

The New National Policy of Research and Development (R&D) in the Czech Republic and Expectations of Institutions of Engineering Education

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Abstract: The analysis of the condition of research and development in the Czech Republic has shown in which points the Czech Republic falls behind the advanced countries. The insufficient amount of state subsidy and insufficient support of university research, the absence of support of industrial research, shortages in the organising and managing structure of state assistance, a low interest from the side of industries and results of applied research, the weak level of research in some fields, centralisation of research capacity in the capital, slight interconnections with education and slow transfer of knowledge from applied research to the entrepreneurial sphere constitute main soft spots of the present condition. The new R&D policy represents a sum of intentions how should be R&D supported, managed and organized by the state. Considerably greater emphasis should be put on applied R&D, where especially disciplines leading to the manufacturing of products and technologies internationally competitive will be supported. Institutional financing will rest on the evaluation of research intentions that have been formulated at the level of particular faculties of universities. We suppose the renewal of institutional financing of R&D workplaces in industries. A share of state assistance lowers logically from basic research through applied research to development. By 2002 it should be 0.7 of GDP. Indirect R&D financial support is also considered, such as tax and custom allowances, risk capital, etc. A new structure of administration and management of research by means of one central authority should replace hitherto financing through resorts. The paper deals with changes that are under preparation in connection with this new R&D policy in the Czech technical universities, and concretely under conditions of VŠB – Technical University of Ostrava.

Keywords: national policy, research and development, engineering education, restructuring of industry

1. Introduction

In connection with the Czech Republic's entry into the European Union, the Czech Republic has, too, assumed an obligation to contribute to the international wealth of new scientific knowledge and in connection with it a related obligation to create a national policy of the research and development in the Czech Republic. It is the matter of government's policy-making in the area of the research and development linked up with the declaration of the world-wide conference about the science which took place in July 1999 in Budapest under the auspices of the UNESCO.

The aim of this new policy of research and development is to rise their performance and efficiency in the Czech Republic, to ensure the renewal of their capacities, to develop the human potential which is active in these capacities, and to engage these capacities in the solution of the claims of the Czech Republic's citizens and economy. The emphasis is put on the possibilities of utilization of the results in all spheres of life of the society.

2. The necessity of changes in research and development

After 1989, the change-over from the planned economy to the market economy has brought many changes, too, in the field of research and development. The analysis of this evolution and its comparison with the abroad resulted in determination of the following priorities of the further development in the area of the research and development:

- to rise the efficiency and performance of research and development;
- to rise the benefits of the research and development for the economy of the Czech Republic;

- to ensure the linkage with other policies especially with the school-, economic-, industrial- and social ones;
- to concentrate the state subventions on a smaller number of mutually coordinated projects;
- to ensure the capacities for the academic research;
- to rise the subventions for the industrial research;
- to improve legal regulations of the state subventions for the research and development;
- to rise the objectiveness and transparency of the funds' distribution;
- to formulate the demands for the Research and Development Act.

The politics formulates the conception of the evolution till 2005; it was elaborated in the cooperation with academic experts. I have, too, taken part in the activity of the team which has prepared the material about the orientated basic research as well as the applied one.

The fact is that in the past ten years no fundamental restructuring took place in the economic field and, consequently, the competitive ability of domestic products is in many sectors based on the relatively cheap workforce. After a problematic privatization and in the process of the economic globalization, the modernization of the national economy does not take place fast enough. And, consequently, the unrealistic ideas of a rapid rise of the living standard have not been realized. Due to these facts, the research and development have not fulfilled their role of a catalyst of the economic rise, the rate of innovative processes – apart from some illustrious exceptions – has not reached the level that could be comparable with the advanced world.

3. Principles of the policy of research and development

They result from the position of the Czech Republic within the framework of the variable conditions of globalization trends in the worldwide economics.

3.1 Openness and flexibility

The rules of state subventions for the research and development and the assessment of the success of the new policy of research and development are under public control, and they must with a proper flexibility react to the variable internal as well as external conditions. A public and unlimited access to all informations about the distribution of state funds should restrict the lobbyism and an unobjective decision-making.

3.2 Coordination with other policies

The realization of the policy of research and development should be coordinated with the policies of:

- economy (industrial, energetical, export-supporting)
- social affairs and employment
- education
- environment
- transport
- defence

namely as well from the point of the infrastructure as at the creation of projects of the orientated research.

3.3 Link up with the education

Just here, the debts incurred by the preceding evolution since the fifties of this century are the greatest ones because due to the acceptance of the Soviet model of the monopoly orientation at the institutions of the Academy of Sciences, the research has been isolated from the education. In spite of many positive changes since 1989 the actual situation is not satisfactory and the level of state subventions is considerably lower than in the EU or in the advanced world. The technical infrastructure and the information infrastructure should be considerably strengthened, the access to the funds for research and development in the international network as well as to the participation in the foreign projects should be increased. A serious problem represents the unsatisfactory age structure of the academic professionals, where 40% of the professionals are in the age of about 60 years and only 10% of them are under 30. There exists an intention to utilize some workplaces outside of universities (institutions of the Academy of Sciences, industrial doctorates) for doctorand studies (PhD).

3.4 External openness

The utilization of advantages of the international cooperation on the one side and the culminating worldwide competition on the other side, lead to the development of comparative advantages of the research and development in the Czech Republic. The supranational companies operating in the Czech Republic profit from the results of their own research and development, nevertheless they are aware of the importance of qualified young people's innovational potential and therefore they promote the academic research in various ways (direct orders, prizes for the best dissertations, establishing of laboratories, foundation of private universities).

3.5 Orientation at the results and their quality

In question is especially the assessment of benefits to the quality of life, economy, education that should significantly influence the future distribution of disposable financial sources and accelerate the switch-over to a new economics founded on the "knowledge based society".

4. Selection of priorities

The Czech Republic is a small Central European state without significant natural sources which must establish its prosperity on a rapid acquisition of new knowledges and their utilization in new products, technologies and services on a international level. It cannot afford to solve the research and development in full extent but it must determine the priorities and concentrate on them the personal and financial resources. These priorities may be partly systematic ones, partly thematic ones.

4.1 Systematic priorities

Systematic priorities are aimed at the improvement of performance of the research and development, at the human resources, at a better utilization of capacities, at the international cooperation and at the necessity of a regional development of capacities for research and development.

In the sphere of the basic research there is in question the concentration of resources on the workplace and the projects achieving peak – internationally recognized – results, the link-up of the workplaces of the basic research with the projects of orientated research and development, and the creation of a knowledge base for the domestic applied research and development. The key priority should be the link-up with the academic education.

In the sphere of the applied research there is in question the promotion of these projects in witch the application sphere is demonstrably interested and into which it puts also its own means, and further the information infrastructure.

In the sphere of the transfer of technologies the state should promote independent subjects which will come into existence at technical universities and which should provide advisory services and services in the sphere of the patent protection and protection of intellectual properties to little and medium-sized companies. Under the conditions of our technical university such a department had been already established and its activity is supported by a broad foreign cooperation /Glasgow, Hannover etc.). This department offers the research capacities on the school's working sites to small and medium-sized companies having no own capacities for the development of new products, technologies and services. it provides also the language and administrative support to the school's working sites which intend to take part in the international projects (eg. the 5th thematic project of EU).

In the sphere of human resources there is in question the raise of young people's interest in the research and development, their financial support, the promotion of mobilities and foreign affiliations, the link-up of the capacities of universities, Academy of Sciences and research organizations in the doctorands' education as well as joining to international projects.

As remarkably important we consider regional aspects of the new policy for research and development. The predominant part of capacities for the research and development is situated in Prague (75%), and in the regions where the restructuring of the industry takes place there exists a minimum support of state. These regions become risky from the point of their further social-economic evolution and therefore it is necessary to build up also

here corresponding capacities for the research and development which could contribute to create their new economic profile.

4.2 Characteristic and thematic priorities of the research

They are the key priorities from the point of view of orientated basic as well as applied research. It is a longtime process and its first stage is in accordance with the 5th project EU aimed at the following thematic spheres:

- quality of life
- information society
- competitive ability
- energetics and environment
- social transformation, in the framework of which the program "Management of the research and development" should be incorporated.

Across these programs there are then defined the so called horizontal programs – human resources, integrated research and development, and regional and international cooperation. On the base of the prediction about the future tendencies of the development of technologies it will be probably necessary to announce the thematic programs. In the framework of the integrated research and development there is announced in the present time a program of National research centres. Our technical university strives for the foundation of a Centre of material research and a Energetic centre with a direct connection for the utilization in the regional industries.

5. The financial subvention – the chief instrument of the new policy for research and development

For the realization of the new policy for research and development the government has promised a gradual rise of the means for the subventions of research and development from 0,6% of GDP in 2000 to 0,7% in 2002 and in the further time horizon to get closer to the average level of the EU-countries. The level of the subvention is according to the rules of EU graduated from 100% in the case of basic research, through 50% in the case of applied research till 26% in the case of development.

The distribution of disposable resources should more significantly prefer the orientated research and development into which should be directed 75% of the volume of state subvention in the form of a purpose-made subvention of the National program and in the form of financing the institutions of research and development whose research intents will be directed to the predetermined aim.

The purpose-made financing in the form of grant agencies is open to all interested companies in the form of a tender.

In a longer perspective there are possible considerations even about indirect forms of promoting research and development namely tax and customs abatements that could increase the motivation of innovations.

6. Modification of the state administration of research and development

The new orientation of research and development at outcomes, the necessity of coordination with other policies and determination of priorities necessitate a new model of management of research and development which would be comparable with advanced countries. Its concrete definition will be in the Research and Development Act which is under preparation. In consideration is the creation of an independent budget chapter that would concentrate hitherto dispersed means for research and development on the basic research and make possible a better coordination and creation of a long-term conception.

The second alternative is the decentralized model of research and development – used until now – at which it would be created a new coordinating body with advisory committees for inter-resort coordination.

7. What do technical universities expect from the realization of the new policy for research and development

Technical universities expect many positive changes:

- Creation of better conditions for qualified preparation of engineers and improvement of their chances to make themselves useful.
- Better quality of activities in research and development, a higher potential for the cooperation with the industries.
- Higher attractiveness of the status of an academic teacher, the improvement of personal situation at technical universities.
- Objectification of the financial funds' distribution.
- Emphasis of the role of technical universities in the restructuralization of the regional economy.
- Creation and promotion of departments for the transfer of technologies.
- Improvement of conditions for foreign investors.
- Access to the international research programs.
- Concentration of capacities on the preferred development programs.

Due to comprehensive reasons it is not possible to avoid the consequences of the globalization under which falls especially the brain-drain.

8. Conclusion

From the strategic objective, that is a new policy of research and development, it remains to pass a great deal of way towards the realization. On this way there will be a lot of obstacles and many antagonistic opinions of the methods for this way. But because this policy has arisen from the initiative "bottom up" it is necessary to look at it with an optimism whose fulfilment is desirable for the return of the Czech Republic among the advanced countries of the contemporary world.