

# Overview of promoting technology-based innovations and investments in R&D in Lithuania

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The investment in R&D activities as the development and implementing of technology – based innovations in economy in Lithuania is still at low level. In addition, the growth of investments in R&D in private sector is still moderate excluding some partial cases. Based on statistical data main causes of such bad situation in private and public sector (especially in higher education and research institutions) are analysed the and provides some suggestions related to faster growth of R&D development and higher competitiveness of Lithuania.

**Keywords:** Technology transfer, creation of innovations

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## Introduction

Innovation is increasingly important for economic development. Innovation and the knowledge economy is seen as a tool that would help the developed countries to ensure competitiveness and a favourable evolution of the standard of living. Competitive economy ensuring the welfare of the residents is related to the promotion of innovation. In order to successfully innovate, it is necessary to ensure efficient transfer of knowledge, technology, organization, culture and so on. Despite the fact that technology is one of the most important sources of innovation, but technology transfer is a complex process. Research-based technology transfer from research institutions to business is of great relevance for the whole innovation process.

The country's economic competitiveness and innovation depend on the success of the scientific and business communities in the field of technology transfer as research institutions developed technology is basically the most important source of innovation.

TABLE 1. RESEARCH AND DEVELOPMENT EXPENDITURE, % OF GDP

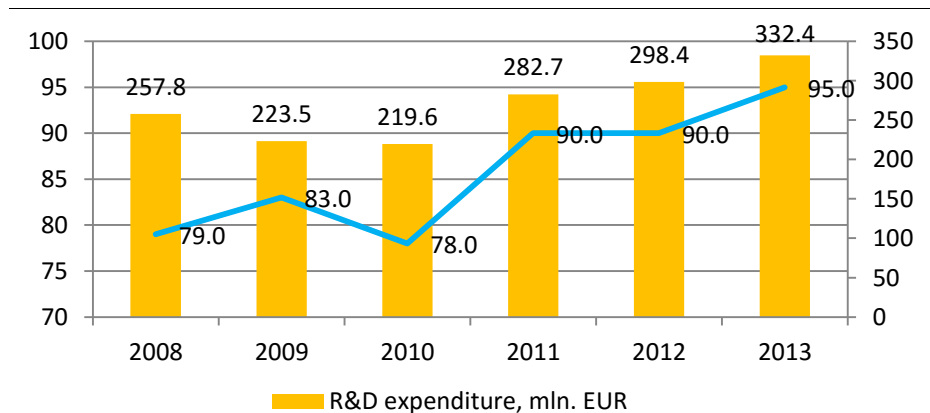
	2007	2008	2009	2010	2011	2012	2013
EU (28 countries)	1,78	1,85	1,94	1,93	1,97	2,01	2,01
Euro area (19 countries)	1,81	1,89	1,99	1,99	2,04	2,09	2,09
Belgium	1,84	1,92	1,97	2,05	2,15	2,24	2,28
Bulgaria	0,44	0,46	0,51	0,59	0,55	0,62	0,65
Czech Republic	1,31	1,24	1,3	1,34	1,56	1,79	1,91

TABLE 1. RESEARCH AND DEVELOPMENT EXPENDITURE, % OF GDP

	2007	2008	2009	2010	2011	2012	2013
Denmark	2,51	2,78	3,07	2,94	2,97	3,02	3,06
Germany	2,45	2,6	2,73	2,72	2,8	2,88	2,85
Estonia	1,07	1,26	1,4	1,58	2,34	2,16	1,74
Ireland	1,24	1,39	1,63	1,62	1,53	1,58	:
Greece	0,58	0,66	0,63	0,6	0,67	0,69	0,8
Spain	1,23	1,32	1,35	1,35	1,32	1,27	1,24
France	2,02	2,06	2,21	2,18	2,19	2,23	2,23
Croatia	0,79	0,88	0,84	0,74	0,75	0,75	0,81
Italy	1,13	1,16	1,22	1,22	1,21	1,27	1,26
Cyprus	0,4	0,39	0,45	0,45	0,46	0,43	0,48
Latvia	0,56	0,58	0,45	0,6	0,7	0,66	0,6
Lithuania	0,8	0,79	0,83	0,78	0,9	0,9	0,95
Luxembourg	1,65	1,65	1,72	1,5	1,41	1,16	1,16
Hungary	0,97	0,99	1,14	1,15	1,2	1,27	1,41
Malta	0,55	0,53	0,52	0,64	0,7	0,86	0,85
Netherlands	1,7	1,65	1,69	1,72	1,89	1,97	1,98
Austria	2,43	2,59	2,61	2,74	2,68	2,81	2,81
Poland	0,56	0,6	0,67	0,72	0,75	0,89	0,87
Portugal	1,12	1,45	1,58	1,53	1,46	1,37	1,36
Romania	0,52	0,57	0,46	0,45	0,49	0,48	0,39
Slovenia	1,42	1,63	1,82	2,06	2,43	2,58	2,59
Slovakia	0,45	0,46	0,47	0,62	0,67	0,81	0,83
Finland	3,35	3,55	3,75	3,73	3,64	3,42	3,31
Sweden	3,26	3,5	3,42	3,22	3,22	3,28	3,3
United Kingdom	1,69	1,69	1,75	1,69	1,69	1,63	1,63

Source: Eurostat, 2011

FIGURE 1. R&amp;D EXPENDITURE (GERD) (2008-2013) IN LITHUANIA



Source: Eurostat, Statistics of Lithuania, 2015.

The investment to Lithuanian R&D sector grew slightly in 2013 and amounted to 0.9% of GDP; EU average of more than 2%. The EU has set itself the target that investment in this sector would be at least 3% of GDP in 2020 as Lithuania has set to reach only 1.9%.

However it can state that it is virtually impossible to achieve this goal. Unlike the EU Lithuania the majority of the investment in R&D sector is composed of public finances - about 33.3%, and the business sector - 26.1%. Most of the EU investment in this sector is composed of business funds - 54.9%, and only one-third of the investment comes from public money - 33.4% (Mosta, 2014).

Following the data of Eurostat on the share of high-tech exports in gross exports, at present, the share of high-tech remains small and strong preconditions for change of this situation in the future are essentially are not developed (Table 1). The biggest causes for that is the lack of funds for research and education sector and therefore decreasing and questionable quality of the study and research.

### **Transfer of technology: Direct interaction between science and business**

Technology transfer is a multifaceted phenomenon that includes both formal and informal process of integrating the different actors working in the fields. Technology transfer can take place in several formal ways, e.g., the development of new innovating businesses, acquiring licenses, by charter or shared with other partners in the research, establishing spin-off companies etc.

Informal ways of technology transfer, such as informal social relations, staff exchanges programs, counselling, joint training programs etc. also are important. Technology transfer, as well as all other measures that could increase the innovation capacity of Member and actually installed in innovation must be at the core of public policy content components. However, the technology transfer policies often dissolves the joint promotion of innovation policy and therefore does not give practical results, because does not take into account the specific characteristics of the technology transfer process. General innovation policy measures are not adequate to technology transfer area.

Planning and strategy documents are in line with the lack of coordination and piecemeal approach to technology transfer, which leads only to the moderate and limited Lithuanian innovation capacity and it is consistent with the main indicators still lag in comparison with the respective EU level. Following Kraujelytė and Petrauskas (2007), technology transfer in the field of isolation innovation policy and support policy development in view of the principles developed is one of the possible ways to strengthen the effectiveness of innovative activities in Lithuania.

Systematic attention to the transfer of technology to promote the formation of a dedicated separate area must be given in Lithuanian innovation policy. The main principles of technology transfer policy are focused on informal social ties between the academic and business communities, strengthening of entrepreneurship promotion in EU research space, the priority R&D areas of provision, targeted support for innovative projects, quality and quantity of the confrontation of the allocation of state support, financial and tax incentives business businesses and effective application of the EU Structural Funds.

The main Lithuanian companies that engage for a large share of the workforce, successfully exporting, and high value added sectors – invest relatively little capital in R&D and innovation. Their competitiveness is based on lower costs of production, namely labor, and increasing productivity, which led to technological modernization (Mosta, 2014).

### **Collaboration between science and business: Risk avoidance, too low capacity and support of investments**

The innovation creation and technology transfer can be characterized by the mutual information asymmetry: usually researchers have the know-how related to technology and entrepreneurs round more know-how in marketing and other organizational areas. On the other hand, exists in different technologies into innovative scenarios: the most

entrepreneurial scientists: some of them do not agree to transfer knowledge about technology to others, but create their own business. On the other hand, the availability of financial support for innovation sector distorts rational economic behaviour.

In some cases, the EU's financial support to entrepreneurs is treated not as a means necessary for innovation, but as a final goal quite easily picks up the money. This became fundamentally flawed thinking, rather than the weakness of the science and technologies institutions and the government's mistakes in implementing R&D and R&D-oriented policies, perhaps the most impedes innovation.

Even a favourable technological development policy is not sufficient and does not guarantee a breakthrough in innovations. The typical problem is too small businessmen competence only lingering appetite scooped profit by investing as little as possible. Another problem inherent in the CEE region and in Lithuania in particular - business reluctance to invest for long term and wait for the return on investment - still pretty strange thing Lithuanian business.

The implementation of new technologies within the activity of an enterprise is not a simple process. First of all, this is related with high risks involved in processes of production and reorganization of organizational systems. When planning the implementation of new technologies, many factors have to be assessed. Some of them are related with the common economic standing of the country, the growth of GDP and its structural changes, the shift of industrial production and the change of working conditions (Vasauskaitė, Snieška, Drakšaitė, 2011).

One of the systematic problems of Lithuanian R&D sector is that in many areas the research and creations of new technologies does not fit the business context, which is shaped by low-tech industries and incremental innovation. A science-based model of innovation necessitates a matching industry capacity, especially in terms of absorptive capacity, that is in many areas simply not developed (CREST, 2007).

Avoidance of risk from the business side is crucial. Uncertainty due to globalization and the emergence of even newer technologies is partly determined by researchers focused to specific scientific problems, but can be "disturbed" by Innovation installers.

## **Role of the risk capital and financial innovations**

Investors managing venture capital are not inclined to invest in their little-known trends that are normally characterized by a strong dependence on the fundamental research, creation of technologies to them becoming commercially attractive innovations. Essentially, their goals are different, corresponded with the desire to invest in the fast-growing new businesses. The main problem of development of innovation based on technologies using risk capital is that the risk capitalists usually require a sudden and huge growth of the value of their (risky) investments. In addition, this requires lots of time and efforts to prove the potential of technology proposed. It distracts researchers from the main job, and on the other hand, scientific principles cannot be completely clear for entrepreneurs and potential investors. As a result, the future of innovation development can stop that from a risk perspective entrepreneurs are heavily dependent on scientists, and scientists usually lack entrepreneurial spirit. In the case of implemented "bottom-up" type research projects entrepreneurs and researchers are faced with great uncertainty: they are faced with great uncertainty caused by the potential demand; on the other hand, there is a risk that another more advanced technology and innovation will be created soon.

In the period of 2010-2012 years, technological innovative enterprises cooperated with a wide range of partners. The biggest part of technological innovators (more than 30 percent) collaborated with hardware vendors; i.e. bought from suppliers the technological solution. This shows that the Lithuanian economy is still relevant need for technological modernization, purchases or adaptation designed equipment from abroad. It is also a big part of innovators (more than 20 percent) cooperated with other businesses and universities. The lowest part of the technological innovators (11 percent) cooperated with

public research institutions, i. e. almost 90 percent technological innovators in public research bodies was not relevant. On the one hand, this may be related to the fact that the research institutes of resources are more focused on research than experimental development. On the other hand, it could be lead be the nature of demand of new solutions. In Lithuania technology application possibilities are considered much more relevant than unique solutions based on research and knowledge. It depends on the business strategies and the competitive nature of innovation (Mosta, 2014).

## Conclusion

The poor financing of higher education and research sector is the main cause of the slow innovation creation in Lithuania and not very high competitiveness of this country. The problems related to transfer of technologies arise due to bad and not fully compatible regulation system and low demand from the business side. In addition, without the clear reforms of higher education sector concerning the quality of studies and research, there are not very clear recipes what to do in the business and industry sectors. In addition, the situation is complicated by business tendency to compete in foreign market essentially by the lower labour costs. On the other hand, the very high uncertainty related to research and creations of new technologies are the main causes of risk avoidance from the business side. Except some examples collaboration between Lithuanian research institutions and business is not systematic and based on long-term relationship.

Despite the EU financial support the opportunities for technology based innovations are not very favourable and results are yet poor. On the other hand, despite the relatively poor financing there is a big complex of problems that causes the smooth growth of creation of technologies, innovations and knowledge economy, The main causes that creates slow development of innovations and knowledge economy is the structure of R&D sector of Lithuania and the low level of higher education. On the other hand, Lithuanian business companies are focussed rather on the low costs than on the creation of innovations and strengthening of competitiveness.

Despite the slow but positive trends of research and innovations development, the necessary solutions as the reforms of structure of higher education and research system are long-term an strongly dependent on the political will.

## References

- Eurostat, 2011. European Commission, Eurostat
- CREST, 2007. OMC Policy Mix Review Report, Country Report. Lithuania. June 2007. EU, Coordinating the Research Framework Programme and the Structural Funds to support Research and Development
- Kraujelytė A. and Petrauskas R., 2007. Technologijų perdavimo vaidmuo inovacijų procese: Lietuvos inovacijų politikos perspektyva. Viešojo politika ir administravimas, 2007. No.19
- MILTA, 2010. Lithuanian Innovation Strategy for the Year 2010-2020. Agency for Science, Innovation and Technology (MITA), February 17, 2010, No. 163, Vilnius
- MOSTA, 2014. Lietuvos mokslo būklės apžvalga. Mokslo ir studijų stebėsenos ir analizės centras. Research and Higher Education Monitoring and Analysis Centre (MOSTA), Vilnius
- Vasauskaitė J., Snieška V., Drakšaitė A., 2011. "Naujų technologijų diegimas Lietuvos pramonėje : sprendimai ir jų veiksniai", *Ekonomika ir vadyba*, No.16, pp.418-427