

# PLACE AND ROLE OF THE DEFENCE SCIENCE IN THE CZECH RESEARCH AND DEVELOPMENT SYSTEM

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This paper describes a system of the defence research and development in the Czech Republic. In the first part are introduced different models used by European countries. Czech defence system uses a so called state firm model, which is also supported by universities and scientific institutes. This model yields results but disadvantages too. Important facts are presented to support positive answer for a question why have a defence research system.

*Key words: research, science, defence, system, university, defence research.*

## Reasons for supporting of the science

Basic questions for solving the topic of this paper are: Why defence science? Is it necessary to separate defence and civil research? Why science at the university? Why military science at the military university? To help answer these questions it is useful to show the results of the Global Competitiveness database. The Global Competitiveness Report's competitiveness ranking is based on the Global Competitiveness Index (GCI) (1), developed for the World Economic Forum by Sala-i-Martin and first introduced in 2004.

Nowadays 139 countries of the world are assessed in 12 main categories (public administration, infra-structure, macro-economic stability, health care, educational system, functioning of goods and service market, labour market, financial sector, level of technological development, market size, enterprise environment, and innovation).

Each of the categories is assessed individually and the final index is the mean of all 12 assessments. The rankings are calculated from both publicly available data and the Executive Opinion Survey, comprehensive annual survey conducted by the World Economic Forum together with its network of Partner Institutes (leading research institutes and business organizations) in the countries covered by the study. High number, over 13,500 business leaders were participated in 139 economies in 2010. The survey is designed to capture a broad range of factors affecting an economy's business climate.

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Table 1 – GCI 2010 Rank Score

Country/Economy	GCI 2010		Change 2009–2010
	Rank	Score	
Switzerland	1	5,63	0
Sweden	2	5,56	2
Singapore	3	5,48	0
United States	4	5,43	-2
Germany	5	5,39	2
Japan	6	5,37	2
Finland	7	5,37	-1
Netherlands	8	5,33	2
Denmark	9	5,32	-4
Canada	10	5,30	-1
Hong Kong SAR	11	5,30	0
United Kingdom	12	5,25	1
Taiwan, China	13	5,21	-1
Norway	14	5,14	0
France	15	5,13	1

The Finland and the Czech Republic are very similar countries as regards the number of population or industry. Comparison of the attitude to science and research in the Czech Republic and Finland (Figure 2) declares a reason that puts Finland among ten best countries in GCI Rank Score. **Except average growth of GDP all Finland parameters are 2-3 times better than Czech. This fact is significant, it shows a value of the science and its influence in monitoring area.**

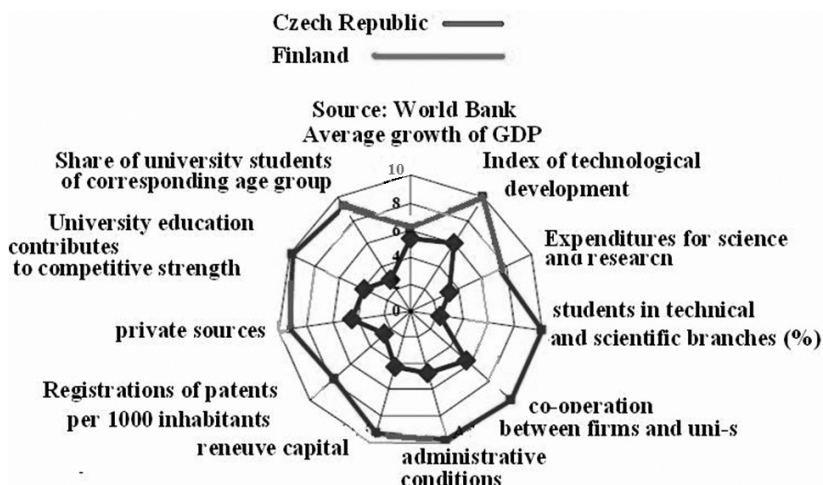


Figure 1 – GCI Czech Finland comparison

## European attitude and models for defence research and development

EU statement related to science, research and innovations: „Countries with developed science, research and innovations are the most dynamic ones and they determine the direction of global development“. Prosperity and competitive strength, and consequently the living standard of inhabitants, depend more and more on how successful the governments are in creating conditions for science which increases innovation power. Countries which become only passive receivers of new technologies are getting in a less and less favourable position in global economic competition.

It is mostly the universities connected with companies ensuring the knowledge transfer and market success which become the centres of innovation power growth.

### Defence research models

There are four basic models of the defence science and research system. It is usually called research and development (R&D) system in European countries, but word “research” can be understood differently: mostly described advancement of the science theory and its practical application. The development is usually separated from production which is role of the military firms.

a) **Military model** – science and research are executed by arms institutes (Germany, France, Italy, Spain), research workplaces are parts of acquisition systems (Germany - BWB, France - DGA). This system is exploited by USA too and firms and institutes are parts of arms service.

b) **Agency model** – science and research are carried out by agencies co-operating with MoD (Sweden – FOI Agency, the Netherlands – TNO Agency, United Kingdom – Quinetic Agency). An agreement arised at the beginning of the cooperation between state and agency. By agencies are created analysies for future predictions in security area too.

c) **Model of state universities and state firms** – science and research are carried out in the framework of state enterprises and universities alongside decisive production programme (Belgium, Czech Republic, Denmark, Finland, Portugal, Austria, Greece, Ireland, Hungary, Slovakia, Slovenia). A civil research activities isn't often separated from defence research and cardinal military production is taken by firms.

d) **University model** – means research is executed by military universities (Estonia, Lithuania, Latvia, Cyprus, Malta). European union plays an important role in defence research area from 2004. EU supports effort of the EU participants by way of the European Defence Agency (EDA). The goal of the EU is an arrangement of european security by common effort of EU participants.

Every country adapts its own conditions to realize a defence research system. The third model is used in the Czech Republic.

## Czech Research System and Position of the Defence Research and Development

The Czech Research and Development system is presented on the figure 2. The government supports research by financial budget, which is divided between so called determined purpose and institutional support. The government determines a priority of the state research and gives a budget out to grantors. Nowadays Czech Republic has 22 grantors (ministries, agencies), but a reform of the research system starts with reducing the number of grantors to 13.

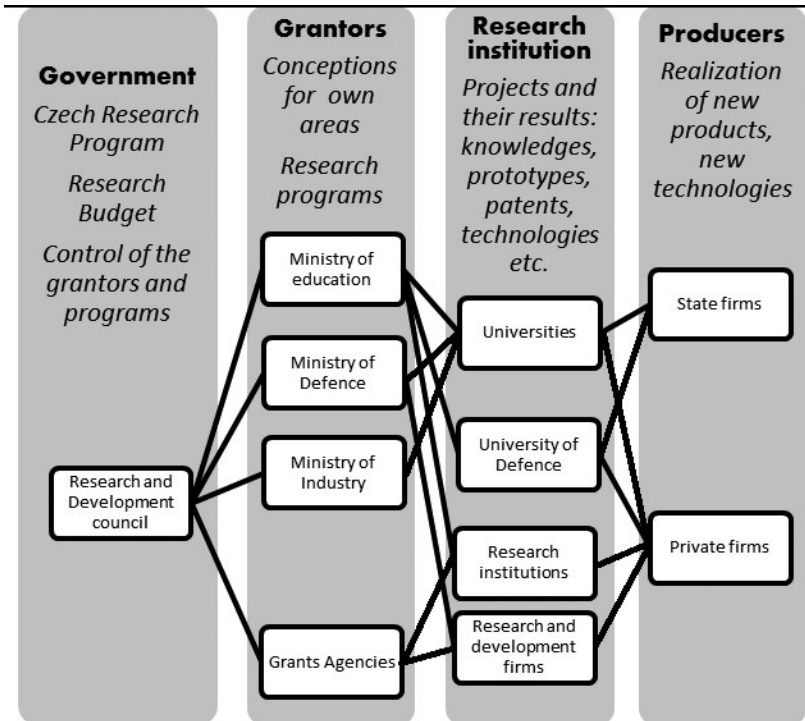


Figure 2 – Czech Research System

In Czech Republic starts a „Reform of science, research and innovations“. It has 7 objectives:

- Simplification of research and development support
- Significant reduction in the number of grantors
- Support of excellence in research, its preferential treatment and application of its results for innovations.
- Conditionality of science and research support by co-operation with the users of science and research results

- Implementation of a more flexible organizational structure of public research.
- Ensuring the experts for research, development and innovations.
- Intensive integration of the Czech Republic into international co-operation in research, development and innovations.

## Structure of the Czech Research System

Defence research in the Czech Republic is provided by University of Defence, Military Institutes (topography, health service, history) and Informatics Agency (Fig. 3).

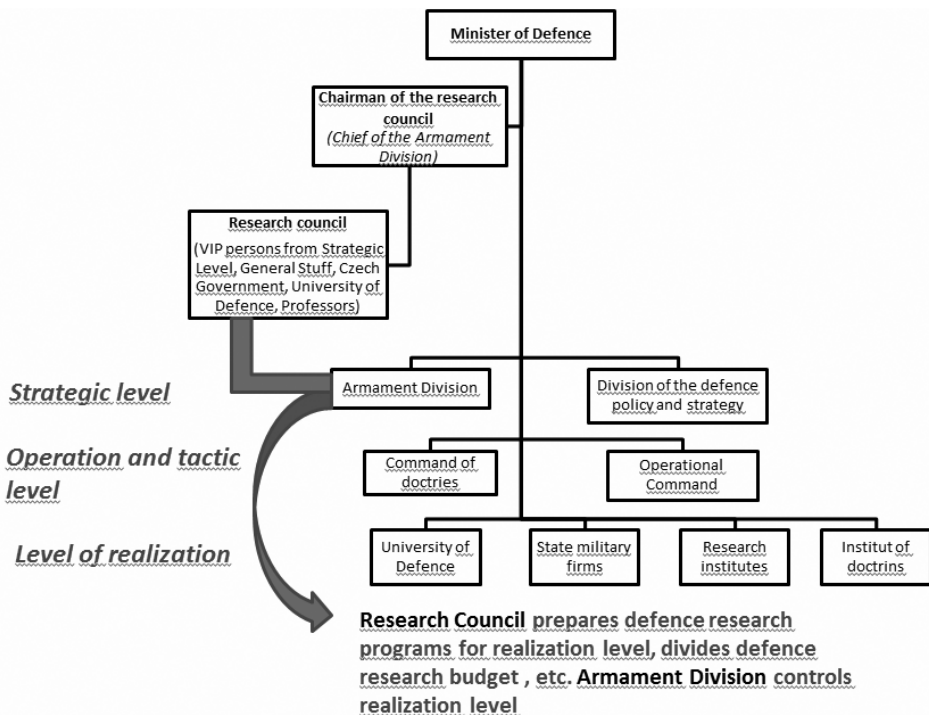


Figure 3 – Structure of the Czech Defence Research System

The Armaments Division of MoD is a concept, standard-creating and managing body of the Ministry of Defence for securing the process of strategic acquisition within the defence department. In addition, it ensures development of armaments systems, planning of the armaments, administration of related programmes, implementation of pilot and strategic projects in armaments, infrastructure and a programme of joint NATO investment (NSIP – NATO Security Investment Programme) within the defence department. The Division is, moreover, in charge of research and development of defence technology and for harmonisation with NATO and EU member countries in armaments policy.

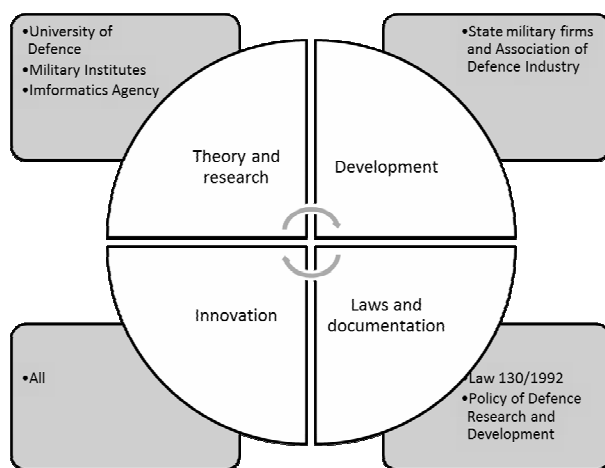


Figure 4 – Czech defence research system

According to Policy of Defence Research and Development in the Czech Republic, in the framework of new programmes, the following objectives are presented:

Reconnaissance, collection, evaluation and distribution of intelligence information, Network Enabled Capability (NEC), Cartographic support of forces in operations, Protection of information and communication systems against cyber attacks (Cyber Defence), CBRN detection and neutralization and protection against them, Anti-missile defence, Protection of forces; mine, explosive and IED detection and elimination, Field health service support in the operations outside the Czech Republic, Non-traditional sources for logistic support of participation in, etc.

Objectives are realized in these programmes:

**907020 – Ambition** – public commission (research); support of the development of areas in which the Czech Armed Forces achieve significant results – budget **3,24 mil. euro**

**907040 – Innovation** – public commission (development, innovation); support of innovation technologies in the framework of the modernization of the Czech Armed Forces - budget **3,46 mil. euro**

**907010 – Technology** – public competition in development, research and innovations – development of state-of-arts defence technologies – budget **1,6 mil. euro**

## The Role and Place of the University of Defence in „Policy of Applied Defence Research by 2015“

University of Defence is a centre of defence research in the Czech Republic. The research and development policy follows the Czech government decrees and laws related to research and development primarily within the University of Defence scope. It is particularly detailed in the research projects of the faculties and institutes, structured research administered by the responsible Czech military agencies, external and internal projects of the declared programs and the requirements made by the Army of the Czech Republic, government administration and defence industry.

The UoD academic staff are involved in defence research projects, technical science development projects, research projects and special research projects of colleges and universities. They are involved in the projects of the national and international grant agencies, NATO research institutions mainly on research and development programmes under process. The full- and associated professors work also for other international institutions responsible for research, standardisation acts, etc. Students, primarily of doctoral but master's degree programs as well, are widely involved in the research and development too. In the Policy of Applied Defence Research is mentioned: "...the institutions, especially the University of Defence, will be promoted to increase their potential for solving projects of defence science and research ...The University of Defence will be a base for achieving significant results in the area of defence science and research, as well as it will create environment for training new research workers ...the Department of Armament of MoD will conduct regular meetings (at least once a year) with the Rector of the University of Defence, with directors of subsidized organizations and state enterprises which deal with defence research ... for the purposes of co-ordination and putting into practice the Policy of Science and Research..."

#### **The Overview of Scientific Projects at University of Defence in 2011:**

In the Czech Republic – **22** state research projects, **30** projects of defence research, **33** grants outside defence sector.

Abroad: **3** EU scientific projects, **1** project with France, **1** innovation project supported by ESF, **1** EU grant – 7th Framework Programme.

## *Conclusion*

Czech research model, which provides defence research by cooperation of universities, science institutions and state firms is functional. According to law about education Universities as the highest level of educational system are top centres of scholarship, independent knowledge and creative activities and they play a key role in scientific, cultural, social and economic development of the society. This is the reason, why science is provided on the universities. Military university is on the top of the defence research, continuously develops different defence branches, tutors young scientists and is able to solve defence research projects. It is EU effort (as well as the effort of each country) to enlarge and strengthen research bases to ensure higher living standard or higher defence capability (e.g. of the Armed Forces).

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