure, macroeconomic stability, health and primary education, good market efficiency, labor market efficiency, financial market sophistication, business sophistication and market size. See: Competitiveness Report 2009-2010.

¹¹ Answers are assessed on a scale of 1-7 with hard data rescaled to this range.

of the scale. According to the overall ranking in 2009, Montenegro (62nd) was the best performing country from the region and has even significantly improved its position, compared to the previous two years level (Table 2, p. 21). On the opposite, Croatia decreased its position to the 72nd place primarily due to the downgrade of the rates in financial markets, business sophistication and quality of institutions while the technological readiness recorded growing trend. However, Lisbon indicators (education, innovation) rank Croatia much better than the general score. Bosnia and Herzegovina recorded the lowest position in the region while Slovenia positions itself among the best performing new member states. The table also shows that all SEE countries rank better in higher education and training than in innovations.

Regarding the technological readiness (Table 3, p. 22), Croatia and Montenegro are according to the WEF executive survey results slightly better positioned than the remaining SEE countries. However, none of the mentioned countries have reached higher ability to absorb technologies at the firm-level while the data on the internet users, personal computers and broadband Internet subscribers (hard data) give much more optimistic picture.

It is interesting to analyse the position of the SEE countries as compared to the EU and some other neighbouring regions regarding the progress in approaching the Lisbon goals. Based on the WEF methodology (WEF, 2008), the EU27 countries, candidates, potential candidates as well as some neighbouring Central Asian countries are biannually ranked comparatively according the progress in eight distinct dimensions¹² that capture the areas considered to be critical for reaching the Lisbon goals (Table 4, p. 22). Two of the mentioned indicators are relevant for this analyses, namely the Information Society and Innovation and R&D. In spite of the fact that lags behind the EU average, Croatia has improved its' overall ranking from 3.93 to 4.10 and thus together with Montenegro ranks in 2008 even better than some of the EU members (Poland, Romania, Bulgaria). Furthermore, Croatia was the best performing among the SEE and neighbouring countries regarding the information society and slightly improved its position regarding innovation and R&D. The remaining SEE countries are ranked below the EU members, but also below Azerbaijan, Turkey, Russian Federation, Kazakhstan, Ukraine and Georgia.

¹² Namely: Information society, Innovation and R&D, Liberalisation, Network industries, Financial services, Enterprise environment, Social inclusion, Sustainable development.

2.2 Relevance of Lisbon strategy goals for the SEE

The Lisbon strategy (LS) widely set goal in 2000 to reach the world primacy in competitiveness by 2010 is still far of being reached in many areas. It was initially intended to improve Europe's economy and boost employment through different incentives directed, among others, towards improving human capital, increasing and improving investment in R&D, facilitating innovations, encouraging education and training, etc. The renewed Lisbon strategy placed its focus on growth and jobs, aiming to increase the EU's ability of creating jobs, raising the capacity for growth through more investment into human resources and ensuring the position of Europe as an attractive location for employment.

In spite of the fact that the EU represented 20% of world trade, 30% of global GDP and 45% of overall FDI, it was not possible to mobilise enough resources to further strengthen the competitiveness without sustainable growth, full employment and social inclusion. Europe is still facing challenges of global economy and its constant and accelerating change, not only in technologies, R&D and innovation but also in markets, social conditions and business models. Therefore the continuation of the Lisbon strategy will be needed to constitute the basis to reach ambitious objectives through innovation strategy and by investing in knowledge society.

The Lisbon strategy objectives became relevant for the candidate countries during the pre-accession stage which was underlined in the early stage of the LS implementation.¹³ The WB countries were suggested to start considering the Lisbon goals in their reforms, aiming to gradually achieve the objectives *"taking into account the level of development of the economies and the individual stage of rapprochement to the EU"* (Commission of the European Communities, 2006). The Lisbon objectives do not constitute additional criteria or economic objectives for the region, but the EU policies towards the region reflect Lisbon activities within the priorities under the European/Accession Partnerships. However, they became more important in the process of negotiations due to the fact that these objectives are deeply integrated in various EU policies and thus represent an overall horizontal policy framework for adjustment. The goals are not obligatory, but many instruments of the Lisbon strategy are a reference point during the screening process in different chapters.

The Lisbon strategy goals could be powerful catalysts of the necessary

¹³ It was already clear at the Barcelona Summit which highlighted the Lisbon strategy "as an incentive for candidate countries to adopt and implement key economic and social environment objectives as a two-way learning process" (European Council, 2002).

reforms in the SEE and facilitate their accession into the EU. Lisbon-type strategy is still needed in the post-2010 period, not only for the EU but also for the current and future EU candidates and neighbouring countries. It is evident that the strategic goals are far from being achieved at the EU level in the first Lisbon decade. In the period until 2020 they will even more strongly reflect the main challenges of the SEE, within highly globalised and multi-polar world characterized with increased technological change. Lisbon strategy, understood as a comprehensive program of structural reforms will have to be adjusted to the new circumstances of the continuously changing global environment and intensified to become a sustainable, development oriented LS. It should introduce knowledge and innovation into the core of economic, social and environmental development.

The Integrated guidelines (IGs) represent one of the instruments for implementing the Strategy, based on Articles 99 and 128 of the Treaty. These guidelines are meant to guide the member states in implementing their National Reform Programmes (NRP) during the three-year cycle.¹⁴ A complex set of issues refers to the knowledge triangle while some of microeconomic guidelines, among others, refer directly to R&D, education and innovations (Commission of the European Communities, 2007).

The Lisbon strategy stresses the need to increase and improve investment in R&D, particularly by private business. The overall objective is investing 3% of GDP in R&D in 2010, with two thirds of investment coming from private sector (guideline 7). The EU member countries are suggested to develop a mix of measures to foster R&D through more effective public expenditure, strengthen centres of excellence of educational and research institutions, and stimulate transfer of technologies, modernise the management in R&D and education sector, ensure adequate supply of qualified researchers by attracting more students into higher education, enhance carrier development and mobility of researchers.

On the other hand, the strategy aims to facilitate all forms of innovation and their dissemination, develop of innovation poles, networks and incubators, encourage of cross-border knowledge transfer, including the FDI etc (guideline 8). Furthermore, it underlines the need to strengthen the competitive advantages of its industrial base, focusing on development of new technologies and markets, promoting new technological initiatives and developing networks of regional and local clusters (guideline 10).

¹⁴ The integrated guidelines were defined for first three-year cycle of the renewed Lisbon Strategy (2005-2008) and renewed for the second cycle (2008-2010). They include 6 macroeconomic guidelines, 10 microeconomic guidelines and 8 employment guidelines.

2.3 Research and innovation

The general observation regarding the research and development in the SEE countries is that the region is significantly lagging behind as compared to the EU- 27 level of development in terms of productivity and expenditures in R&D, human resources, infrastructure, cohesion and overall competitiveness, while the process of catching up is slow. The SEE countries are facing many weaknesses in their science and technology sectors, such as lack of investment, lack of financial support for project implementation and inadequate position of researchers. The problem of mobilizing infrastructure is common for all SEE countries. There is a need to strengthen communication on the regional and European level, developing cooperation between the R&D, higher education and business sector and better integrating the region into the European Research Area.

The level of expenditure on R&D for some of the SEE countries is given in the Table 5, p. 23. In 2006, the average gross domestic expenditure of EU-27 on R&D was 1.85% of GDP, which was significantly lower than in Japan (3.3%) and US (2.6%). Sweden and Finland were the only two countries that exceeded the target with investing more than 3% of their GDP in R&D, while another four member states were above the EU average (Germany, Austria, Denmark and France). Corresponding data are not available for all candidate and potential candidate countries for the same year, except for Croatia (0.87%) and Turkey (0.76%). Although Croatia was significantly below the EU average, the level of expenditure was higher than in Cyprus, Romania, Bulgaria, Slovakia and some other new member states. The mentioned figures could only be compared to the level of expenditure in R&D in Macedonia (0.25% in 2005) and Montenegro (1.02% in 2004)¹⁵.

This shows that the SEE countries are still not enough efficient to put research and innovation on the top of their national agendas. Their GDP expenditures and investments on research capacities, both on human resources and research infrastructures, are insufficient and the current global recession has further weakened financial perspectives. Despite rising growth rates, the SEE is facing slow process of catching up.

Regarding the sources of financing, there is generally low level of financing from private sector which differs from the EU member states that are in average closer to reach the Lisbon target of covering 2/3 of expenditure from business enterprise sector (BES). Namely, in 2006 the BES remained the primary source of R&D financing in the EU, accounting for 55% of the to-

¹⁵ Source: Eurostat, 2009: 142-143.

tal EU-27 R&D expenditure. However, it does not reflect the situation in most of the new member states where the share of government sector was greater than the business sector's share. The comparative data is not available for all countries in the region except for Croatia where the share of BES amounts 35% of total R&D expenditure in 2006,¹⁶ which means that the structure of expenditure is opposite than the envisaged Lisbon goals (Eurostat, 2009: 26).

The countries of the region are facing the problem of brain drain in science and research, i.e. loss of highly qualified work potentials. Low wages make the profession of researchers unattractive. Other common problems in this sector are low R&D capacities, weak communication between higher education and business sector and rather low demand for the R&D outputs.

Croatia seems to be the only SAP country that is implementing the national 3% action plan which is considered to be a step further for the countries' integration into the European Research Area (Ministry of Science, Education and Sports, 2007). The Action Plan 2007-2010 starts from the fact that Croatian Science and technology system should become globally more competitive and therefore 10% annual increase in R&D expenditure is envisaged. Due to the fact that the cooperation between public S&T and economy (industries, SMEs) has been insufficient, it needs to evolve from R&D sponsorship to forms of mutual participation in projects of common interest. There is insufficient and unfocused funding of S&T, under equipped public S&T network, little direct demand and funding from SMEs and industry, low investment into R&D from the business sector and insufficient presence in the international S&T cooperation.

Therefore, measures have been taken to stimulate private sector investment in research (establishment the system and government bodies for innovation, improve the legislative and regulatory framework, improve financing of S&T sector, improve education of S&T community towards commercial exploitation of R&D, integrate with the EU and international environment).¹⁷ However, increasing investment into R&D, reorganization of science system and intensified participation of Croatian scientists in the European framework programmes remain the main goals of Croatia's key strategic priorities, while there is no visible increase of R&D expenditures recorded yet.

¹⁶ In Turkey the share of BES was higher amounting 46% of total R&D expenditure in 2006 (Eurostat, 2009).

¹⁷ Cooperation between science and industry was strengthened with the launch of Croatian National Innovation System -HITRA and some measures have been taken to improve the mobility of researchers.

Another important feature to be mentioned in this paper is low level of the SEE countries participation in the EU programmes supporting research and development. Their participation in the EU Framework programmes could be given as an illustration of the development level of their respectable R&D sectors (Table 6, p. 23). The countries of the region are participating in FP7 programme within the group of candidate and associated countries. However, the group called „Candidate and Associated Countries" is wider and includes Albania, Bosnia-Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Iceland, Israel, Liechtenstein, Montenegro, Norway, Serbia, Switzerland, and Turkey.¹⁸ The whole group accounts for only 8,8% of total applicants for FP7 in retained proposals and 9,9% of requested Community financial contribution. Within the EU contribution to the whole group (which in 2008 received almost 350 mil euro), the SEE countries participated with marginal share of some 16.5 mil euro (4.7%). It reflect relatively low level of readiness of preparation the demanding FP7 project proposals. The success rates of FP7 projects for the group of candidate and associated countries in 2008 was 21,5% and 17,6% respectively. Montenegro had the highest success rate in 2008 within the whole group (34.5%) while the lowest rate had Serbia (12.9%). For comparison, among the new member states, the highest success rate was recorded the same year for Lithuania while the lowest one was 14.6% in Malta (European Commission, 2009).

The overall performance of the R&D sector in the SEE reflects that the closer link between science and business is necessary. The regional dimension of scientific cooperation is not utilized enough. Inadequate exchange of know-how, best practices, innovation capabilities and mobility of the researchers and the "brain-drain" increase that problem. The level of integration and participation in the international and the EU projects is unsatisfactory with overall weak usage of the EU funds for research and innovation. Finally, cooperation between the high education, R&D and business sector is weak that deflates the multiplied benefits of the possible joint efforts.

Some of the mentioned statements are illustrated in the table below (WEF Global Competitiveness Report ranks, executive survey data). The Table 7, p. 24 reflects the fact that the countries of the region generally lag behind the technologically advanced economies in innovation, although the performance differs in some analysed areas and countries. Croatia is best performing in the region and in the same time with moderate position in the overall context regarding capacity for innovation (rank 52), company

¹⁸ Albania, Serbia, Montenegro and Bosnia and Herzegovina signed in 2007 and 2008 Memoranda of Understanding and thus joined the group of Associated countries.

spending on R&D (49) and utility patents (35), while Montenegro is the regional leader regarding quality of research institutions (47) and university-industry collaboration (54). However, all the available data with the exception of utility patents are based on expert assessment.

The innovation policy is considered to be essential for knowledge based growth in SEE economies and there is a need to broaden the focus of science and technology policies and to build public R&D linked to countries' core sectors (industry, agriculture, health, other) and make better use of international assistance to integrate R&D in SEE into the European Research Area (Radosevic, 2007: 3).

The World Bank analyses (Linden, Arnhold, 2008) come to a conclusion that the highest priority with regard to R&D in the SEE should be to strengthen links with and raise the contribution of the private sector. On the other hand, public R&D funding needs to be more effectively targeted, preferably through private-public partnerships. It is important to investigate which sectors and areas might justify the future investment. There is a need to deepen cooperation with other countries and institutions to share resources (people, equipment, and ideas). Special attention should be given to future support for young researchers and their status within the R&D system.

2.4 Education

The education and training systems in most of the SEE countries need to pass through deep reforms. The comparison with the EU countries according to different indicators shows that the SEE countries are lagging behind in many areas.

The countries of the SEE lack skilled labour force with higher education. Dropout rates in higher education are huge while the graduation rates are low. The number of graduates with the master's or doctoral level degree is stagnating or even decreasing. The enrolment rates in secondary and tertiary education are inadequate in most of the countries, while the university graduation rates are very low. Public expenditure on R&D and on tertiary education as a share of GDP is low. Most of the SEE countries are facing problems of quality of higher education where old-fashioned teaching methods are predominating. Therefore the higher education is not adequately prepared to contribute to competitiveness through the knowledge absorption and adaptation (Linden and Arnhold, 2008).

Progress in education could be measured by the Lisbon Strategy indica-

tors and benchmarks for measuring the progress in education.¹⁹ They are targeted towards participation in primary, secondary and tertiary education; participation in lifelong learning and special needs education; language, ICT and civil skills; cross-national mobility of students; education attainment of the population; investment in education and training and related areas. Since the SEE region is facing problems in the comparability of indicators, the continuation of analyses will focus on the areas where the minimum level of comparable data is available.

One of the Lisbon goals in education is to reduce the number of early school leavers to 10%. Although the goal has not been reached, the number of early school leavers has been reduced and in 2007 in the EU-27 remained 14.8% of young persons aged between 18 and 24 who had not completed upper secondary education (Table 9, p. 25). The figures in the SEE region and Turkey also show a downward trend. The highest share of young persons who have not completed upper secondary education is recorded in Turkey (48%), followed by Macedonia (32%, the only available information for 2002) and Serbia (10.7%) while Croatia has a very low percentage (4%).

Another Lisbon objective that could be illustrated with the data on the SEE countries' performance is to increase the proportion of the population aged 20-24 who has completed at least the upper secondary education to 85% (Table 10, p. 25). In 2007, almost 80% of the EU-27 population in mentioned age have completed at least secondary education, while the trend is slowly increasing. Croatia and Serbia have very high proportions (95% and 89% respectively), Macedonia was in 2020 far from reaching the goal (65%) while the figure for Turkey is extremely low (47%).

Further on, one of the Lisbon benchmarks aims to increase of at least 15% in the number of tertiary graduates²⁰ in Mathematics, Science and Technology (MST) followed by the decrease in the gender imbalance (Table 11, p. 26). Enrolment rates in the EU-27 are growing but are not balanced since women are nearly half of men's rate. In the all SEE countries enrolment rates are increasing except on fluctuating rates. The female participation rate is more than the half that of the male rate.

Finally, the Lisbon strategy targets a substantial increase in the *per capita* investment in human resources (Table 12, p. 26). While the EU-27 public investment in education was in 2005 amounting 5% of GDP, the spending on

¹⁹ The Lisbon Strategy defined 16 core indicators and five benchmarks for measuring the progress in education.

²⁰ Tertiary graduates are those that have successfully completed the education programmes that result in obtaining a certificate or diploma (bachelor's or master's degree or a doctorate)

education in the SEE ranged from 2.5% in Serbia (2001) to 4.5% in Croatia (2003). Despite of some efforts and changes which has been made in education policies across countries of the SEE, expenditure on tertiary institutions as a share of GDP is still low, with the exception of Croatia. However, it could only partly the reason for the lack of incentive to improve efficiency of education systems. Reforms are needed both in functioning of the sector as well as in its funding mechanisms.

3 Conclusions

The paper leads to the conclusion that interaction between research, education and innovation is a driving force for economic development of SEE region. It contributes to rising of competitiveness by providing highly skilled labour force and by creation, transfer and adaptation of knowledge. The SEE countries lag behind the EU- 27 level in terms of productivity and expenditures in R&D, human resources, infrastructure, cohesion and overall competitiveness, while the process of catching up is slow. There is a problem of brain drain in science and research while the level of participation of the region in the EU programmes supporting research and development is still low. The education and training systems in most of the SEE countries need to pass through deep reforms. The region lacks skilled labour force with higher education; dropout rates in higher education are huge while the graduation rates are low. Public expenditure on R&D and on tertiary education as a share of GDP is low.

The priority in R&D development is to increase the private funding, while public R&D funding needs to be more effectively targeted. Reform efforts should be addressed to research infrastructure, improvement of human potential, support for young researchers, institution building, promotion of joint RTD activities of mutual benefit and regional impact. It is important to stimulate cooperation between the EU member states and SEE countries, leading to introduce the SEE countries into the European Research Area. Furthermore, it is necessary to strengthen regional scientific and innovation cooperation, transfer of knowledge through mobility's and supporting networks of scientists and engineers, building excellence in the region and support cross-border regional clusters of knowledge and innovation. Introducing integrated approach to reforms in education, training, research and innovation (a shift from fragmented to integrated approach of the region) would be a crucial step forwards to increase investment in human capital,

facilitate innovation and promote a more entrepreneurial culture.

However, disparities in development of research, education and innovation policies within the region are huge. Croatia is the best performing country according to most of the indicators, being the forerunner among the SAP countries in the EU accession process. In this respect, Croatia could play important role in transferring the knowledge to other countries and thus contribute to speed up the process of integration of the region into the EU.

Tables

Country	2005	2006	2007
Albania	22	23	24
Bosnia and Herzegovina	25	27	29
Croatia	50	52	54
Macedonia, FRY	28	29	30
Montenegro	31	35	41
Serbia	32	33	33
SAP average	31	33	35
Turkey	40	42	45
Island	130	123	121

Table 1: The EU candidate and potential candidate countries development level GDP per capita (PPS), in %, EU-27 = 100
Source: IMF, World Economic Outlook (2009), Eurostat

Country	Overall ranking		Higher education and training ranking		Innovation ranking	
	2007-08	2009-10	2007-08	2009-10	2007-08	2009-10
Albania	109	96	103	90	131	126
Bosnia and Herzegovina	106	109	98	86	121	131
Croatia	57	72	46	56	50	61
Macedonia, FYR	94	84	75	70	92	92
Montenegro	82	62	79	57	104	56
Serbia	91	93	82	76	78	80
Bulgaria	79	76	66	60	88	91
Romania	74	64	54	52	76	70
Slovenia	39	37	24	19	30	29

Table 2: Global Competitiveness Index - ranking the countries in the SEE and the CEE according to performance in education and innovation
Source: The Global Competitiveness Report 2009-2010, and 2007-2008, World Economic Forum

Note: Global Competitiveness Report 2007-2008 is based on survey and data of 131 countries, while for 2009-2010, N=133.

Country (N = 133)	Availability of latest technologies		Firm-level technology absorption		Internet users (hard data)		Personal computers (hard data)		Broadband Internet subscribers (hard data)	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Albania	105	4.1	100	4.3	80	15.0	91	3.8	80	1.1
Bosnia and Herzegovina	122	3.7	131	3.5	50	33.2	79	6.2	56	4.8
Croatia	61	5.0	102	4.2	36	49.3	31	33.8	41	11.5
Macedonia, FYR	103	4.1	127	3.7	42	42.9	30	36.8	45	8.8
Montenegro	75	4.7	92	4.4	40	46.8	n/a	n/a	59	4.3
Serbia	114	3.8	125	3.7	69	23.9	46	18.3	58	4.6

Table 3: Selected indicators of the technological readiness in the SEE and the CEE countries

Source: The Global Competitiveness Report 2009-2010, WEF 2009.

Country	Final Index				Sub indexes			
	Rank		Score		Information Society		Innovation and R&D	
	2006	2008	2006	2008	2006	2008	2006	2008
Greece	23	23	4.19	4.10	3.17	3.18	3.77	3.85
Croatia	25	24	3.93	4.10	3.69	3.69	3.32	3.41
Italy	24	25	4.17	4.05	4.06	3.83	3.73	3.76
Montenegro	31	26	3.14	3.96	2.94	3.27	2.80	3.15
Romania	28	27	3.59	3.84	3.21	3.70	3.17	3.30
Turkey	26	28	3.92	3.82	3.22	3.34	3.27	3.25
Poland	27	29	3.76	3.76	3.32	3.18	3.57	3.51
Bulgaria	29	30	3.31	3.68	3.09	3.57	2.92	3.04
Macedonia, FYR	30	35	3.28	3.53	2.79	3.17	2.51	2.78
Serbia	31	37	3.14	3.44	2.94	3.20	2.80	3.00
Albania	-	41	-	3.12	-	2.70	-	2.37
Bosnia and Herzegovina	-	44	-	3.12	-	2.83	-	2.43
EU25 average	-	-	4.84	-	4.58	-	4.24	-
EU27 average	-	-	-	4.73	-	4.53	-	4.18
EU15	-	-	-	5.07	-	4.86	-	4.62

Table 4: Comparative ranking the scores of the EU and the SEE countries according to selected Lisbon criteria (2006 and 2008)

Source: World Economic Forum. The Lisbon Review 2006. Measuring Europe's Progress in Reform. World Economic Forum. The Lisbon Review 2008. Measuring Europe's Progress in Reform.

Note: WEF ranking 2006 (N = 31) included EU and SEE countries only, while the WEF ranking in 2008 (N=44) encompassed EU, SEE and Central Asian economies.

Country	Gross domestic expenditure on research and development relative to GDP (%)						
	2000	2001	2002	2003	2004	2005	2006
EU-27	1.86	1.87	1.88	1.87	1.83	1.84	1.84
Croatia	1.23	1.07	1.11	1.11	1.22	1.01	0.87
Macedonia, FYR	0.44	0.32	0.26	0.23	0.25	0.25	:
Turkey	0.64	0.72	0.66	0.61	0.67	0.79	0.76
Montenegro	0.85	0.75	0.75	0.80	1.02	:	:

Table 5: Expenditure on research and development (R&D) in the SEE
Source: Pocketbook on candidate and potential candidate countries, 2009 edition. EUROSTAT

Country	Applicants				EC contribution				EC contribution per applicant	
	No.		Success rate		€ millions		Success rate		€ thousand	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
AL – Albania	7	6	8,2%	18,2%	0,4	0,2	5,2%	8,5%	58,7	33,0
BA – Bosnia-Herzegovina	7	5	6,8%	17,9%	0,6	0,2	6,5%	12,0%	84,2	33,9
CH – Switzerland	692	443	24,4%	27,0%	246,5	178,9	24,4%	30,7%	356,2	403,8
HR – Croatia	68	36	17,5%	14,6%	9,1	8,1	14,6%	15,1%	134,0	225,0
IL – Israel	277	187	19,1%	21,1%	87,1	61,8	17,2%	13,6%	314,5	330,3
IS – Iceland	38	26	22,5%	26,3%	8,8	6,3	19,7%	21,6%	230,6	242,9
LI – Liechtenstein	1	2	5,3%	25,0%	0,4	0,4	8,7%	24,9%	375,6	198,1
ME – Montenegro	8	10	15,7%	34,5%	0,4	0,5	9,1%	12,4%	49,9	48,9
Macedonia, FYR	20	16	15,6%	20,3%	2,4	3,3	14,2%	17,8%	119,0	206,8
NO – Norway	332	221	22,6%	23,8%	97,0	70,8	19,7%	21,1%	292,2	320,5
RS – Serbia	50	29	12,8%	12,9%	11,3	4,2	13,3%	7,3%	225,1	145,7
TR – Turkey	141	114	12,7%	13,0%	25,2	14,9	8,9%	3,3%	178,4	130,8
Total	1.641	1.095	20,0%	21,5%	489,1	349,6	19,4%	17,6%	298,0	319,3

Table 6: Participation in FP7 projects and corresponding success rates for FP7 calls concluded in 2007 and 2008
Source: Second FP7 Monitoring Report. Monitoring Report 2008. European Commission, 2009.

Country (N = 133)	Capacity for innovation		Quality of scientific research institutions		Company spending on R&D		University-industry collaboration in R&D		Availability of scientists and engineers	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Albania	120	2.3	128	2.5	126	2.3	133	2.2	115	3.2
Bosnia and Herzegovina	121	2.3	126	2.6	122	2.4	130	2.3	122	3.1
Croatia	52	3.2	50	4.1	49	3.2	61	3.5	80	3.9
Macedonia, FYR	86	2.7	90	3.4	114	2.6	78	3.3	81	3.9
Montenegro	71	2.9	47	4.1	59	3.1	54	3.6	65	4.2
Serbia	82	2.8	54	4.0	110	2.6	81	3.3	77	4.0

Table 7: Performance of countries in the SEE and the CEE in innovation (selected indicators)

Source: The Global Competitiveness Report 2009-2010, WEF 2009.

Country (N = 133)	Secondary enrolment (hard data, 2007)		Tertiary enrolment (hard data, 2007)		Quality of the educational system		Quality of math and science education		Local availability of specialized research and training services	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Albania	91	76.7	85	19.1	63	3.7	59	4.2	110	3.2
Bosnia and Herzegovina	75	85.5	56	36.9	114	2.8	31	4.8	130	2.8
Croatia	54	91.7	47	45.8	75	3.5	33	4.8	54	4.2
Macedonia, FYR	79	84.3	60	35.5	59	3.7	57	4.3	101	3.4
Montenegro	76	85.5	52	41.1	43	4.1	32	4.8	64	4.0
Serbia	67	87.9	59	35.8	71	3.6	43	4.7	90	3.6

Table 8: Performance of the SEE countries in higher education and training (selected indicators)

Source: The Global Competitiveness Report 2009-2010, WEF 2009.

	2002	2003	2004	2005	2006	2007
EU-27	17.1	16.6	15.9	15.5	15.2	14.8
Croatia	8.3	8.4	6.2	4.8	5.1	3.9
Macedonia, FRY	32.2	:	:	:	:	:
Turkey	54.8	53.0	54.6	51.3	50.0	47.8
Serbia	:	:	11.5	11.4	12.6	10.7

Table 9: Proportion of the population aged 18-24 having not completed upper secondary education (currently not in any education or training, in %)

Source: Pocketbook on candidate and potential candidate countries. 2009 edition. EUROSTAT

Country	2000	2001	2002	2003	2004	2005	2006	2007
EU-27	76.6	76.6	76.6	76.9	77.2	77.5	77.9	78.1
Croatia	:	:	90.6	91.0	93.5	93.8	94.7	95.4
Mace- donia, FRY	:	:	65.4	:	:	:	:	:
Turkey	38.9	40.4	42.8	44.9	41.8	43.9	44.6	46.5
Serbia	:	:	:	:	88.1	89.0	86.8	89.0

Table 10: Proportion of the population aged 20-24 having completed at least upper secondary education (%)

Source: Pocketbook on candidate and potential candidate countries. 2009 edition. EUROSTAT

Male (per 1 000 population aged 20-29)											
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
EU-27	:	12.3	12.8	13.7	14.5	15.1	16.3	16.9	17.9	17.6	:
Croatia	:	:	7.6	7.4	7.0	7.8	6.4	7.0	7.5	7.6	8.7
Macedonia, FYR	4.7	4.1	4.2	3.5	3.3	3.7	3.5	3.7	3.9	3.6	:
Turkey	4.6	5.2	5.6	5.9	6.3	6.7	7.0	7.6	8.0	:	:
Montenegro	:	:	:	:	:	:	3.1	4.6	5.0	4.6	3.6
Serbia	6.7	7.2	7.2	7.2	7.3	7.5	7.4	8.3	:	:	:
Female (per 1 000 population aged 20-29)											
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
EU-27	:	5.2	5.6	6.2	6.6	7.0	7.7	7.9	8.4	8.4	:
Croatia	:	:	3.7	4.8	4.1	3.4	3.5	3.6	3.8	4.3	4.8
Macedonia, FYR	2.8	3.1	3.1	2.6	2.6	2.7	2.6	3.1	3.4	3.2	:
Turkey	1.9	2.3	2.8	2.8	3.0	3.1	3.3	3.5	3.3	:	:
Montenegro	:	:	:	:	:	:	1.8	2.3	2.5	3.9	2.4
Serbia	4.5	4.8	4.5	4.9	5.4	5.4	5.4	6.2	:	:	:

Table 11: Tertiary graduates in science and technology

Source: Pocketbook on candidate and potential candidate countries. 2009 edition. EUROSTAT

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
EU-27	:	:	4.7	4.9	5.1	5.1	5.1	5.0	:	:
Croatia	:	4.2	4.5	4.2	4.3	4.5	:	:	:	:
Macedonia, FYR	:	:	:	:	3.4	3.4	:	:	:	:
Turkey	3.3	3.1	3.5	3.7	3.6	3.7	4.1	:	:	:
Montenegro	:	:	:	:	:	:	:	:	:	:
Serbia	3.3	2.7	2.5	2.5	3.0	3.8	3.5	:	:	:

Table 12: Spending on human resources (public expenditure on education) as a proportion of GDP (%)

Source: Pocketbook on candidate and potential candidate countries. 2009 edition. EUROSTAT

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