

INFLUENTIAL FACTORS ON THE EU STRUCTURAL FUNDS FINANCING EFFICIENCY IN THE R&D FIELD IN LATVIA

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Abstract

Facing the challenges of global competition Latvia emphasizes the advantage of its main and the most competitive recourses – highly educated society and well developed science based on the research, innovation and modern technologies. Development of the scientific activity within the national innovation system has been set as one of the priorities for future growth. The main obstacle that hinders the development of scientific activities is restricted amount of funding for research and development (R&D). Under the situation of the recent crisis, when the financing for R&D has decreased, there is necessity to invest the European Union (EU) Structural funds financial contribution in the most efficient and effective way.

The aim of the research is to determine the factors influencing the efficiency of EU structural funds financing in the field of R&D in Latvia.

To achieve the aim of the research the following tasks were set out. Firstly, accomplish revision and analysis of existing research and theoretical findings on factors of scientific activity and innovation development. Secondly, perform a survey evaluating and comprising the opinion of project implementers and policy makers on factors that accelerate or impede the development of scientific activity and innovation creation. Thirdly, analyse the results of questionnaire. Investigate the attitude and values of two main stakeholders – R&D policy planners and implementers of R&D projects – within the innovation system. Finally, elaborate suggestions for policy makers to elaborate measures that are more focused on jointly working national innovation system and user friendly, effective and efficient policy planning and implementation process.

The following economic research methods were used for tackling the tasks: grouping, graphic illustration, monographic descriptive method. Analysis and synthesis are used in the paper to study the problem elements and synthesize coherencies. The authors studied legal framework in Latvia and analyzed scientific publications in regional development, innovation economics, innovation policy, research policy, and education systems. Induction method is used for summarizing individual facts in general statements, while deduction method for theoretical explanations and logical synthesis of the empirical study.

The authors organised survey in December 2010 during annual general meeting of Latvian Academy of Agricultural and Forestry Sciences in Jelgava and via internet directly inviting the most representative stakeholders. Stakeholders were initially chosen from two main target groups: 1) beneficiaries of EU structural funds projects in the field of R&D (mainly research institutes, representatives of higher education institutions and their research institutes) and 2) policy planners of innovation, R&D and scientific activity policy in Latvia. In total, 162 completed questionnaires were returned.

The empirical research showed that there is a gap between the view of policy makers and project implementers on the basic factors of the scientific activity and innovation development. This gap shall be narrowed in order to enhance the effectiveness and efficiency of EU structural funds financing in the field of R&D in Latvia.

Keywords: Innovation policy, R&D factors, innovation, policy planning, EU structural funds.

Introduction

Phenomena of innovation are studied by the economists by applying significantly more approaches, such as:

- theoretical system oriented (Lundvall, 1992; Fagerberg, Srholec, 2008; Filippetti, Archibugi, 2011);
- methodological approach (Sinclair-Desgagné, 2000; Srholec, 2007);
- practically oriented research (Fagerberg et.al., 2009; Hall, Ziedonis, 2001; Wang., Thornhill, 2010; Prodan, Drnovsek, 2010).

Focusing on wide range of matters of innovation include the measuring of innovation inputs (Peneder 2008, Conte et.al., 2009; Flanagan et. al., 2011), outputs (Edquist, Zabala, 2003; Bayona-Sjiez, Garçã-Marco, 2010), composite indexes and indicators of innovation (Daugėlienė., 2008; Grupp,

Schubert 2009; Freeman C., Soete L., 2009).

There are several authors in Latvia that have been writing on innovations and knowledge based economy like innovative activities (Boļšakovs, 2008), innovation process and system (Dimza, 2003), knowledge society (Kamītis, 2004), innovation capacity (Lukjanska, 2010).

However, there is a lack of research that addresses an exploration of the attitude and values of each stakeholder within the innovation system.

The authors assume that the gradually increasing European Union (EU) financial contribution to Latvia can be used more effectively and efficient provided that stakeholders concentrate on the joint action within the national innovation system and build it on similar understanding of values.

Therefore the authors of this paper have found it **topically**

to study the main aspects of the scientific activity and innovation development factors in Latvia.

Scientific problem of the article deals with factorial research of the attitude and values of main stakeholders within the innovation system.

This article **aims** to determine the factors influencing the efficiency of EU structural funds financing in the field of R&D in Latvia.

To achieve the aim of the research the following **tasks** were set:

- analyse existing research and theoretical findings on factors of scientific activity and innovation development.
- perform a survey evaluating and comprising the opinion of project implementers and policy makers on factors that accelerate or impede the development of scientific activity and innovation creation.
- analyse the results of questionnaire. Investigate the attitude and values of two main stakeholders – R&D policy planners and implementers of R&D projects – within the innovation system.
- elaborate suggestions for policy makers to elaborate measures that are more focused on jointly working national innovation system and user friendly, effective and efficient policy planning and implementation process.

Research Object is development of scientific activity and innovation and factors influencing R&D.

The following economic research methods were used for tackling the tasks: grouping, graphic illustration, monographic descriptive method. Analysis and synthesis are used in the paper to study the problem elements and synthesize coherencies. Induction method is used for summarizing individual facts in general statements, but deduction method for theoretical explanations and logical synthesis of the empirical study.

The authors organised survey in December 2010 during annual general meeting of Latvian Academy of Agricultural and Forestry Sciences in Jelgava and via internet directly inviting the most representative stakeholders. Initially stakeholders were chosen from two main target groups:

1) Implementers (both beneficiaries and project partners) of the EU structural funds projects in the field of R&D (mainly representatives of the state funded research institutes and higher education institutions and their research institutes);

2) Policy makers in the field of innovation, R&D and scientific activity policy in Latvia.

In total, 162 completed questionnaires were returned. In order to test the significance level of each factor and interactions among the development factors, such as dependent variables and characteristics of the respondents – belonging to the target group, age group, experience of project implementation, sex, region of workspace – as independent variables were tested using the multivariate analysis of variance (MANOVA) test in the programme SPSS.

The analysis of R&D financing in Latvia is based on statistical data obtained from the Central Statistical Bureau of Latvia, Eurostat and the information included in Reports on higher education in Latvia (figures, data, tendencies) acquired from the Ministry of Education and Science of the Republic of Latvia during the period 2003-2009 and unpublished data from the EU Funds Joint Information System (JIS).

Comparative, analytical and historical methods have been mainly used in the article, taking into consideration the large amount of scientific literature.

Determination of the scientific activity and innovation development factors

The analysis of scientific literature, expert interviews, and previously conducted research (Meženiece et al., 2010) provided the background for the factor determination. Within the research Meženiece and colleagues (2010) organized a survey where the respondents were questioned to name the factors that impede the development of the scientific institution they represent. According to the results of questionnaire, the second difficulty impeding the development of research institutes, following the cut of basis financing from the state budget, was mentioned the legislation framework.

European catching-up countries, namely the New Member Countries of Central and Eastern Europe, have been affected by recent crisis to a greater extent than the countries with a stronger National innovation system (Filippetti, Archibugi, 2011). Purlys (2009) underlines the necessity of enterprises to innovate in order to overcome the recession.

According to Filippetti and Archibugi (2011), competences and quality of human resources, the specialization in the high-technology sector along with the development of the credit system seem to be the structural factors which are able to mitigate the effects of the economic downturn on innovation investments of companies across Europe. The fact that some structural characteristics of the National innovation system explain persistency of innovation in response to major exogenous shocks is an important finding (Filippetti, Archibugi, 2011).

Since the direct public R&D funding can not be delivered or increased in sufficient amount (the financing for innovation is just 0.45% of Gross Domestic Product (GDP) in Latvia, while the average performance of 27 European Union (EU) member states is 2.01% of GDP in 2009 according to data provided by Eurostat) because of recent crisis and huge cuts of the state budget, it is important to study the factors of R&D influence and investigate possibilities to use indirect measures such as interference in the legal and regulatory framework and definition of public procurement rules in favour of innovative and R&D promoting products and services, that could enhance R&D performance in Latvia.

Therefore the authors were encouraged to set and test the following main factors and aspects of the factors that influence the development of R&D activity in Latvia:

- Legal factor group
- Skills of project realization
- Commercialization of inventions
- Financing factor
- Efficiency factor group.

Legal factor group

The indirect measure that can be taken by government in order to enhance the scientific and innovation activity is a set of legal framework.

The authors were encouraged to name and test the following main aspects of the legal framework that influence the development of R&D activity in Latvia:

- the current regulation on the intellectual property

rights;

- the recently introduced joint record keeping of scientific and academic personnel working hours at the same employer;
- corruption;
- tax allowance or subsidies for producers of innovative products;
- the legislative conditions, which make provision for indemnification of losses in case of unsuccessful research results.

The legislation on intellectual property rights is one of the basic elements of the national innovation system (Dimza, 2003; Boļšakovs, 2006) and is used not only for purposes of innovation development, but also for the mutually reinforced comprehension of vulnerabilities of private companies and persistent need for self-protective strategies of patent trading and cross-licensing (Hall, Ziedonis 2001). The consequences caused by unconsidered action of the government when elaborating legislation on intellectual property rights can bring about enormous state budget losses later on (see Aghion et.al., 2009), therefore it is even more important to evaluate the aspect of the legal factor.

The experts from scientific institutions and state agencies expressed contestant opinion about the newly introduced joint record keeping of scientific and academic personnel working hours at the same employer, therefore we included this aspect into the research.

While tax relief was introduced as contraction to crisis in the EU member states like Belgium, Germany, Spain, Ireland, France, the Netherlands, Portugal and Slovakia (Conte et.al. 2009), this measure that facilitates innovation around the Europe has not been established in Latvia. We consider that tax relief would push innovation activity towards faster development and growth; therefore we tried to clarify the attitude of the respondents to this measure.

Skills of project creation and realization

In order to indicate if there is lack of information on R&D project calls or lack of project realization skills among project implementers, the authors asked to value if scientific institutions need to improve skills in such aspects:

- Project preparation, project proposal writing skills;
- Skills of project administration management;
- Skills for project partner attraction from other scientific institutions or universities;
- Skills of entrepreneur involvement in the project realization.

Commercialization of inventions

Inventions without their commercialization do not become innovations. Innovation has the practical application of new inventions into marketable products, services or processes; thus contributing to the economic growth.

The qualifications of researchers for joining business world is also an issue of interest to many researchers. Some of them are studying researchers intentions of becoming an entrepreneur (Ding , Choi, 2011), while others are more concerned about employment of researchers in the private sector (Keršytė, Kriščiūnas, 2008; Roach, Sauer mann, 2011).

Attitude to the commercialization of inventions has been studied in the article, because it could help to understand the differences of stakeholders point of view.

The main aspects of inventions commercialization questioned in the survey were:

- Knowledge of intellectual and intangible property rights;
- Ability of scientists to patent practically useful inventions;
- The scientists orientation to the performance of applied research;
- Involvement of entrepreneurs in contracting new product or service development to the scientific institutes;
- Ability of scientists to offer their services to the entrepreneurs in common language.

Guidelines for Development of Science and Technology 2009-2013 elaborated by the Ministry of Education and Science of Latvia states that lack of knowledge and skills of commercialization and insufficient amount of financing are the main problems in the field of research and development (R&D) in Latvia.

Financing factor

The monetary resources have been defined as separate factor group, because the authors of article considered it important to include not only the aspect of availability of this resource, but the financing mechanisms both directly and indirectly used by the government within the 'policy mix' (for more see Flanagan, 2011). Evaluating financing mechanisms available for research institutes we constructed financing factor that according to our questionnaire includes the main financial instruments:

- Base funding, which is allocated to ensure scientific activities and development in the state research institutes and state university research institutes, as well as to cover maintenance costs of research institutes and salary expenses for scientific staff;
- Financing from European initiatives, for example Framework Programme 7, EUREKA, COST and other, European Structural Funds and national research programmes.

State loan is an option available for state research institutes to borrow financial resources to ensure developmental project completion also as substitute to commercial bank loans. The both kind of borrowing instruments are included in the financial factor group together with financial instruments and support mechanism for consulting in finance management and accounting issues.

Efficiency factor group

Activation of innovation process in European Union can be reached by more target oriented developed and more effective use of innovation potential (Melnikas, 2009).

Efficiency aspects of factors influencing R&D development refers to the efficient use of recourses and methods in the innovation creation process, efficient national innovation system and efficient planning of structural policy as well as efficient institutional scheme of state research institutes. According to Conte (Conte et.al., 2009) some of these aspects refer to the environmental factors influencing efficiency and effectiveness of R&D.

Questionnaire organization

The authors questioned representative stakeholders from two main target groups:

- 1) Beneficiaries of the EU structural funds projects in the field of R&D – mainly research institutes and representatives of higher education institutions and their research institutes as well as some entrepreneurs who have been implementing R&D projects or participating in the projects as partners (810, response rate 17.3%);
- 2) Policy makers of innovation, R&D and scientific activity policy in Latvia – different levels of civil servants working in the ministries and state agencies: Ministry of Education and Science, Ministry of Economics, Investment and Development Agency of Latvia and State Education Development Agency (203, response rate 10.8%).

During a 6-weeks process of collecting the replies on questionnaire, one reminder was sent after 4 weeks. In total, we obtained a representative random sample with 162 usable responses – 32 were filled in paper during annual general meeting of Latvian Academy of Agricultural and Forestry Sciences in Jelgava and 130 - via internet using survey portal <http://www.kwikisurveys.com>.

The overall response rate was 39.50% (paper filled by 45.71%; internet filled by 12.83%) and all of them were valid, because it was possible to complete the questionnaire only when all of the required answers were provided.

Age structure of respondents shows that 43.8% were above 44 years, 9.2% above 63 years, but the main group of respondents (35%) were aged between 25 and 34 years.

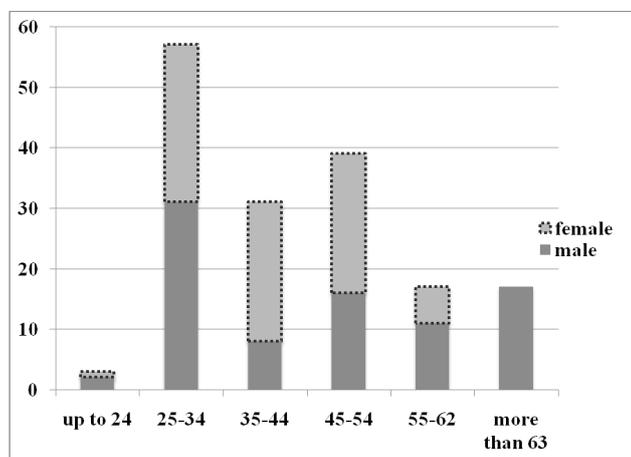


Figure 1. Distribution of survey respondents between age and sex

Source: authors' calculations based on survey results, December 2010 – January 2011 (n=162)

The Figure 1 shows the distribution of survey respondents between age and sex. The number of women and men participants is almost equal – respectively 49% (79) women and 51% (83) men, but the female respondents are younger than male ones.

Survey was formed from different type of questions:

For evaluation of the above mentioned aspects of each of factors we used matrix question, where identical response categories are assigned to multiple questions, combined with

scale method in order to measure attitude to each aspect of the factor; for the ranking of factors rank order scale.

Analysis of questionnaire results

The respondents were asked to evaluate aspects of each factor in the scale from -5 to +5, respectively to mark an aspect as -5 if, according to respondents opinion, it influences the development of scientific activity in Latvia in the most negative way, and as +5 if the impact of the aspect is extremely positive. We assume that the aspects marked with zero over 30% of all answers have no influence on the development of scientific activity in Latvia. Evaluating legal factor we have concluded that main aspects which influence the development of R&D in Latvia negatively are:

- the recently introduced joint record keeping of scientific and academic personnel working hours at the same employer;
- corruption.

However tax allowance/ tax relief or subsidies for producers of innovative products was rated as positive even though it has not come in to force yet. So we can conclude that in case of tax relief introduction, it would become even more positively evaluated factor.

The analysis of variance (ANOVA) shows that there is a significant interconnection between the opinions of two main target groups (project implementers and policy makers) on how the legal factor influences the development of the scientific activity and R&D in Latvia only in regard to two aspects: joint record keeping of scientific and academic personnel working hours at the same employer ($\alpha=0.05$, $R^2= 0.139$) and tax allowance or subsidies for producers of innovative products ($\alpha=0.05$, $R^2= 0.135$).

The results show that project realization skills among project implementers could be slightly upgraded, while there is need for substantial improvement of scientific institutes' skills of entrepreneur involvement in the project implementation.

The group of commercialization factors were evaluated overall positively except of involvement of entrepreneurs in contracting new product or service development to the scientific institutes (average -0.51) and ability of scientists to offer their services to the entrepreneurs in common language (average -0.05), while the highest average mark (+1.31) was given to the aspect of the scientists orientation to the performance of applied research.

The questionnaire results approved our assumption that base funding and nationally organized R&D project calls (EU funds, national research programme, LZA grants, Market oriented research programme etc.) are the most popular ones among the project implementers.

An efficient use of recourses and methods in the innovation creation process were outlined by respondents as the most important aspect of factors influencing R&D development.

The previous research (Meženiece et al., 2010) showed that the respondents valued the provision of public funding for basic research as the most powerful policy instrument ensuring development of scientific activity in the long run. That potentially creates positive externalities that favour industrial applications over the long run (Peneder, 2008).

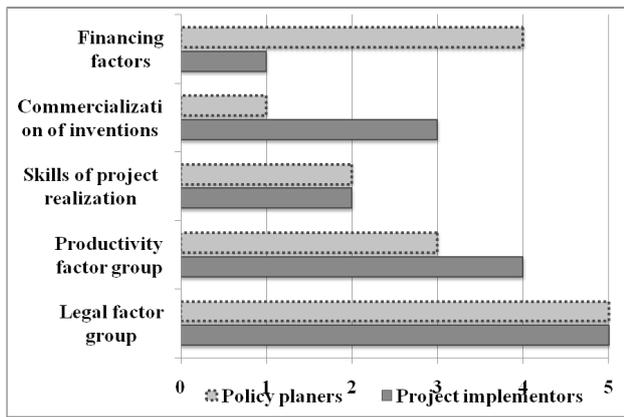


Figure 2 . Ranking of factors that impact development of scientific activity

Source: authors' calculations based on survey results, December 2010 – January 2011 (n=162)

To study which of the above mentioned factor groups are the most influential to the R&D development in Latvia we asked to rank the factors from 1 – factor has strong influence to 5 – factor is least influential. The Figure 2 shows that there are differences between opinion of policy planners and policy implementers.

Policy planners as No. 1 ranked factor of commercialization, while the project implementers financing factor found the most influential.

Interesting that policy planners group of financing factors ranked just as No.4 after ranking skills of project realization in the second place, but productivity and efficiency factor group in third place.

Conclusions

Tax allowance is a measure that facilitates innovation around the Europe, but has not been established in Latvia. We consider that tax relief would push innovation activity towards faster development and growth.

The survey results showed that tax relief or subsidies for producers of innovative products was rated positively even if it has not come in to force yet. This means that in case of tax relief introduction, it would become even more positively evaluated measure.

Measures shall be introduced that do not demand immediate financial investments from the conversely direct spending of government, for example the innovation procurement.

There is an attitude gap between project implementers and project planners means that there is lack of joint vision of two main stakeholders within the national system of innovation.

This gap shall be narrowed in order to enhance the effectiveness and efficiency of EU structural funds financing in the field of R&D in Latvia.

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