

## Science & Technology Policy of the Republic of Croatia 2006. - 2010. Priority Goals and Strategy of Development

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Survey\*

*The documents "Science and Technology Policy of the Republic of Croatia 2006 - 2010" and "Action Plan" were adopted by the Government of the Republic of Croatia towards the end of 2006 as the key instruments for restructuring, development and modernization of science and technology in the Republic of Croatia by the end of 2010. The Croatian science, technology and innovation policy must be compatible with that of the EU and Lisbon Strategy (LS) as the underlying document for national strategies of member countries. This strategy conveys two major goals: stronger and more stable economic growth, which further implies opening of a larger number of high-quality jobs. It is an imperative to strengthen the competitiveness of national economies, and concrete measures are specified to achieve these goals. The mentioned Croatian documents analyze the existing state and long-term and short-term development priorities in the field of scientific research, innovation and technological activities in the Republic of Croatia as well as measures that will ensure the realization of the strategy and conveyed goals. In that context concrete implementation elements and measures are pointed out, and appropriate supervising bodies of the Republic of Croatia have been established, which will continuously supervise and ensure the implementation of proposed measures at the national and local level and at the level of each research, educational and technological subject in the Republic of Croatia, respectively.*

### 1. Background and rationale

On the session of the Government of the Republic of Croatia on May 5, 2006 was adopted the document "Science and Technology Policy of the Republic of Croatia 2006 - 2010" [1]. This strategic document presents a vision of the development of the Science and Technology sector in the Republic of Croatia, upon which the speedy development and qualitative changes enabling the transformation of Croatia into a „society based on learning". To realize this goal the successful implementation of the Science and Technology Policy, as well as changes in the education system, is necessary.

Admission into full membership of the EU community of states is Croatia's national interest and the Croatian science, technology and innovation policy must be compatible with that of the EU. The underlying EU document for national strategies of member countries is the *Lisbon Strategy* (LS). This Strategy conveys two major goals: stronger and more stable economic growth, which further implies opening of a larger number of high-quality jobs. The *Action Plan* (EC SEC 2005, 192 working document) emphasizes:

- coherence of innovation policies
- regulatory framework conducive to innovation
- encouragement of creation and growth of innovative enterprises
- improvement of the key interfaces in the innovation system
- society open to innovation.

The *Action Plan* (EC SEC 2005, 192 working document) covers ten major goals, wherein, under the common title "Knowledge for Growth", the following are listed [2]:

- Increase and improvement of investments into knowledge, research and development
- Stimulation of innovation, expanding the use of information and communication technologies, and sustainable use of resources
- Knowledge-based society must strive towards realization of a healthy economy.

The Croatian S&T and innovation policy must be compatible with that of the EU but also take into account the specifics of the Croatian situation.

Within the policy of increasing investments into research and development, the *Lisbon Strategy* [3] anticipates increase of funds for research

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and development in individual member countries, as well as achieving the goal of 3% GDP allocation at EU level. It further anticipates improvement of off-budget and public investment ratio to 2:1. These goals are incorporated into and are the basis of the Croatian national programme for research and development, denoting a country which entirely belongs to the European cultural and economic sphere, and sees its place exclusively in the community of European states.

## 2. Basic gap analysis of current National Innovation System (NIS), challenges

The main selected deficiency in field of national science & technology and innovation system are:

- Croatian science and technology system (S&T) should globally be more competitive and contribute more towards development;
- No NIS-like systems approach exists, no clear rules apply, no precise objectives and indicators to proceed with;
- S&T policy and innovation policy not a major component in the overall development policy;
- Very little interaction between public S&T and economy (industries, SMEs), the interaction needs to evolve from R&D sponsorship to forms of mutual participation in common projects with common interest, which should also be supported by the regulatory framework;
- Insufficient and unfocused funding of S&T, results not evaluated or monitored properly;
- Under-equipped public S&T network;
- Little direct demand and funding from SMEs and industry, low investment into R&D from the business sector;
- Academic curricula not flexible and insufficiently correlated with the needs of the economy;
- Very little mobility, both within public S&T system and between public S&T and industry;
- Insufficient presence in international S&T cooperation;
- Insufficient direct commercial impact of the public S&T investments and funding;
- Low level of patent applications, low commercial exploitation;
- Low commercial exploitation of IT, limited e-economy.

The following indicators were selected for the monitoring of implementation and assessment of impacts of this Action plan:

### A. R&D supply:

- R&D expenditure as percentage of GDP, GERD  
*currently: 1,22% (2004)*  
*target: 10% annual increase*
- Number of researchers (FT) per 1000 labour force  
*currently: 3,8 (2003)*  
*target: 10% annual increase*
- Number of patent applications to the EPO per million labour force  
*currently: 48,8 (2002)*  
*target: 5% annual increase*
- Number of CC/SCI publications per 1000 R&D employees  
*currently:*  
*target: 10% annual increase*
- Number of Science & Engineering (SE) graduates per 1000 population aged 20-29  
*currently: 5,4 (2004): women 3,6 (2004)*  
*target: 12% annual increase*
- Number of S&E PhDs per 1000 population  
*currently: 3,5*  
*target: 10% annual increase*

### B. Absorption capacity & demand:

- R&D and innovation expenditure of companies as percentage of GDP, BERD

*currently: 0,52% (2004)*

*target: 15% annual increase*

- Number of employees participating in lifelong learning  
*currently:*  
*target: 20% annual increase*
- Number and value of R&D contracts between SMEs or industry and universities or RTOs  
*currently:*  
*target: 20% annual increase*
- Number of S&T start-up SMEs  
*currently:*  
*target: 18% annual increase*
- Percentage of total employees in high-tech service sector  
*currently: 3,29 (2005)*  
*target: 15% annual increase*
- Percentage of employees in high-tech manufacturing and industries  
*currently:*  
*target: 10% annual increase*
- Sales of new-to-market or new-to-company products as percentage of total sales  
*currently:*  
*target: 10% annual increase*
- High-tech exports – exports of high-technology products as a share of total exports  
*currently: 11% (2004)*  
*target: 10% annual increase*
- Number and value of participation of Croatian researchers in international R&D projects  
*currently:*  
*target: 24% annual increase*

## 3. Implementation Instruments and Budget Allocation

The MSES, as creator of this policy, will utilize its funding instruments to achieve the following goals:

### 3.1. Research grants

Since 2006 new scientific research projects have been started, as well as programmes for clustering scientific research and conducting it according to areas of interest for the Republic of Croatia. The main criteria for the evaluation of projects and programmes, encompassing participation of foreign and domestic evaluators, is excellence.

### 3.2. IT grants

Financing projects related to resolving practical problems in different areas of scientific research, by use of information technology. For these projects there is a special competition, organized by the Ministry of Science, Education and Sports.

### 3.3. Equipment grants

This form of support is aimed at procurement of small, medium and large-scale (capital) scientific-research equipment, through a special tender for equipment. This support is aimed at reinforcing the research infrastructure in Croatia.

### 3.4. Fellowships for early stage researches and international mobility grants

These are programmes that help young competitive researchers to carry out their work at home or abroad, by participating in international conferences or study tours at eminent international institutions.

### 3.5. Aid for publishing activity, conferences and associations

This form of support helps develop domestic scientific and specialized publishing, aids the promotion of science, and the creation of networks of professionals.

In addition, the MSES is the initiator of a legal framework change. At present the MSES is leading a public debate on the proposed amendments to the Act on Scientific Activity and Higher Education. Proposals are underway for the engagement of the Ministry of Finance in encouraging investments in R&D.

The MSES also plans to establish a fund to carry out a public awareness campaign in order to support changes of S&T image and general attitude towards S&T in public, as well as funding to support efficient use of S&T in the decision making process.

In order to employ all domestic potential and ensure better cooperation between the S&T sector and Government decision-making bodies, a number of expert teams, comprising experts from institutes and universities, will be formed. The teams will act as advisory bodies, to support the decision making process in all relevant ministries. The key role have: *National Science Council* (NSC) which will help in restructure Croatian science and develop centers of excellence. Further key body is The National Foundation for Science, Higher Education and Technological Development (NFS). With its current funds of €15 million and a yearly income of €1.4 million they will support excellence in research. Currently, through:

- *Support for Croatian scientists in joining European Science Foundation Programmes,*
- *Training of doctoral students,*
- *Promotion "Partnership in Basic Research",*
- *Establishing SCIENCE award,*
- *Reform of the educational system in Croatia,*
- *Support Programme "Brain Gain".* The "Brain-Gain" programme aims to repatriate Croatian

scientists living abroad, permanently or temporarily.

Furthermore, public institutes should take on a key role of accredited institutions for public tasks like toxicology evaluation, risk assessment, standardization and measurements, animal disease diagnostics, food quality, safety control, etc.

## 4. Recognizing and Developing Priority Areas

For Croatia, the priorities that enables globalization of knowledge, scientific propulsion, economic efficiency based on the values of a human society and those that directly support rapid progress of basic sectors of the economy, are the most promising. On 25 October 2005 the National Council for Science accepted strategic research priorities in the long term (2005-2010) and short term (2005-2008), proposed by the Ministry of science, education and sports expert group. Some of these priorities are of national interest and others are in line with EU Framework programmes (especially FP6 and FP7).

The long-term priorities are:

- Knowledge-driven basic research
- Environmental protection and economic development of the Karst regions; Adriatic sea, coast and islands
- Agriculture; Biotechnology; Food
- Health
- Information and communication technologies
- Nanoscience; New materials, construction and new production processes
- Energy; Sources of alternative and renewable energy; Transport and security
- Social and human sciences; Croatian identity
- Social integration, learning and education; Lifelong learning.

The short-term priorities are:

- Environment (Adriatic sea, coast and islands; Karst region)
- Health (Food; Agriculture; Biotechnology; Social aspects of health; Health systems)
- Energy and Materials (Alternative and renewable energy; Bio-nanomaterials)
- Croatian Identity (Croatian contri-

bution to culture, religion, art and sciences;

Croatian language).

Within these priorities Croatia should identify, encourage and develop highly specialized niches, through which it would become recognizable in the global knowledge society and be competitive in the world market.

## 5. Conclusion

The presented S&T Policy of the Republic of Croatia is the key instrument for restructuring, develop-

ment and modernization of science and technology in the Republic of Croatia. In according to this document, the Government of the Republic of Croatia has prepared a detailed Action Plan, in order to define the priorities in implementation. Furthermore, the Government established a permanent governmental body, headed by the Prime Minister, which will continuously supervise and ensure the implementation of proposed measures at the national and local level and at the level of each research, educational and technological subject in the Republic of Croatia, respectively.

## References:

- [1] Science & Technology Policy of The Republic of Croatia 2006 - 2010; [http://www.hatz.hr./policy\\_2010.pdf](http://www.hatz.hr./policy_2010.pdf)
- [2] Action Plan 2007- 2010; [Action\\_Plan\\_STpolicy\\_18062007\\_ENG.pdf](#)
- [3] Lisbon Strategy: [http://www.europa.eu.int/comm/lisbon\\_strategy/pdf/COM2004\\_029\\_en.pdf](http://www.europa.eu.int/comm/lisbon_strategy/pdf/COM2004_029_en.pdf)