2.4. The rise of science and innovation in world regions (Asia, Latin America, Africa, Central and Eastern Europe transition countries, Australia and New Zealand): change and diversity.

Science & Technology Sector in the BSEC Member States: Latest Evolution

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The Organization for Black Sea Economic Cooperation (BSEC) was established in June 1992 in Istambul, when presidents or government heads of the eleven countries, namely, Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russian Federation, Turkey and Ukraine, signed the Declaration and the Bosporus Statement, launching the Black Sea Economic Cooperation. The goal, fixed by these countries, was to make the Black Sea a region of peace, freedom, stability and prosperity, thus reflecting their commitment to the principles of the Helsinki Act and other decisions of the Council for Security and Cooperation in Europe to foster cooperation in the Black Sea region in the basis of common values.

The BSEC can be viewed as one of the significant international entities in Europe and the world by many parameters, such as the total number of its population (340 mln.); the geographic size (19,200,000 km^2); mineral and human resources; facilities available in the industry, agriculture, science & technology, services and other economic sectors.

The BSEC was, above all, created as a response to globalization threats stemming from widening the technological gap between the part of the world that developed from the Western Christian civilization and over the several latest centuries, due to the development specifics, could gain technological and, therefore, political dominance over the other world. Planned & administrative (socialist) scheme imposed on the most of the BSEC Member States, proved to be not only ineffective tool for preventing on these threats, but principally unviable. As soon as it broke down, these countries faced the very same challenge: either to stay at the technological "periphery" with all involved consequences or to embark on a qualitatively new level of development, by employing inner mechanisms for systemic transformations and coordinated effort. In the science & technology (S&T) context, it would require introducing the innovation-driven economic model.

A study of the evolution of the science & technology sector of the four member states of the Organization of the Black Sea Economic Cooperation (BSEC), Russia, Romania, Greece and Turkey, over the period of 1995-2007, is contained in the paper. The study is a continuation of the international project FP6-510665 "Research Potential of the Black Sea Countries" [1,2].

The results of the project allowed to have a quite extensive characteristic of the science institutions and science & technology sector in the BSEC region, by tracing their evolution and transformations since their rise in ancient Greece till late XX – early XXI century, to identify

their advantages and weaknesses now, to evaluate their capacities for building up the common research and innovation area in the region and integration in the European research and innovation area.

Due to historical specifics of the BSEC member states, the beginning of XXI century can well be regarded as the transformation "landmark" in each of them, with stable economic growth recorded across the BSEC region, and conceptualization and legal enforcement of the National Innovation System (NIS).

Yet, as far as the science & technology sector is concerned, this "landmark" was passed by the BSEC region with the following characteristics:

1. Low (if not extremely low) science & technology intensity when measured by the share of R&D expenditures in GDP, which, although displaying a positive dynamics, cannot promise quick bridging of the gap between the BSEC region and developed nations.

2. Focus of the science & technology sector in the post-socialist segment of the BSEC on R&D supply rather than R&D demand, given poor effective R&D demand. It resulted from the consensus between science & technology communities and power bodies in the post-socialist segment of BSEC member states and was embedded in science & technology policies as an instrument for "preservation and survival" of the science & technology sector in times of systemic crisis accompanied by reductions in R&D inputs and outputs. According to expert opinions (see, for example, [3]), focus on R&D supply failed to consolidate the science & technology sector of these countries, which still remains in the fragmented condition (or in fragmentation phase, according to the transformation model elaborated in [4, 5]).

3. Disparity between the scientific specializations revealed through analysis of political documents and empirical analysis of bibliometric data, that is, between claimed and actual priorities. It indicates that the BSEC member states have failed to restructure research fields, and priority setting in the BSEC member states is still nothing more than a chain in the decision-making, meant to show political intentions to restructure national R&D in favor of new and advanced research fields.

Follow up of earlier studies on science & technology sector in the BSEC region, in order to monitor and measure its dynamics and further evolution, seem to be relevant because the abovementioned parameters go contrary to the tendencies in developed countries of Europe and other world.

The method is based on the following sources of data:

1. OECD Database on Main Science and Technology Indicators. The method could be implemented once the database covered the group of selected countries that are not OECD members. Hence, apart from Greece and Turkey, data for Russia and Romania are now available for analysis. Due to the full access to comparable data on the four BSEC member states accommodating major economic and science & technology resources of the BSEC region, results of the study can be representative enough for the whole BSEC region.

2. European Innovation Scoreboard (EIS) 2009. Comparative analysis of innovation performance. Apart from data on the EU member states (EU-27) and selected non-member countries, including Turkey, the source contains information on BRIC countries (Brasilia, Russia, India, China), thus allowing to extract information about Russia.

3. Science and Innovation Activity in Ukraine. This is Annual statistical book for comparative analysis Ukraine with others BSEC member states.

For developed countries of Europe and other world, where the NIS has supposedly been established, a close correlation exists between (i) the share of the business enterprise sector as an

R&D performer and the share of R&D expenditures in GDP, (ii) the share of the industry as a source of R&D financing and the share of R&D expenditures in GDP, (iii) the share of the industry as a source of R&D financing and the share of the business enterprise sector as an R&D performer. Therefore, study of the evolution of science & technology sector in the abovementioned BSEC countries is focused on indentifying the analogous correlations, on the assumption that the closer the correlations, the better are the capacities for building up the NIS.

For this purpose, the following indicators are selected from the OECD database: R&D financing by source (government, industry, other national sources, abroad); R&D performers by sector (business enterprise, universities, government, private non-profit); financing of R&D performed by business enterprise sector, by source of financing.

Also, indicators of R&D resources in business enterprise sector are taken: R&D expenditures of business enterprise sector; number of researchers in business enterprise sector (FTE); the share of researchers in business enterprise sector in the total number of researchers; researchers in business enterprise sector per 1,000 of employment in the industry.

For analyzing the disciplinary structure of R&D performed in business enterprise sector, the indicator of R&D performed in business enterprise sector, by industry, is taken.

The above measures for the five selected BSEC member states are thereafter compared, when possible, with corresponding EU and OECD averages, and with analogous measures for individual countries of Europe and other world, selected as "standards" for the comparison.

The study shows the real evolution of the science & technology sector in each of the five BSEC member states from the perspective of R&D supply and R&D demand, whereas their comparison by individual indicators allows to group them by the evolution profile. Comparisons with EU and OECD averages, and with selected countries of Europe and other world, taken as "standards", allow for conclusions about the future of the BSEC region from science & technology, innovation and integration perspective.

Results of the study are given in the paper.

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