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**THEME B: CROATIA:**
**CROATIAN PROGRAM FOR INNOVATIVE TECHNOLOGICAL DEVELOPMENT (HITRA)**
**Background**

At present the market economy challenges Croatia to join a successful economic environment - European Union - and strengthen its place in the world. In order to meet this challenge it is necessary to identify, choose and implement scientific and technological policy and support programs appropriate for the beginning of the third millennium, but even more important is to ensure appropriate institutional infrastructure and financing of innovation.

Croatian technology lags behind developed countries. It seems that this fact of Croatia lagging behind developed countries has not been given adequate significance or importance in the past. However, today it is clear that development of innovation, research and development of new technologies, products, processes, services and markets have no alternative in the Croatian economy its is a key in further development and growth of the country. Future can be built only on knowledge, expertise and innovation. Only capable people and professionals may stop a downhill economic loop, and start a wheel of a speedy progress, but a technological development still requires a firm financial support by the government.

The financial support program of Ministry of Science, Education and Sport (MSES) is creating an environment for active layers of society with the best education and greatest prosperity to find its place in a broad spectrum of creating knowledge-based small and medium enterprises.

**Innovation and Technology System and its Development**

At present Croatia, in terms of technology, largely lags behind successful economies that could be entitled "innovative and knowledge based economies". This technological gap may be bridged by: (1) application, introduction, transfer of foreign or existing technologies, or (2) creation of Croatian technologies, products, processes, and services.

Bridging the technological gap, technology transfer, organized entrepreneurship of knowledge-based small and medium enterprises, technology centers or other organizations of similar origins, differs considerably from traditional entrepreneurship. Such entrepreneurship largely includes inventiveness and innovative capabilities of entrepreneurs, and has its specific characteristics. In the successful economies this type of entrepreneurship is implemented under the state administration responsible for science.

The functioning of the overall innovation and technology system will result in new technologies in the Croatian economic system with a maximal integration of domestic scientific research potentials, establishment of knowledge-based small and medium enterprises, creation of new jobs for highly-qualified people, and finally in the Croatian technological innovations, products, processes, services and markets. The technology system is comprised of the following infrastructural institutions:

- Research and Development Technology Institute
- Research and Development Centers
- Technology Innovation Centers
- Business and Innovation Center of Croatia (BICRO).

Developing the infrastructural system implies enhancing the existing institutions, and establishment of new institutions such as technology centers, technology parks, research and development centers, and in the future science parks. Nowadays the technological development is based on research and development, therefore these technology - related institutions are under the jurisdiction of the MSES.

### **Financing of Innovation – Institutional Support**

Business and Innovation Center of Croatia (BICRO) is a government institution, established by the Government of the Republic of Croatia, under a direct jurisdiction and within the system of financial support of the Ministry, through co-financing operational costs (overheads), but not development.

BICRO has the most important role in the implementation of the program for creation and development of knowledge-based small and medium enterprises. BICRO is actually a coordinator of the Program for knowledge-based small and medium enterprises. To be specific, its tasks are related to professional and financial monitoring of the creation, development and final formation of knowledge-based small and medium enterprises. In a full sense it implies overall assistance in the creation of the knowledge-based small and medium enterprises, including consulting; analysis of the entrepreneurial plan, investment project, business strategy and organizational development; providing financial resources; identifying domestic and foreign partners during the foundation and final formation and marketing of its products or a whole company in Croatia and abroad.

BICRO offers services that are similar to those offered to knowledge-based small and medium enterprises, to existing companies engaged in the transfer and improvement of technology, and to innovators. The Government of the Republic of Croatia continually provides financial resources for this purpose. Co-financing is expected from regional and local communities and interested economic entities. In the implementation of this function BICRO relies considerably on Technology Innovation Centers, as well as on other public or private institutions, and they present a framework for the creation of a flexible and open network of transfer institutions focused towards the development of knowledge-based small and medium enterprises.

### **Financing of Innovation – Financial Support**

Financial support for founding, development and operation of knowledge-based small and medium enterprises is a new category, although the Government of the Republic of Croatia has approved this idea in its conclusion dated March 18, 1998. It is an instrument, a technology policy measure that Croatia uses to join the economies of knowledge in the most direct way.

This measure provides a real support to entrepreneurial projects based on new technologies and products. Results of scientific and developmental research are implemented through the production activity of knowledge-based small and medium enterprises. Those financial resources support their founding, development and final formation. However, the logic of the economy lies not only in the introduction and creation of new technologies; innovative products, processes, and services; and markets, but also in the improvement of the existing ones. A portion of foreseen and secured financial resources is used for this purpose, i.e. for activities of existing companies outside technology centers. In addition, innovative ideas of individuals, innovators, are also financed from these resources up to the level of a prototype, in case that the innovator, apart from his/her innovation, does not possess entrepreneurial spirit to establish a company. Two last types of financing, innovative improvements and prototype solutions, become prominent for another reason and that is the fact that regional and local communities have to deal with the problems of existing local companies, and they in addition to the state and the Government in reality finance technology development. That is to say that resources for described support are provided in the state budget, budgets of regional and local administration and self-government, and interested economic entities.

Direct financial support from the state is used for example for direct loans, non-repayable funds for projects, guaranteed loans or other types of direct support. In order to secure instruments of public support to the introduction and creation of new products and technologies, specific financial instruments for their financing are created e.g. various investment funds, such as a seed-fund or risk-capital fund. Procedure and manner of use of resources and creation of funds, if necessary including other institutions from the region, will be regulated by separate legal acts. BICRO drafts such acts and submits them to the state administration. BICRO has jurisdiction for the actual implementation of the technology policy instrument.

### **Financing of Innovation – Program HITRA**

The MSES program of financing innovation is basically formulated in the HITRA (Croatian Program for Innovative Technological Development) adopted by the Government of Croatia on April 5, 2001. The Program is aimed at initiating the national innovation system through permanent development of the three strategic and long term and goals: (1) Fostering science-industry cooperation, (2) Revitalization of industrial R&D, and (3) Encouraging commercialization of the research results

HITRA is especially targeted to encourage the science-industry cooperation and provides a framework for direct cooperation between entrepreneurs/industry and Croatian higher education institutions and research institutes. HITRA is implemented through two complementary subprograms: TEST (technology Projects aimed at pre-commercial development of the new technologies), and RAZUM (Development of Knowledge-Based Companies aimed at commercial entrepreneurial projects (set-up, development and expansion of a company) based on new technologies, i.e. products with higher added value).

The whole program is managed by BICRO while Technology Centers are responsible for the evaluation of the business plans and are expected to monitor the projects development.

**TEST:** Both individuals and legal entities, researchers and enterprises, are eligible for the TEST but research is carried out at registered scientific research institutions since they have adequate resources (staff and equipment) and is coordinated by principal investigator who must have a scientific rank (qualification). About 30% of projects have some kind of cooperation or support from companies out of which 10% is regulated by contracts and mutual agreements regarding investments, intellectual property rights and similar issues.

**RAZUM:** provides direct financial and other support for increasing competitive advantage of firms through investment in innovation, R&D and technology. The financing includes a mixture of: (1) Grants for research and development (30% of the total project value), (2) Favorable commercial loans, (3) Conditional loans in case very promising projects or academic entrepreneurship (spin-offs from universities). RAZUM also includes assistance in identification of research teams for needed research activities, organization and monitoring of research services provided to companies.

### **Results on the Ground**

Since the whole HITRA program is a pilot project towards research commercialization the current results are encouraging. The outcomes of the several completed projects are close to market exploitation like production of wooden pellets as alternative energy resources and ecological treatment of bee's disease in honey production. A number of feasibility studies are produced like "Croatian solar house," wind turbines, laboratory for ecological measurement and services, laboratory for bimolecular medical diagnostic, etc. Several projects succeeded in transition to RAZUM program and the results are going to be commercialized via company development such as production of the low-calorie fruit-jams, artificial skin and production of extruded wheat flour.

#### **Program TEST**

In the last two and half years after launching the Program MSES received almost 400 project application and after the evaluation process little more than 200 projects were selected for financial support. TEST Projects are financed on different bases due to the complexity and the level of maturity, as follows: (i) the majority of projects (72%) are financed as simple technology projects; (ii) 10% are classified as complex technology projects; (iii) 11% of projects received funds for pre-feasibility study as a basis for making final decision of accepting the projects; and (iv) 7% of the project received the financing for making the pre-feasibility studies for transfer to RAZUM program since those projects are identified as potentially successful entrepreneurial projects. In addition, 26 project applications have been received within Program Nucleus and are still under the process of evaluation.

Technological projects covered all the filed of science and technology. However, almost half of them (48%) are from engineering, while 40% percent are biotechnical and biomedical sciences.

The remaining are projects from natural and social sciences. Although some of the projects are rather immature regarding market exploitation, there is quite a good number of projects with the commercially very challenging potentials, such as: optical treatment of cancer, neurosurgical ultrasonic equipment, immunology treatments and new vaccines, wind and solar energy, ecological breeding of sheep, centre for standardization of psychometric methods, water purification, etc.

#### **Program RAZUM**

In the last two years BICRO has analyses about 80 business plans out of which 21 projects are selected for financing. The entrepreneurial project are rather different in business activities, scale of investments and even in research intensity. While some projects are research spin-offs like chorale methods in pharmacology, low-calorie fruit-jams, others are more market oriented like digital CD postcard or waste-water filtration systems. Some are large-scale projects like the Centre for telemedicine or the National network for monitoring of allergens. Those projects, if successful, might have a significant impact on economy.

[Back to Case Studies Main Page](#)

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