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A new Candidate to EU Accession  
Croatia  
“S&T developments”

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*Printed in Belgium*

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# 1. INTRODUCTION

Croatia participates in the 6<sup>th</sup> Framework Programmes of the European Communities for research and technological development as a third country.

Following the decision of Head of States and Governments, on June 18, 2004, Croatia is now offered a status of “Candidate Country” to the European Union. The coming negotiations will aim at having Croatia recognising, accepting and adopting the *acquis communautaire* .



Due to its specificity, the *acquis* in the field of science and research does not require any transposition in the national legal order. Implementation capacity does not relate to the application and enforcement of legal provisions but rather to the existence of the necessary conditions for effective participation in the Framework Programmes. In order to ensure the successful implementation of the *acquis* in this domain, notably the successful association to the Framework Programmes, Croatia will need to create the necessary implementing capacities in the field of research and technological development including an increase of the personnel related to Framework Programmes’ activities.

In Croatia, science and research is under the authority of the Ministry of Science, Education and Sport (MSES). Advisory bodies for issues of science and higher education are the National Science Council and the National Council for Higher Education. Basic legislation in this sector is the Act on Scientific Activity and Higher Education adopted in July 2003. The technology policy is formulated in the Croatian Programme for Innovative Technological Development.

The Government Expenditure on Research and Development (GERD) was 1.09% of GDP in 2001 (EU: 1.99% of GDP). Estimated business expenditure equals between 32-45% of the amount allocated for RTD from the state budget. The Croatian research system consists of 6 universities, 26 public institutes, 11 research centres in the industry sector, 18 schools of professional higher

education, 8 polytechnics, 1 military research centre and 50 others scientific research legal entities.

Full participation in the Framework Programmes should be the first step towards the implementation of the *acquis* in the field of research and requires the development of research policy, infrastructure and the appropriate institutional set-up. It also depends on budgetary availability for the payment of the association fee.



The prospects for integrating science and technology in Croatia into the European Research Area are defined by the Strategy for Development of Science in the Republic of Croatia in the 21<sup>st</sup> Century and the Act on Scientific Activity and Higher Education. These documents foresee radical changes in order to create an efficient and stimulating system of science and technology based on the EU model. Integration into the European Research Area is supported through the EU and other European Research Programmes and Initiatives (FP 6, COST, EUREKA, CARDS). The TEMPUS programme supports the integration into the European Higher Education Area.

This brochure is presenting some general information on Croatia and on its S&T policy and basis.



## 2. A PROFILE OF CROATIA



### 2.1. General information

Croatia is located in Southeast Europe. It borders Bosnia and Herzegovina, Slovenia, Hungary, Serbia and Montenegro. Croatia has also a 948 kilometres long maritime border with Italy, Slovenia and the FRY/Montenegro. Its area is 56,538 sq. km., and the area of the coastal sea about 31,900 sq.km. In July 2002 Croatia's population was estimated at approximately 4.4 million. The currency unit is KUNA : € 1 = 7.636660 7.58 Kn (December 2003).

#### Political Framework:

The 1990 Constitution was revised in November 2000, changing the semi-presidential system into a full parliamentary system. Under the revised Constitution, legislative power rests in the Parliament or Sabor (referred to, until March 2001, as the House of Representatives), a 151-member unicameral body elected by direct popular vote for four-year terms.

The executive power is held by the President (Stjepan MESIĆ, since February 2000) and by the Prime Minister (Ivo SANADER, since December 2003). The president is the chief of state, elected by popular vote for a five-year term. The Prime Minister is the head of the Government. The members of the Government are nominated by the Prime Minister and approved by the Parliament.

(Croatian Government <http://www.vlada.hr>)



*Stjepan MESIĆ*

The Supreme Court and the Constitutional Court represent the judicial branch in Croatia. Judges for both courts are appointed for eight-year terms by the Judicial Council of the Republic of Croatia, which is elected by the Parliament.

Units of local self-government are municipalities and towns. Units of regional self-government are counties. Croatia is divided into 20 counties (“županije”, “županija” - singular) and 1 city (“grad” – singular). The capital city of Croatia is Zagreb.

## **2.2. *The National Economy***

Before the dissolution of Yugoslavia, the Republic of Croatia was, after Slovenia, the most prosperous and industrialised area of former Yugoslavia, with a GNP (Gross National Product) per capita of US \$ 3,729 in 1989. The break-up of Yugoslavia and the conflicts that followed Croatia’s declaration of independence in 1991 severely damaged the Croatian economy, bringing about an estimated 40% fall in the country’s real GDP (Gross Domestic Product) between 1989 and 1993.



The economic stabilisation programme introduced by the government in 1993 reduced the inflation to 3 – 4% per annum in 1994. The currency – Kuna (HRK)

– has remained stable, foreign currency reserves are relatively large and industrial production is slowly picking up, with a growth rate of 6% in 2001.

With a GDP per capita above € 5,000 in 2001, Croatia remains well above the level of the other countries in the region. Croatia has been successful in further integrating its economy in regional and international trade. The country has, however, shown slow progress in implementing structural reforms, in particular those related to the labour market and public enterprises, thus affecting negatively the export performance.



In line with its obligations under the SAA (Stabilisation and Association Agreement), Croatia is making serious efforts to establish the necessary legislative framework for further institutional reforms. These, however, need to be accelerated, including the reform of the judiciary, which is crucial for the legal security of enterprises.

## 2.3. Leading Economic Indicators 2003

			1997	1998	1999	2000	2001	2002
Population, mid-year estimate		thousands	4 572.0	4 501.0	4 554.0	4 381.0	4 437.5	4 437.5
Gross domestic product *	market prices	million HRK	123	137	141	152	162	176
		million USD	810.7	603.7	579.1	518.8	909.0	429.0
	growth rates	%	20	21	19	18	19	22
	per capita	USD	108.6	628.0	906.0	427.3	535.6	435.8
Industrial output growth rates	%	6.8	2.5	- 0.9	2.9	3.8	5.2	
Retail prices growth rates, end of year	%	4 398.2	4 805.1	4 371.1	4 206.2	4 402.4	5 056.0	
Costs of living growth rates, end of year	%	6.8	3.7	- 1.4	1.7	6.0	5.4	
Manufacturing producers' prices growth rates, end of year	%	3.8	5.4	4.4	7.4	2.6	2.3	
Unemployment	unemployed persons, thousands	annual averages	277.7	287.8	321.9	357.9	380.2	389.7
	unemployment rates, %	annual averages	17.5	17.2	19.1	21.4	22.3	22.5
External debt, end of year *	million USD		7 451.6	9 683.3	9 977.9	11 054.8	11 316.6	15 283.7
CNB international reserves, end of year *	million USD		2 539.1	2 815.7	3 025.0	3 524.8	4 704.2	5 885.8
Commercial banks' foreign exchange reserves, end of year *	million USD		2 291.3	1 885.2	1 350.2	2 152.9	3 577.4	2 688.7
CNB midpoint exchange rates, end of year	HRK / EUR	/	6.9472	7.3291	7.6790	7.5983	7.3700	7.4423
	HRK / USD	/	6.3031	6.2475	7.6477	8.1553	8.3560	7.1457
Foreign direct investment, total since 1993 *	million USD		1 438.2	2 378.2	3 845.8	4 934.5	6 493.9	7 474.4
Commodity exports *	in USD	million USD	3 981.3	4 517.2	4 302.5	4 431.6	4 665.9	4 903.6
		year-on-year indices	85.7	113.5	95.2	103.0	105.3	105.1
	in HRK	million USD	24 509.6	28 728.3	30 711.9	36 785.1	38 916.6	38 421.4
		year-on-year indices	97.2	117.2	106.9	119.8	105.8	98.7
Commodity imports *	u USD	million USD	9 101.5	8 275.6	7 798.6	7 886.5	9 147.1	10 722.0
		year-on-year indices	116.9	90.9	94.2	101.1	116.1	117.2
	u HRK	million USD	56 201.8	52 688.7	55 712.7	65 572.8	76 425.5	83 888.1
		year-on-year indices	132.8	93.7	105.7	117.7	116.6	109.8
Percentage of imports covered by exports *	%		43.7	54.6	55.2	56.2	51.0	45.7
Trade balance *	million USD		- 5 120.2	- 3 758.4	- 3 496.1	- 3 454.9	- 4 481.2	- 5 818.5
Current account balance *	million USD		- 2 512.1	- 1 452.8	- 1 397.2	- 1 459.4	- 725.1	- 1 546.7
	% of GDP		- 12.5	- 6.7	- 7.0	- 2.5	- 3.7	- 6.9
			Q3 2002	Q4 2002	2002	Q1 2003	Q2 2003	
GDP growth rates compared with the same period of the previous year		%	6.5	5.9	5.2	4.9	5.0	
Current account balance *	million USD		1 002.7	- 955.2	- 1 605.8	- 996.9	- 1 269.9	

Foreign direct investment *		million USD	56.5	299.2	980.5	990.6		
			6, 2003 6, 2002	7, 2003 7, 2002	8, 2003 8, 2002	9, 2003 9, 2002	1-9, 2003 1-9, 2002	9, 2003 8, 2003
Industrial production		indices	107.1	104.5	103.1	102.9	105.2	...
Retail prices		indices	101.1	101.5	101.7	101.6	101.4	100.4
Costs of living		indices	102.3	102.9	102.8	103.2	101.9	100.6
Manufacturing producers' prices		indices	101.7	101.4	102.0	101.2	102.4	99.6
Retail trade	nominally	indices	113.1	109.5	107.9	108.1	112.2	95.5
	really	indices	112.4	108.4	106.5	106.3	111.1	94.9
			1-4, 2003	1-5, 2003	1-6, 2003	1-7, 2003	1-8, 2003	1-9, 2003
Commodity exports *	in USD	million USD	1 879.0	2 413.8	2 966.5	3 218.4	3 950.7	4 441.8
		year-on-year indices	129.0	127.0	131.1	125.9	126.2	124.8
	u HRK	million HRK	13 243.7	16 745.9	20 308.7	23 948.7	26 851.6	30 137.6
		year-on-year indices	107.3	105.1	108.4	105.7	106.6	106.1
Commodity imports *	in USD	million USD	4 130.5	5 448.4	6 604.5	7 989.9	8 967.2	10 188.3
		year-on-year indices	136.1	137.8	135.0	133.2	132.5	131.8
	u HRK	million HRK	29 084.9	37 710.5	45 171.6	54 301.8	60 880.6	69 065.3
		year-on-year indices	113.2	113.9	111.9	111.8	111.9	112.2
Imports covered by exports	%		45.5	44.3	44.9	44.0	44.1	43.6
	same period of previous year of %		48.0	48.1	46.3	46.6	46.2	46.0
Trade balance	million USD		- 2 251.5	- 3 034.6	- 3 638.0	- 4 471.5	- 5 016.5	- 5 746.6
	same period of previous year of million USD		- 1 577.9	- 2 053.6	- 2 627.9	- 3 204.4	- 3 639.1	- 4 171.9
			Apr 2003	May 2003	Jun 2003	Jul 2003	Aug 2003	Sep 2003
External debt, end of month *		million USD	17 413.0	18 995.0	18 559.7	19 207.8	18 710.7	...
CNB international reserves, end of month		million USD	6 524.1	7 003.5	6 772.2	6 663.5	6 624.1	7 058.5
Commercial banks' foreign exchange reserves, end of month *		million USD	2 601.4	3 149.0	3 232.3	3 569.7	3 404.9	3 821.5
CNB midpoint exchange rates, end of month	HRK	/	7.56730	7.54643	7.50884	7.54151	7.45789	7.57137
	EUR	/	8	4	4	3	6	0
	HRK	/	6.88939	6.36883	6.57401	6.59107	6.83520	6.63050
	USD	/	2	6	9	9	9	2
Unemployment	unemployed persons	thousands	345.3	330.9	319.7	314.2	306.6	307.4
	unemployment rates	%	20.4	19.6	18.9	18.5	18.2	18,3

Source: Central Bureau of Statistics, Croatian National Bank, Ministry of Finance\* revised data Zagreb, November 2003

## 3. EU-CROATIA RELATIONS

### 3.1. History of EU-Croatia Relations

**1997:** Regional Approach. The EU Council of Ministers establishes political and economic conditionality for the development of bilateral relations with Croatia.

**1999:** The EU proposes a new Stabilisation and Association Process (SAP) for the five countries of south-eastern Europe, including Croatia.

**2000:** Parliamentary and presidential elections in January 2000 result in a change of government in Croatian politics and usher in a new political climate. These changes have offered the opportunity for rapid progress in the relationship between Croatia and the European Union. The EU has responded by:

February: Establishment of an EU Croatia Consultative Task Force, which has provided Croatia with expertise and technical assistance in preparation for the SAP.

March: Upgrading the EC Office of the Special Envoy in Zagreb to a permanent delegation of the European Commission.

24 May: Adoption by the Commission of a positive feasibility report on the opening of negotiations for a Stabilisation and Association Agreement (SAA).

June: Feira European Council states that all the SAP countries are "potential candidates" for EU membership.

September: Extension of the duty-free access to EU market for products from Croatia.

20 November: Opening of negotiations for an SAA in the margins of the Zagreb Summit.

**2001:** First year of new CARDS programme specifically designed for the SAP countries.

**29 October 2001:** Signing of the SAA. The SAA provides for wide-ranging co-operation and will guide a gradual approach of Croatia to the EU structures. The SAA includes the establishment of a framework for political dialogue and the promotion of economic and trade relations with the perspective of establishing a free trade area after a transitional period of 6 years. The agreement also provides a basis for co-operation in the field of Justice and home affairs, and identifies the "acquis communautaire" which

Croatia will have to adopt in order to be able to effectively participate in the European integration process. An Interim Agreement, covering the trade and trade-related measures, was concluded in parallel with the SAA, and entered into force at the beginning of March 2001.

**2002:** An Interim Agreement, covering the trade and trade-related measures, was concluded in parallel with the SAA, and entered into force on 1 March 2002. Meetings of the Interim Committee were held in April 2002 and April 2003.



**2003:** Croatia submitted an application for EU membership on 21 February 2003. The GAERC () Council requested the Commission to prepare an opinion on the Croatia application on 14 April 2003.

**2004:** On June 18, following the application in March 2003, Croatia was awarded candidate status.

## 4. SCIENCE AND TECHNOLOGY POLICY

### 4.1. *The Science and Technology Policy Framework*

The Science and Technology (S&T) system in the former Federal Republic of Yugoslavia was highly decentralised and based on the principles of self-management. In 1990, when took place the first free elections in the former Yugoslavia, the Croatian research and development (R&D) was well integrated in the world R&D system and about 30% of its potential was implied in international research projects. In spite of the 1991 – 1995 war, Croatia has maintained the activities of all of the universities and scientific institutes as well as its involvement in regional and international projects.

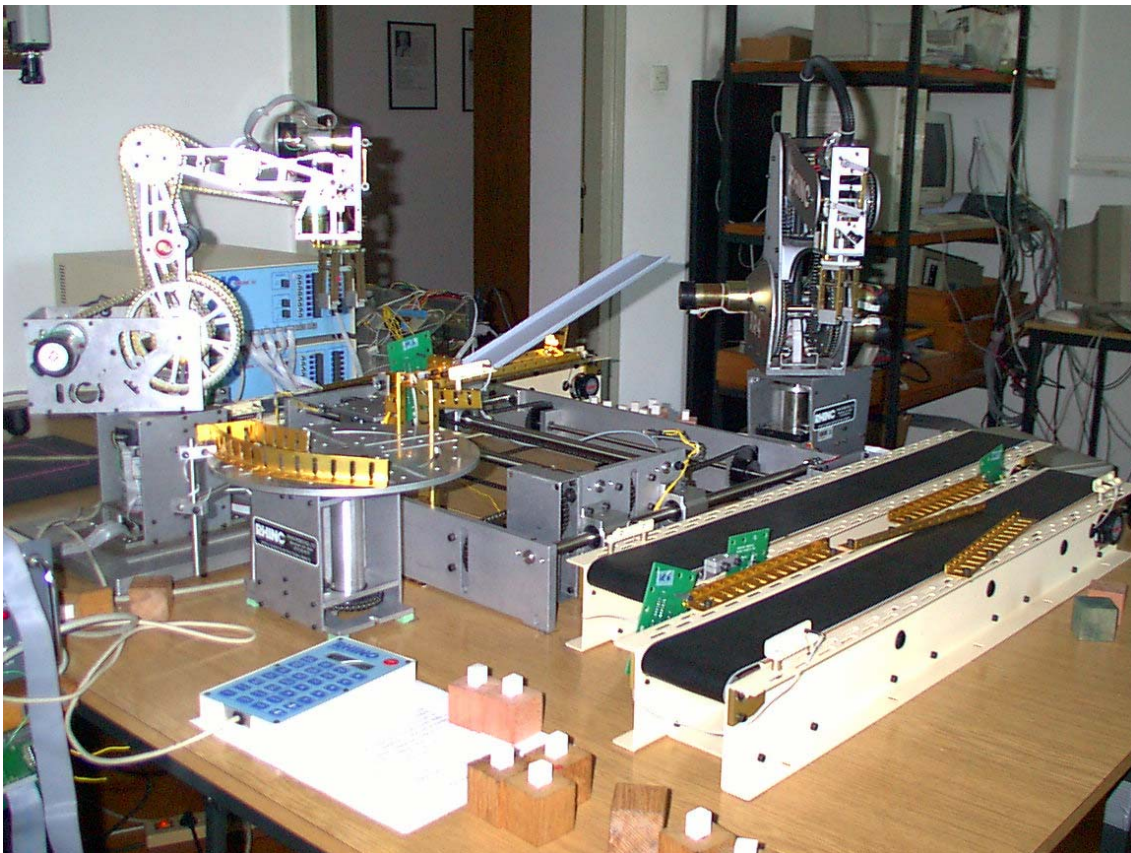


The central governmental organisation in charge with science and higher education policy is the Ministry of Science, Education and Sports (annex: scientific bodies conducting R&D in Croatia).





In the area of science, the Ministry of Science, Education and Sports (MSES) carries out administrative and other tasks related to the development of scientific research activity and scientific-technical information and communication, foundation and development of scientific research and other legal entities, development of science and application of scientific achievements, harmonization in financing programs of permanent research activity and contracted projects as well as in financing scientific projects of special interest, planning, harmonization and implementation of development of IT activity and its integration into an overall information system in the Republic of Croatia, monitoring, documenting and implementing scientific, technical and technology cooperation with foreign countries and international organizations according to international agreements, sending experts from Croatia abroad and integration of foreign experts in activities in the Republic of Croatia etc.



The Ministry prepares draft laws and Ordinance in the area of science, research, technology, education and sports to be submitted to the Croatian Parliament by the Government of the Republic of Croatia. MSES manages budgetary funds for these areas.

The National Science Council and the National Council of Higher Education are advisory bodies which formulate and monitor the programmes of functioning of R&D and higher education organisations (universities and institutes). The National Science Council appoints councils for specific areas of science (natural, technical, biomedical, bio-technical, social science and the humanities). Advisory body for the area of technology is the Technology Council.

The Croatian Parliament appoints the Committee on Education, Science and Culture responsible for proposing legislation under the authority of the Ministry of Science, Education and Sports.



Croatia has invested a substantial effort to formulate scientific and technological policies and to start their implementation. On July the 17th, 2003, the Croatian Parliament has adopted a new Act on Scientific Activity and Higher Education. The amendments to the Act were adopted in July 2004 in order to facilitate the its implementation. The Act stipulates the systems of scientific activity i.e. scientific and developmental research, and higher education. The Act states basic characteristics of the science system: freedom and autonomy of creation in the scientific activity. In addition to undergraduate, graduate and postgraduate education tasks of higher education institutions include the implementation of scientific, artistic and development research, as well as science programs with strategic interest for the Republic of Croatia.

In July 2004 the Government of the Republic of Croatia established the Agency for Science and Higher Education and entrusted it with the implementation of administrative tasks related to the evaluation of scientific activity and higher

education, scientific projects and collaborative scientific programs, as well as tasks related to the creation of the National Network for Quality Assurance of Higher Education and its integration into the European Quality Assurance Network. The Agency is the state institution with autonomous operation that carries out the aforementioned tasks for the National Science Council and the National Council for Higher Education thus complying with the European standards in science and higher education.

The Act envisages the National Science Council as a strategic body responsible for the development and quality of the overall scientific activity in the Republic of Croatia. Its major function is to monitor quality and evaluate scientific organizations, determine scientific fields, areas and discipline, as well as interdisciplinary fields of science and arts, setting detailed requirements for attaining authority to conduct a procedure for appointment into science ranks, evaluation of scientific projects, collaborative scientific programs etc. Among its tasks there is one shared with the National Council for Higher Education submitting proposals to the Government of the Republic of Croatia on allocation of financial resources foreseen in the budget of the Republic of Croatia for scientific activity and higher education.



Novelties in the science system are scientific centres of excellence – groups of scientists or scientific organizations assessed by relevant bodies and proclaimed as such by the Minister. There is a possibility for universities and scientific institutes to establish technology parks in order to commercialise scientific results, encourage cooperation between scientists and business community, and enhance the science-based economy.

The financing of public scientific institutes is conducted by their own budget adopted by the Management Council of the institute upon proposal by the Scientific Council and consent by the Minister. Financing scientific projects, collaborative scientific programs, associate work posts and scientific equipment is allocated from the state budget, based on a public call announced by the Ministry at least twice a year.

The Act on Scientific Activity and Higher Education provides for the financing of public higher education institutions from the state budget, taking into account the established capacities of each individual higher education institution, the price of a particular course, and a quality assessment based on evaluation. Private higher education institutions can also be financed from the state budget according to the rules set by the National Council for Higher Education. The state budget funds assigned to HE institutions are allocated to them as a total amount for all their work, and these funds are then allocated from their budgets to individual items, in accordance with the statute and decisions of their authorised bodies.



The Act defines the research and higher education activities, stipulates the tasks and the composition of the National Science Council and of the National Council for Higher Education. The Act stipulates also the ways of establishing the scientific institutions, their basic structure and the registration process, the Scientific and Technological Parks, the researchers and research assistants, the way of achieving such positions, the registration process (a researcher position is valid for a certain period; the researcher is elected by the institution involved and he is registered by the Ministry of Science, Education and Sports; without this registration and confirmation from the Ministry, the researcher has no right to benefit from Governmental funding).

The chapter on Higher Education Organisations is referring to their establishment, types and tasks and on the students' rights and obligations and on the professors and lecturers status.



Despite of improvements in the procurement of equipment Croatian research still lacks up-to-date equipment and that which does exist is often provided through international co-operation projects. Croatia particularly lacks, equipment of major scale, and compensates this through international cooperation schemes (e.g. with CERN, and other European centres).



Effort has been made to create an academic communications network in Croatia (CARNet) and IT systems, as well as other modern technologies, are gradually being invested in.

#### **4.2. Role and Objectives of S&T Policy**

In its Programme for the period 2003-2007, the Croatian Government emphasizes the importance of creating the synergy between science and economic development (*The Programme of the Republic of Croatia 2003-2007, 23.12.2003*).

The Program foresees the establishment of the National Innovation System aimed at providing further incentives for introducing new technologies into the Croatian economy. The Program also foresees the establishment of the National Foundation for Science, Higher Education and Technology Development.

By creating new knowledge and developing new products and services, R&D enables the continuous progress of technology. R&D as well as technology are the driving forces behind employment, economical development and competitiveness in general. They also have a crucial role in reaching and

implementing political decision in a number of areas, for example in healthcare, food processing, environmental issues etc.



The Croatian National Scientific Research Programme for the period 1996 - 1998, later extended for three more years, dealt mainly with the institutional structure, elements of state control of science and the definition of the objectives and priorities in S&T. Very ambitious, the Programme targeted to "form the foundations of the scientific policy and to constitute the implementation program for the advancement of the system of S&T" (Ministry of Science and technology, National science and Research Programme 1996-1998). Although adopted by the Croatian Parliament and by the Ministry of Science, Education and Sports, this programme was never systematically implemented.



Since July 2003 Croatian science policy has been based on the concepts from the Strategy of Development of the Republic of Croatia in the 21 Century-Science (Official Gazette of the Republic of Croatia 108/2002) adopted by the

Government and the Parliament of the Republic of Croatia and the Act on Scientific Activity and Higher Education adopted by the Croatian Parliament on 17 July, 2003 (OG 123/03).

Overall goals of RTD are as follows:

- restructuring the scientific research sector
- increased investment into science in order to achieve a goal of 3% of GDP
- financial diversification i.e. more intensive integration of the economic and private sectors into financing science
- regional diversification of research activity
- optimal use of scientific research through international cooperation.

The main targets of technology policy are directed to:

- strengthening science-industry cooperation
- strengthening generic research by public-private partnership
- revitalization of industrial research
- commercial use of scientific research
- building up technology capabilities of companies
- developing private incentives for financial investments into technology-based entrepreneurship.



The Department of Technology of the Ministry of Science, Education and Sports has focused on the establishment of a national network of institutions engaged in the development, transfer, application and financing of new technologies. It also works to extend specific measures of government support to the development of technology-based small and medium enterprises. Consequently, the Department of Technology has focused on the establishment

of a national network of institutions engaged in the development, transfer, application and financing of new technologies. It also works to develop specific measures of government support to technological development and innovative entrepreneurship. In order to encourage the development of SME, the Croatian Government adopted in March 1998 the Program for Promotion and Start-up of Production Based on New Technologies.



In February 2001, the Ministry of Science, Education and Sports has launched the Croatian Program for Technological Development – HITRA. The program was approved by the Croatian Government on April 5th, 2001.

The Programme is aimed at building up efficient national innovation system through permanent development of the three strategic and long term goals:

- creation of stimulative policy measures, mechanisms and programs
- creation of technological institutional infrastructure
- establishing the control mechanisms of policy for innovation and technology.





HITRA is especially targeted to public-private-partnership or science-industry cooperation and provides a framework for direct cooperation between entrepreneurs/industry and Croatian higher education institutions and research institutes.

The target groups are all the individuals and legal entities with commercially and technically viable ideas and technology-based companies.



HITRA is being implemented through two complementary subprograms: The TEST Subprogram (Technology-Related Research and Development Projects) provides financial support to pre-commercial research activities related to the development of new technologies (products/processes/services), as well as to complex projects for technological development.

The RAZUM Subprogram (Development of Knowledge-Based Companies) is aimed at financing entrepreneurial projects (set-up, development and expansion of a company) based on new technologies, i.e. products with high added value.



The Business and Innovation Center of Croatia (BICRO) is implementing the RAZUM subprogram. High professionalism in the implementation of the RAZUM subprogram, without administrative influence on decision-making, as well as development of specific knowledge and relevant network of experts for financing, assessment and managing entrepreneurial projects, has been secured by implementing this program as one of the regular activities of BICRO and technology centres.

The TEST Subprogram has been implemented by the Ministry of Science, Education and Sports as one in the array of its activities. A logical sequence of this approach, identical to the RAZUM Subprogram, requires entrusting the implementation of the TEST Subprogram to an institution outside direct influence of the government administration. Therefore, the implementation of the RAZUM Subprogram will be transferred to the Institute for Technology Policy and Development as its regular activity, for the purpose of professionalism, further expansion and promotion.

The monitoring of performance of the HITRA program is organized through annual reports to the Ministry and Government. A special body for controlling the use of public resources for HITRA program - Interdisciplinary Control Group was founded on December 6th, 2001 (Official Gazette of the RH, No.108/2001).



#### Duration and the budget

year	2001*	2002	2003
EURO	7 184 410	6 669 433	11 649 750

\*first public call in May 2001

#### The results of the calls

TEST Subprogram (see explanation above)  
 320 projects have so far been proposed  
 174 projects have been approved for financing

RAZUM subprogram (see explanation above)  
 BICRO has so far analyzed about 70 entrepreneurial projects  
 15 projects are currently financially supported

Concerning the exploitation of the results, Intellectual property protection and patenting are regulated by the Patent Act and related acts. This area is under the responsibility of the Croatian State Intellectual Property Office (CSIPO). Since October 2003 there is a new legal framework for intellectual property. In October 2003 the Croatian Parliament has passed the following acts in this area: Copyright and Related Rights Act, Patent Act, Trademark Act, Act on Industrial Designs, Act on Indications of Origins of Products and Services, and the Act on Protection of Topographies of Semiconductor Products. They respect both WIPO international agreements and EU directives.



There is a need to raise awareness of the importance and the role which intellectual property creation and protection play in modern industrialized societies. The National Programme of the Republic of Croatia for the Association to the European Union in 2004 (the Official Gazette 37/2004) includes measures regarding the intellectual property matters.

In spite of the significant efforts of CSIPO in the field and around sixty patent agents registered at CSIPO it is very hard to obtain strategic advice in this field, especially when research and technology is involved. Commercial companies have been slowly building up some in-house basic intellectual property knowledge, but only two companies in Croatia have presently full fledged intellectual property departments.

Research institutions (including Ministry of Science, Education and Sports) have very modest capability in the intellectual property protection accompanied with the almost total absence of IPR strategy and policies. Since MSES recognized that as the serious limitation factor of commercialization of research results, academic entrepreneurship, and public-private partnership, the CARDS project on establishing IPR infrastructure has been initiated and accepted.

Assistance in managing and counselling in the field of research and management is not developed in Croatia. The first steps towards modern

science management is made within MSES/World Bank “Science and Technology Project“.

### **4.3. National Research Priorities**

The National Science and Research Programme (1996-2000) listed a number of general and special research priorities, implemented within the framework of six scientific fields: natural sciences, technical sciences, biomedicine, biotechnology, social sciences and humanities. There were 15 such priorities.

The general programme included the general enhancement of knowledge and the special programmes concerned the development of: biomedicine and healthcare, biotechnology, dissemination and use of available research results, information and communication technologies, maritime research and the use of the sea and the other natural resources, defence, research, reconstruction and development of infrastructure (especially in the newly liberated territories, underdeveloped parts of the country, and the islands), development and improvement of tourism, agriculture and forestry, increased competence and mobility of researchers and professionals, energy production and its rational use, incentives for economic development, the development of national science and scholarship, environmental studies and protection of the environment, socio-economic research (especially demographic). Some of these priorities are not related to any scientific specialisation, while others supported R&D activities in certain fields. As already mentioned it, the Programme was never fully implemented. Past practice of setting numerous priorities showed that priorities should be redefined in a more rational and systematic manner.



At present priorities include:

- restructuring and reform of the system of science and technology, and the higher education system so as to enable their full functioning and convergence with the EU systems;
- information and communication technologies;

- Croatian natural and development resources (Adriatic Sea, carst etc) including biodiversity;
- biotechnology;
- human development (medicine, education, etc.);
- social development and functioning of governmental services (judiciary, social services etc.).

The majority of financed projects reflect interest by researchers and institutes for specific topics (curiosity-driven research). A number of projects and allocation of funds show that majority of research in the Republic of Croatia falls within biomedical, technical and natural sciences.

Most of the research activities take place in universities and public institutes. The breakdown of the 26 PUBLIC research institutes according to scientific areas is as follows: 9 in social sciences, 6 in the humanities, 5 in natural sciences, 1 technical (engineering) institute, three institutes in the area of biotechnical sciences (agriculture and forestry) and two institutes in the area of biomedical sciences (one institute for medical research and occupational health, and one for veterinary medicine). In 2000, the number of research projects was 1,307 (source: Ministry of Science, Education and Sports). Those projects are financed by MSES and cover all scientific areas In 2002 the number of research projects financed by MSES equalled 1,702:

- natural sciences 18% = 311 projects
- engineering sciences 20% = 334 projects
- biomedical sciences 24% = 404 projects
- biotechnical sciences 10% = 163 projects
- social sciences 14% = 237 projects
- humanities 14% = 252 projects

TOTAL: 1.701 projects



By adoption of the Act on Scientific Activity and Higher Education in July, 2003, Croatia has made an important step towards the integration of its S&T into the European scientific structures. The Act stipulated the establishment of an intermediate level of management between the political process and the S&T: the Agency for Science and Higher Education, an independent organism

coordinated by the Government entrusted with the implementation of programmes and assessing the quality of the universities and the research institutions' programmes. The Agency was established in July 2004.

A progress was made also on the diversifying of the financing sources; the Act stipulates that apart of the state budget there will be also other financial sources, such as: sources of the founders, budget of the counties, cities and municipalities, direct investments of individuals, companies and other legal entities, donations.

This new approach of combining different financial sources and an increasing links between research institutes/universities and industries is already experienced through the HITRA Programme, which is combining the state budget funds with private funds coming from private companies and also commercial loans. The National Foundation for Science, Higher Education and Technology Development will further increase links between research institutes/universities and industries.

#### **4.4. S&T Indicators**

Croatia counts 26 public research institutes, 5 technology centres, 11 corporate research institutes, 6 universities, 8 polytechnics, 50 scientific research legal entities (parts of business, cultural, health and state institutions) the Inter-university centre in Dubrovnik (an association of about 200 Croatian and foreign universities), the Croatian Academy of Sciences and Arts (CASA), the specialised Medical Academy, the Academy of Technical Sciences, the National and University Library, and the Croatian Academic and Research Network (CARNET - a large network of the Croatian academic and research institutions).

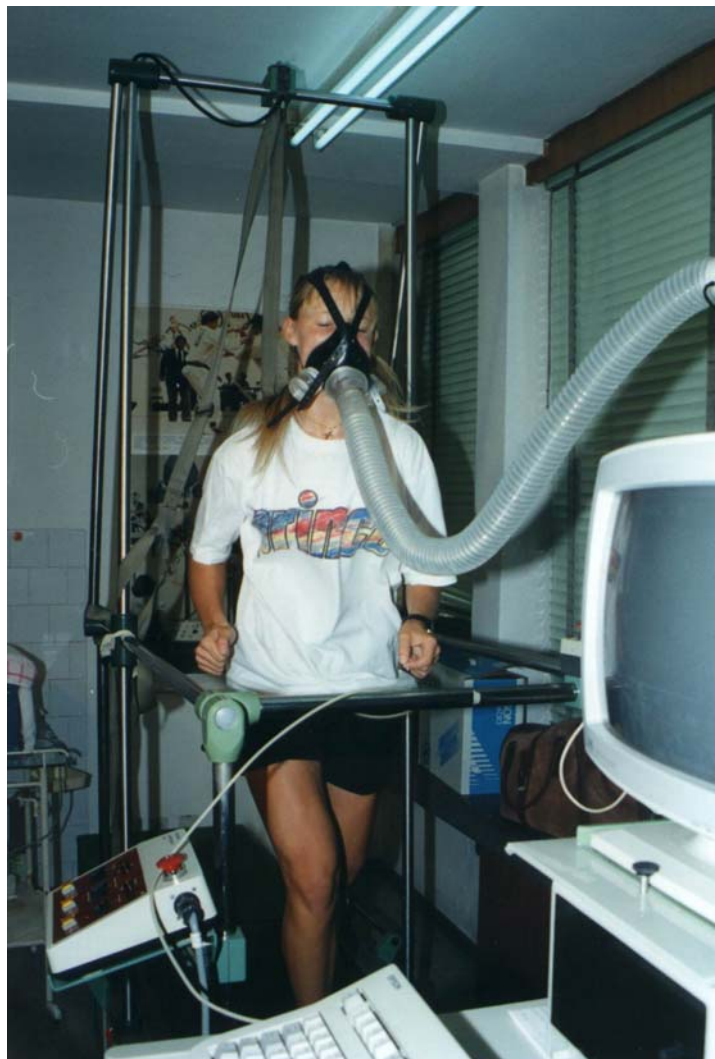


The financing of R&D organisations is increasingly restrictive. Data from the Ministry of Science, Education and Sports show that in 2001 1.09 % of the GDP was allocated to scientific research, and most of the funding was spent on salaries. The decline in investment in science, which took place in Croatia

particularly during the 1990's, has multiple consequences. The equipment still needs to be modernised further and the inadequate material conditions make the research work in some fields difficult. The number of scholars and scientists is also on decline.

In addition to funding for scholarly literature and journals provided by MSES there is a need for additional off-budget resources for this purpose. An example of off-budget support is a donation of 560.000 books and CDs to higher education and research institutions in Croatia by the SABRE Europe Foundation in the period 1993-2003.

In terms of international cooperation, S&T indicators show that Croatian academic community has potential for larger participation in international programs.



The difficult economic situation and the collapse of major business brought about the elimination of corporate financing of R&D and the links between universities and professional R&D organisations have been cut. Very few companies that survived the economic breakdown have preserved the internal R&D as a resource for normal functioning and future development. Economic

activities rely mainly on the import of knowledge and technology, mostly under very unfavourable or unregulated conditions.

In Croatia the main S&T funding sources are the state budget, the foreign donors and the private sector. Part of the official data of the Ministry of Science, Education and Sports is presented below.

**Table 1.** *The percentage share of Croatia GDP allocated to the Ministry of Science, Education and Sports.*

<b>Year</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
% GDP allocated to the Ministry	1.24	1.23	1.14	1.21	1.32	1.32
% of the Ministry budget intended for R&D activities	31	30	30	30	29	26

<b>Year</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
GDP (mil. USD)	19.906	18.427	19.536	22.436
GDP per capita (USD)	4.371	4.206	4.403	5.057
Gross expenditure for research and development as a share of GDP	0.98	1.23	1.09	-

These figures show us that in 2002 only one third of the total budget allocated to the Ministry was spent on R&D activities, constituting about 0.4% of the GDP. However, most of the financing is actually spent on salaries. In 2003, 15% of the funds allocated to the Ministry of Science, Education and Sports have been used to finance research projects. This percentage does not include funds for equipment.



According to data from the State Budget, in 1996-2002, from the total budget of the Ministry of Science, Education and Sports there were allocated:

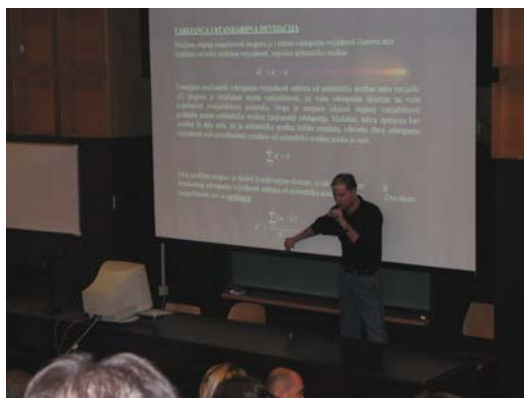
- around 30% for Scientific Research
- around 60% for Higher Education;
- around 2% for the Croatian Academy of Sciences and Arts.



According to data from the State Budget in 2003, from the total budget of the Ministry of Science, Education and Sports there were allocated:

- 29.10 % for Scientific Research
- 60.70 % for Higher Education
- 10.20 % for other costs.

Budgetary Expenditure for Science, Higher Education, International Scientific Cooperation, Development of Technology and Information Systems in the period 1996-2000 has been elaborated.



In 1990, the number of full-time employees in R&D was of 18,361 of which 8,772 were researchers. In 1999, these values have dropped to 10,746 and 6,805 respectively, showing a severe fall in total and researchers employment in R&D during the last decade. However, this decline was smaller than in other countries in transition, as for example the Czech Republic where the average annual rates of reduction of total employment in R&D and in the number of researchers were 18.9% and 8.9% against 5.8% and 2.8% respectively in Croatia. The distribution of scientists within the different scientific fields is given in table 2.

**Table 2. Researchers by scientific fields in 1991 and 2001**

<b>Scientific field</b>	<b>1991</b>		<b>2001</b>	
	<b>Number</b>	<b>%</b>	<b>Number</b>	<b>%</b>
Natural sciences	1,914	18.7	1,941	21.4
Technical sciences	2,681	26.2	1,747	19.2
Medical sciences	2,195	21.4	2,519	27.8
Bio-technical sciences	907	8.8	590	6.5
Social sciences	1,370	13.4	1,239	13.6
Humanities	1,178	11.5	1,040	11.4
<b>Total</b>	<b>10,245</b>	<b>100.0</b>	<b>9,076</b>	<b>100.0</b>

Another key indicator of the S&T sector's structure is the qualification of the research personnel. The share of researchers with academic degrees is given table 3. These figures show that Croatia has highly qualified scientific personnel, with more than half of the researchers holding a Ph.D. degree.

**Table 3.** Qualification structure of researchers in 1991 and 2001

	<b>1991</b>		<b>2001</b>	
	Number	%	Number	%
Academic degrees				
B.A., B. Sc.	3,635	35.5	1,053	11.6
M.A., M.Sc.	2,992	29.2	2,919	32.2
Ph.D., D.Sc.	3,618	35.3	5,104	56.2
Total	10,245	100.0	9,076	100.0

**Table 4.** The Human potential in R&D activities in public institutes

<b>Total 1475</b>	<b>Senior research fellows</b>	<b>Senior research associates</b>	<b>Research associates</b>	<b>Research assistants</b>	<b>University graduates</b>	<b>Other employees</b>
%	13	10	13	15	13	36



Croatia has good overall telecommunications infrastructure, with good international, national and local distribution. Needed improvements, though important, are not hindering the development of high quality networks throughout the country. The presence of an extensive national fibre-optic network with modern switching equipment gives Croatia an important prerequisite to a competitive advantage for wireless telephone and Internet service markets. In addition, Croatia has technically competent, highly educated labour.

#### **4.5. Policy Coordination and Promotion with the EU and other Agencies**

Between 1991 and 2000 Croatia and its scientific institutions were incorporated into a wide range of international organisations including ICSU (International Council for Science), IUPAC (International Union of Pure and Applied Chemistry), EERO (European Environmental Research Organisation), ALLEA (All-European Academies), IAP (Inter-Academy Panel), IAMP (Inter-Academy Medical Panel), UAI (Union Académique Internationale) etc. In the period 1991-2003 the Ministry of Science, Education and Sports signed 49 bilateral agreements and programs on co-operation in the area of science, technology and higher education. Scientific co-operation is most active with Slovenia, United Kingdom, Italy, Federal Republic of Germany, France and the United States of America. Croatian universities and institutes, as well as the Croatian Academy of Sciences and Arts also have their own co-operation agreements with foreign partners.



Although international co-operation seems to be well developed, Croatia spends only a very little amount of money on it. In 2001, the budget allocation amounted only 1.44% of the total budget of the Ministry of Science, Education and Sports, while the National Programme for Research and Development for the period 1996 - 1998 previewed 8% of the budget to be spent on international co-operation. In 2003, 2.1 % of the MSES budget has been allocated for the international co-operation. The same applies to the financial year 2004.

#### **4.6. Specific RTD Cooperation Schemes in Croatia**

Until recently, Croatian presence in the scientific structures of the European Union was low, mainly for political reasons. However, scientific co-operation was never really interrupted and during the last decade, Croatia continued to participate in some international research projects. Since 2000, things have changed : Croatia became member of the ESF (European Science Foundation) and participates in several European scientific programmes.

Croatia is participating in EU's Co-operation in the Field of Scientific and Technological Research programme (The 6th Framework Programme) and participates in several actions, the most important being INCO. The 6th Framework Programme, beginning in 2002, has a Western Balkans budget of € 15 million distributed through two calls for proposals.



Croatia also co-operates with the EU in:

- 5th Framework Programme (24 projects)
- EUREKA (since 2000, involved in 19 projects as a partner, coordinating 8 projects)
- COST (80 projects since 1992),
- TEMPUS: (27 projects since 2000).

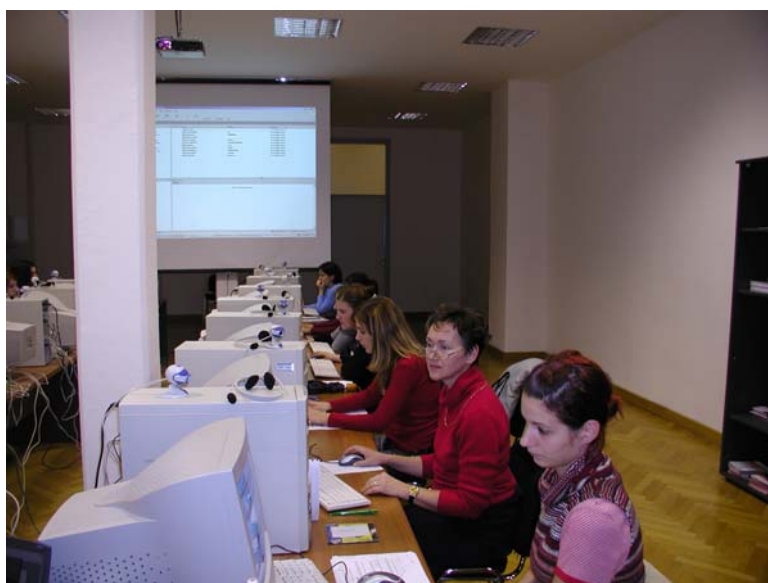
CARDS programme is an important instrument of integration of the Republic of Croatia in EU research and technology development. Three projects have been approved to the Ministry of Science, Education and Sports in fields important for the development of the system of higher education, science and technology (developing infrastructure for intellectual property rights in the area of research and development; quality of higher education and the relevant higher education information system; and recognition of foreign diplomas).

## 5. THE NATIONAL SCIENCE AND TECHNOLOGY BASE

The national science and technology base includes as follows:

<b>Types of Institutions</b>	<b>Number</b>
Universities (Universities include faculties, schools of higher education, academies of art, university departments and independent courses of study attached to the university. Total: 80 units.)	6
Public Institutes	26
Research Centres in the Industry Sector (state and private)	11
Academies (Croatian Academy of Arts and Sciences, Academy of Medical Sciences, Academy of Technical Sciences)	3
Schools of Professional Higher Education (6 independent and 12 private Schools of Professional Higher Education)	18
Polytechnics (7 public and 1 private accredited polytechnic)	8
Other scientific research legal entities (parts of business, cultural, health and state institutions)	50
Military research centres	1
Technology Centres	5
<b>Total</b>	<b>122</b>

Source: Ministry of Science, Education and Sports of the Republic of Croatia, October 2003



## **5.1. Science and Technology in Universities**

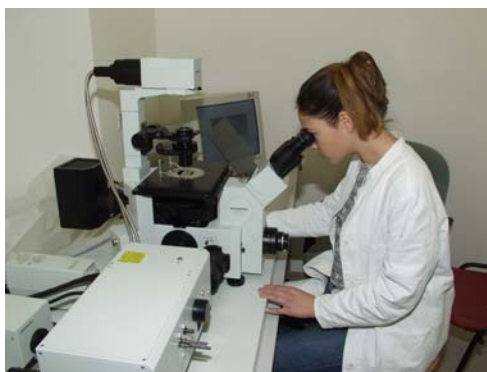
Croatian Universities are institutions of higher education authorised to organise and implement courses of study and scientific research, as well as to develop high-quality artistic and technological work.



Science and engineering students form 30% of the total student population in Croatia, compared to 19% in Albania, 47% in the Former Yugoslavian Republic of Macedonia (FYROM) and the Federal Republic of Yugoslavia (FRY) and 38% in the EU. In 1997, 544 scientific and technical articles came from Croatia, compared to 10 from Albania, 49 from FYROM, 492 from FRY and 115,641 from the EU. Approaching the level of the EU in these indicators of scientific health should be a priority for the Croatian scientific community.

## **5.2. National Research Institutes**

Croatia has 26 public research institutes and 11 research centres in the industry sector (state and private) (see Annex).



The Croatian Academy of Sciences and Arts is among the most prestigious scientific research organisations in Croatia. It counts 143 full members, 92 associate members and 137 corresponding members. It has nine departments, research units in spread in the whole country, museums and art galleries and a library.

# **ANNEX:**

## **SCIENTIFIC BODIES CONDUCTING R&D IN CROATIA**

### **Croatian Academy of Sciences and Arts:**

1. Department of Fine Arts
2. Department of Literature
3. Department of Mathematical, Physical, and Chemical Sciences
4. Department of Medical Sciences
5. Department of Music and Musicology
6. Department of Natural Sciences
7. Department of Philological Sciences
8. Department of Social Sciences
9. Department of Technical Sciences

### **Research Units of the Croatian Academy of Sciences and Arts:**

1. Adriatic Institute
2. Cabinet for Architecture and Urban Planning
3. Cabinet for the Research and Standardisation of Immunological Substances
4. Cabinet for the Research of the Structure and Function of the Sensory Organs - Zagreb
5. Centre for the Chemistry of Organic Natural Compounds
6. Centre for Scientific Work in Vinkovci
7. Institute for Corrosion Research and Desalination in Dubrovnik
8. Institute of Historical Sciences in Dubrovnik
9. Institute for Historical and Social Sciences in Rijeka
10. Institute for Historical Sciences in Zadar
11. Institute of Historical and Social Sciences in Zagreb
12. Institute for the History and Philosophy of Science
13. Institute for the History of Croatian Literature, Theatre and Music
14. Institute of Ornithology
15. Institute for the Palaeontology and Geology of the Quaternary Period
16. Institute for Scientific and Artistic Work in Split
17. Institute for Scientific Work in Osijek
18. Institute for Scientific Work in Varaždin
19. Juraj Križanić Cabinet for Legal, Political and Social Sciences
20. Linguistic Research Institute

### **Public Research Institutes:**

1. Agricultural Institute, Osijek
2. Croatian Institute for Bridges and Structural Engineering, Zagreb
3. Croatian Institute of History, Zagreb
4. Croatian Veterinary Institute, Zagreb
5. Forest Research Institute, Jastrebarsko
6. Institute for Adriatic Crops and Karst Reclamation, Split
7. Institute for Agriculture and Tourism, Poreč
8. Institute for Anthropological Research, Zagreb
9. Institute of Archaeology, Zagreb
10. Institute of Art History, Zagreb
11. Institute of Croatian Language and Linguistics, Zagreb
12. Institute of Economics, Zagreb
13. Institute of Ethnology and Folklore Research, Zagreb
14. Institute of Geology, Zagreb
15. Institute for International Relations, Zagreb
16. Institute for Medical Research and Occupational Health, Zagreb
17. Institute for Migration and Ethnic Studies, Zagreb
18. Institute for Oceanography and Fisheries, Split
19. Institute for Philosophy, Zagreb
20. Institute of Physics, Zagreb
21. Institute of Public Finance, Zagreb
22. Institute for Social Research, Zagreb
23. Institute for Tourism, Zagreb
24. Ivo Pilar Institute of Social Sciences, Zagreb
25. Old Church Slavonic Institute, Zagreb
26. Ruđer Bošković Institute, Zagreb

### **Business Sector (Corporate) Research Institutes:**

1. Croatian Engineering Institute
2. Ericsson Nikola Tesla Ltd.
3. Hrvoje Požar Energy Institute Ltd.
4. INA-Department for Strategic Development, Research and Investments
5. Institute for Electric Power, Industry and Energetics Ltd.
6. Institute for Improvement and Production of Crops Ltd.
7. Končar Institute for Electronics Ltd.
8. PLIVA Ltd.
9. Ship-building Institute
10. Tobacco Institute Ltd.
11. Traffic and Communication Institute

### **Examples of other types of scientific research legal entities:**

1. Croatian Hydrographic Institute
2. Fruit Center Zagreb
3. Meteorological and Hydrological Service of Croatia



### **Universities:**

1. University of Zagreb
2. University of Rijeka
3. University of Split
4. University of Osijek
5. University of Zadar
6. University of Dubrovnik

### **Polytechnics (public):**

1. Zagreb Polytechnic for Social Sciences
2. Zagreb Polytechnic for Technical Sciences
3. Karlovac Polytechnic
4. Požega Polytechnic
5. Rijeka Polytechnic

### **Private Higher Education Institutions Accredited by the Ministry of Science and Technology:**

1. Accredited School of Professional Higher Education in Occupational Safety, Zagreb
2. American College of Management and Technology (accredited), Dubrovnik
3. Baltazar Adam Krčelić School of Professional Higher Education for Business and Management, Zaprešić
4. Business School of Professional Higher Education, Višnjan
5. Ino Mirković Accredited School of Professional Higher Education in Music, Lovran
6. School of Professional Higher Education for Entrepreneurship and Economics, Zagreb (VERN)
7. Technical School of Professional Higher Education in Pula - Accredited Polytechnic Course of Study
8. Zagreb School of Economics & Management
9. Zagreb School of Management with public liability

### **Independent Public Schools of Professional Higher Education:**

1. Police School of Professional Higher Education – Police Academy of the Ministry of Interior, Zagreb
2. School of Professional Higher Education in Agriculture, Križevci
3. School of Professional Higher Education in Health Services, Zagreb
4. School of Professional Higher Education in Tourism, Šibenik
5. Teachers` School of Professional Higher Education, Čakovec
6. Teachers` School of Professional Higher Education, Petrinja

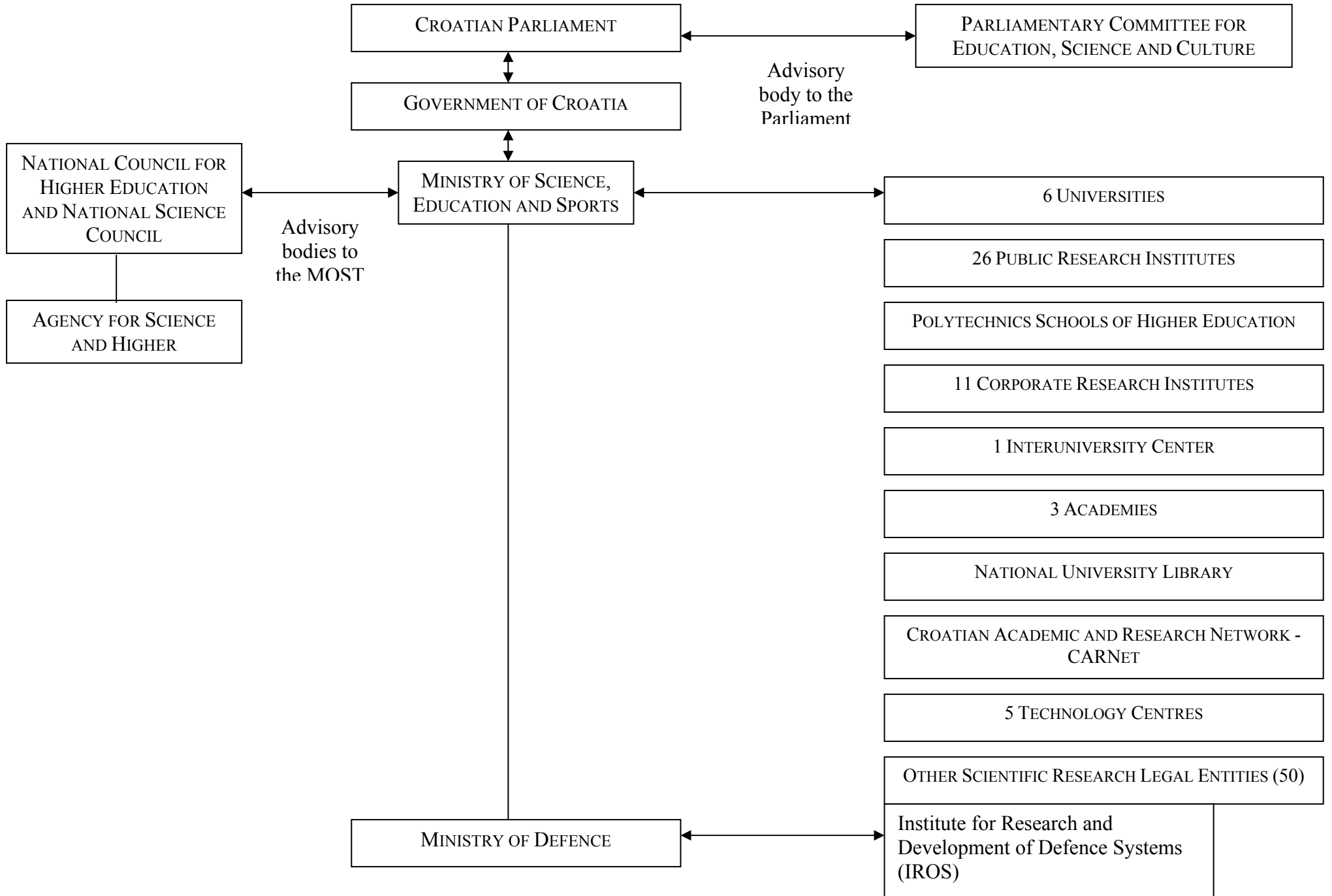
**Technology Centres:**

1. Technology and Innovation Centre, Rijeka
2. Croatian Business and Innovation Centre, Zagreb
3. Technology Centre, Split
4. Center for Technology Transfer, Zagreb
5. Research and Development Centre for Mariculture, Ston
6. Technology Development Center, Osijek

**Other institutions:**

1. Academy of Technical Sciences, Zagreb
2. Inter-university Centre in Dubrovnik
3. Medical Academy

# ACTORS IN S&T POLICY





European Commission

**A new Candidate to EU Accession - Croatia - "S&T developments"**

OIB

2004 — 40 pp. — 21.0 x 29.7 cm

Croatia participates in the 6th Framework Programmes of the European Communities for research and technological development as a third country.

Following the decision of Heads of States and Governments, on June 18, 2004, Croatia is now offered a status of “Candidate Country” to the European Union. The coming negotiations will aim at having Croatia recognising, accepting and adopting the *acquis communautaire*

Due to its specificity, the *acquis* in the field of science and research does not require any transposition in the national legal order. In order to ensure the successful implementation of the *acquis* in this domain, notably the successful association to the Framework Programmes, Croatia will need to create the necessary implementing capacities in the RTD field, including an increase of the personnel related to Framework Programmes’ activities. This brochure is presenting some general information on Croatia and on its S&T policy and basis.