

Research and Development Financing with Use of the Structural Funds in Poland

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Abstract

The article concentrates on showing the spheres of R&D and higher education in the Polish Operational Programmes and diversity of actions included in the OPs, as well as relations of financing from the Structural Funds and national budget, structure of financing of the R&D in Poland, and main assumptions made in the National Strategy for Science in Poland until 2015

1. Introduction

The aim of the article is to present current system of financing of the R&D and higher education sector in Poland, with the special focus on the Structural Funds use.

The European Commission stressed very much adoption and implementation of the revised Lisbon Strategy and obliged the EU Members to spend money for their objectives, within the framework of the regional policy. Also Poland, even if more concentrated on the convergence goal, decided to show its willingness to reinforce the R&D sector with the use of additional resources.

Many strategic documents prepared before 2007-2013 perspective contain goals of innovation increase, raising R&D expenditure and higher education reforms. The basic strategic document which integrates assumptions of the renewed Lisbon Strategy and of the Cohesion Policy for the years 2007-2013 is the Community Strategic Guidelines (CSG). Within the framework of the CSG, the Commission proposed to concentrate intervention measures of the Cohesion Policy on the objectives of the renewed Lisbon Strategy, namely on stimulating growth of economy competitiveness and on increasing the employment level. In the CSG, the Cohesion Policy goals, to be attained at the Community level, are defined as follows: making Europe and its regions a more attractive place to work and invest, development of knowledge and innovativeness for economic growth and creation of a substantial number of better and permanent jobs.

Referring to the research area the Polish government elaborated the Strategy for Development of Science in Poland until 2015¹. Its general aim is “an increase of international competitiveness of the Polish science, which is understood as:

- ability to solve research problem at the level recognized as “high”
- ability to create solutions that can be applied taking into account international competitive supply of socio-economic innovation in enterprises, education and public administration sectors.

Those aims should be achieved under conditions of existence of high quality research and human research potential and infrastructure.”

Another similar in formulation objectives are included in i.e. the Country’s Development Strategy for the years 2007-2015, and many Operational Programmes (OPs).

The analysis of the programmes let one notice existence of many R&D and higher education actions in the majority of sector and regional OPs. Therefore, the following questions arise:

- will those activities be coordinated properly?
- will financial resources from the country budget and the EU Funds be concentrated or rather dispersed?

The latter is extremely important due to the fact of quite low level of R&D spending in Poland.

The article consists of the following sections:

- analysis of the system of financing of R&D in Poland
- analysis of the strategic documents and Operational Programmes priorities referring to main problems of the Polish R&D sector within the scope of the article main areas
- conclusions.

¹ Other Polish strategic documents referring to the R&D and priority research areas for Poland are the following:

-*Proposed areas of the development of science and technology in Poland until 2020* (policy document of the Minister of Science and Information Society Technologies, November 2004),

-*Aims of the national research, science and technology, and innovation policy until 2020* (adopted by the Government in December 2004),

-*The strategy for the development of science in Poland until 2020* (adopted by the Government in June 2005). In: M. Dąbrowa-Szefler, J. Jabłecka-Pryśłowska OECD Thematic Overview of the Tertiary Education, Country Background Report for Poland, Warsaw 2006

2. Analysis of the present system of financing R&D and higher education in Poland

In the diagnosis shown in the Strategy, a few problem areas are enumerated. Those problems are main causes of the gap existing between Poland and better developed countries in the research and development field.

1. The major problem described in the Strategy for Development of Science in Poland until 2015 is a **shortage of financial resources** for the research in Poland. In 1991-2004 relation between total expenditure from the Polish budget and GDP was systematically dropping. In 2005 the amount was at the nominal level of the 2004 expenditure, while in 2006 and 2007 increased by 15% and respectively - 10%.

In 2004 the indicator, measured in PPP, was 0,38% of GDP and that level was twice time lower than the EU average, which reached 0,63% of GDP. The most developed countries however had the indicator at the 0,90% of GDP, where the best performers in the EU were Finland and Sweden (0,90% of GDP) and France (0,87% of GDP).

In 2005 country spending on the R&D (GERD²) was 0,57% of GDP with EU-25 average – 1,86% of GDP, and the OECD countries – 2,26% of GDP.

2. Another important problem is **unsatisfactory structure of financing** of R&D in Poland. In the majority of high developed countries R&D is financed from non-budgetary resources, mainly – private entities budgets. In Poland in 2005 the structure was the following:

- 57% of total amount came from the state budget
- 26% of total amount was financed by the enterprises
- 7% of total amount comes from the budgets of scientific entities (i.e. the Polish Academy of Sciences, R&D entities (Polish JBR – Jednostki Badawczo-Rozwojowe).

In comparison, in the EU countries the share of the public money is 35% and OECD – 30%.

According to the tendencies observed, the Polish decision-makers assumed the increase in total expenditure on the disciplines that have been underfinanced when taking into consideration the similar amounts spent in better developed countries.³ Those priority-disciplines are, namely: mathematics, engineering, ICT, biology, chemistry and physics, which are driving forces of the innovative and competitive economy. At the same time the choice of such scientific areas one can contribute also to the change of the structure of financing of the R&D. The solutions and technologies (the effects of support given to the

² GERD – Gross Domestic Expenditure on R&D

³ In 2005 the structure of spending on R&D on the more prospective disciplines was the following: 43,3% of total amount was development projects in engineering and technology, 24,4% – natural science: i.e. biology, chemistry, physics, 15,2 % – medical science, 3,6% – social sciences and humanities, 13,5% – agriculture. In: The Strategy of Development of the Science until 2015.

research areas) should be in the field of interest of many companies, which can contribute to finance R&D, when its implementation may give potential comparative advantage to them.

Another consequence of current system of research financing in Poland is domination of basic research upon applied research.

When analyzing institutions involved in research in Poland in 2005 the highest share in total GERD was in the research entities (JBR) – 32,9% and the universities – 31,6%. The private companies had the share at the level of 20,6%, and the Polish Academy of Sciences' research entities – 13,4%..

3. Third major problem defined in the Strategy is “**institutional weakness**” in the sphere of financing R&D from public resources. The majority of individual decisions on the financing of research projects are taken by the Minister for the Science and Higher Education and the managing of financing is due to the Ministry of Science and Higher Education, which results almost complete centralization of decision-making in the sphere. Only small part of competences was delegated to the external entity – the Federation of Scientific and Technical Associations (NOT) - that distributed financial resources for the implementation of the results of research projects for the small and medium enterprises.

In 2006 the majority of means (68% in 2006) was assigned within the framework of statutory activity for the protection of basic needs of scientific entities. The remaining resources were assigned mainly for: research projects (17,7%), goal-oriented projects (4,18%), investments (6,52%) and international scientific and technological cooperation (1,96%). Such a distribution of resources indicates that the budgetary financing is to a very small extent linked to the effectiveness and applicability of research performed by subsidized scientific entities, with respect to the needs of the economy. It should be stressed that changes in this scope consisting in a substantial increase of demand for competition – “project” funding (it refers both to enterprises and scientific entities) would not be possible in a short period of time because this requires wider systemic reforms.⁴

Until 2007 there was no executive agency (with legal personality) with the right to direct the budgetary resources to particular beneficiaries dealing with the R&D (i.e. research entities). The result of such situation is non-optimal efficiency of the investment made, mainly due to administrative constraints put on the whole process.

The described problem is another example of lagging behind more developed countries.

⁴Operational Programme Innovative Economy

The answer to the problems diagnosed is the formulation of institutional and financial proposals that should enable to reduce the gap existing between Poland and the leaders in R&D sphere. Referring to the problem of insufficient expenditure on R&D, in the strategic documents, priority areas of development of the Polish science were indicated together with respective and possible areas of their implementation. (Tab. 1.)

Table 1. Driving force of the Polish science until 2015

Areas of science Areas of implementation	Biotechnology	Nanotechnology	ICT
Health	+++	++	+
Energy	++	+++	+
Physical Production	++	+++	+
Innovative services			+++
Society			+++

Source: The Strategy for Development of Science in Poland until 2015

In the documents and OPs also main goals resulting from the tendencies in the science sector were presented. Those tendencies comprise:

- civilization trends that influence scientific development, stress the popularization of the research results as well as networking between the science and economy.
- research trends, technology development and innovation that focus i.e. on the areas of science show in the Tab. 1.
- research and innovation policy instruments' trends, that promote calls for proposals and grant system while applying for money; implementation of the research effects, clustering, use of the joint-ventures, seed capital and start-ups.
- trends in the R&D and innovation sector that stress the raise of share of private capital in financing research; growing role of the universities in research (financed from the public resources), change of the character of R&D in the companies; joining the European Research Area (ERA).

In order to create innovative economy, in the the Country's Development Strategy for the years2007-2015 a postulate "to concentrate public resources on „implementation of strategic research and development programmes, that should end with commercialization of the Polish products" appeared. The State should support and encourage the entrepreneurs to involve their own resources for the R&D and the final result should be a raise of their innovativeness.

The optimal financing structure is that in which 2/3 of all investment on R&D derives from the non-budgetary sectors, mainly from the industry sector.⁵

Increase of private expenditure on R&D is estimated from current level of 0,15% of GDP to 0,6% of GDP in 2015. The private sector should finance mainly applied research and development..

At the same time there is strong pressure on increase of public expenditure on R&D (according to the obligation to implement the Lisbon Strategy – Tab. 2.) as well as the improvement of the quality level of research conducted by the Polish scientists, access to research infrastructure and creation of efficient institutional environment that operates R&D financing from the public resources.

On April 17th 2007 The Polish Council of Minister adopted the following prognosis of increase of the R&D spending in Poland (Tab. 2.):

Table 2. Value of GERD and its components (in mln of PLN) and its share in GDP in 2007-32015 (prognosis)

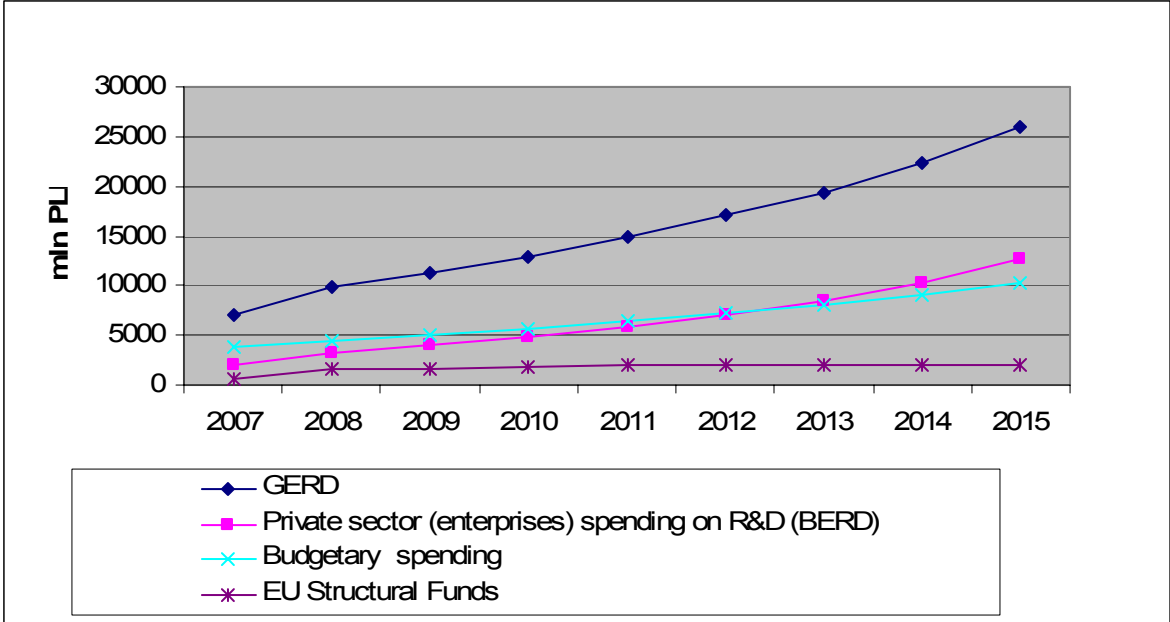
	2007	2008	2009	2010	2011	2012	2013	2014	2015
GERD	6960,4	9794,9	11232,5	12932,6	14875,1	17042,7	19351,6	22301,3	25929,5
Private sector (enterprises) spending on R&D (BERD)	2027,9	3317,0	3987,1	4817,4	5822,9	7021,4	8410,0	10290,0	12708,3
Budgetary spending	3849,5	4396,3	4970,1	5618,8	6350,7	7175,4	8101,8	9153,4	10342,7
EU Structural Funds	591,8	1539,2	1676,4	1835,0	1970,9	2038,9	1948,3	1948,3	1948,3
% of BERD in GERD	29,13%	33,86%	35,50%	37,25%	39,15%	41,20%	43,46%	46,14%	49,01%
% of the Structural Funds in GERD	8,50%	15,71%	14,92%	14,19%	13,25%	11,96%	10,07%	8,74%	7,51%
% of GERD in GDP	0,62%	0,81%	0,86%	0,92%	0,98%	1,04%	1,09%	1,17%	1,26%

Source: Ministry of Science and Higher Education

⁵ the Country's Development Strategy for the years 2007-2015, approved by the Council of Minister of the Republic of Poland on 29.11.2006

As one can observe expenditure on R&D in Poland should increase four times in 2015 when comparing it to the 2007 level. The share of private sector should be six times higher, while the percentage of BERD in GERD will double. There is also certain amount of the EU Structural Funds programmed within the OPs. Even if the relative share of the Structural Funds is not as high as the other sources, their role is quite important. The projects financed from the EU funds should serve as the engine of changes in the way of thinking of the R&D financing and aim at the testing of innovative policy making in the sphere, as well as change in the efficiency of expenditure on R&D.

Chart 1. Increase of main components of GERD in Poland 2007-2015 (mln PLN).



Own elaboration on the basis of the Ministry of Science and Higher Education data

Another aspect of additional finance for the R&D and higher education is related to different rules of subsidizing research and the universities functioning, depending on the source of finance, namely, the Structural Funds or state budget.

When taking into account the EU funds one can observe very small dependence of present algorithms for the research activity conducted by the universities and the algorithms for didactics and infrastructure financing, upon the scientific potential of the particular university.

The grant algorithm for the university functioning and infrastructure is based, to very limited extent, on the scientific potential co-efficient.⁶

Moreover, grants on statutory activity of the research entities reflect only retrospective way of calculating subsidy, which means that the entity receives grant based on the data from the previous years, while current necessities can be different than in the past. Also participation in i.e. EC Framework Programmes had no big influence on the level of state subsidizing.

Financing from additional (EU Funds), which since 2007, have been flowing via the Polish budget, is quite different. It can be admitted only after the universities or research entities' project acceptance by the authorities and signing the contract. If the project is multiannual, one may enclose its costs, financed either from the Structural Funds and from own contribution, in the state budget in advance. Nowadays, in Poland it seems extremely important to co-ordinate those two financial inflows from the country and the EU budgets and concentrates spending on developing most promising and strongest academic centres and research entities.⁷ This is also very often pointed out that only the reforms of the system of financing of the R&D and higher education sectors, combined with the institutional changes (i.e. establishing the national governmental agencies that specialize in the scientific activity coordination in the applied and basic sciences) can bring the positive effects in both spheres.⁸

⁶ Its wage among other algorithm co-efficients is low and is 0,10: when other related to the former grant is 0,7 and – to the number of academic staff - 0,35 levels. Regulation of the Minister for the Science and Higher Education, 2nd April 2007

⁷ In the Strategy of Development of the Science in Poland until 2015 the processes of consolidation, commercialization and privatization of the research entities is stressed. The changes should lead to creation of smaller amount of strong entities, which are able to to conduct integrated and huge R&D projects. Their results will serve the society and economy and help gain strong position in the international arena. Very important role plays co-operation between ministries of i.e. economy, agriculture and Health. After JBR (research entities) restructurization one will aim at the creation of the national scientific institutes (Państwowy Instytut Naukowy – PIN).

Also referring to the institutions of the Polish Academy of Sciences one focuses on the effectiveness of research, especially of this that influence civilization and economic development of the country and use of the best practices in the entities management.

When the research entities of the universities are taken into account one predicts concentration of expenditure on the functioning of the inter-universities interdisciplinary centres.

⁸ The Strategy of Development of the Science in Poland until 2015 assumes changes of budgetary subsidizing R&D, where the basis of the assessment of the level of efficiency of the research entities are effects of the parametric evaluation. The evaluation is pursued once per 4 years, and starting point for that are published or implemented research results of the entity. The parametric assessment is based on i.e. patents, main articles and books, copyrights and practical use of the results outside the evaluated entity. The biggest change in the evaluation will be stress put on the entity acting on the commercial market, strong dependence of the amount of subsidies on the implementation of tasks that conform the state policy as well as position in the ranking; and involvement into parametric assessment the representatives of enterprises, financial institutions and foreign experts.

3. Priorities of development of the R&D and higher education sectors in the Polish Operational Programmes co-financed from the Structural Funds.

The objectives of both Strategies and prognosis are also present in the OPs financed partly from the Structural Funds. Poland is the biggest net beneficiary from the EU budget and while programming the development until 2015, the Structural Funds were also directed to the R&D and higher education. Those sectors, treated as crucial for contemporary economies growth and knowledge-based economy, have to be taken into account also in many aspects of state and regional policies. The Structural Funds projects in R&D will serve as pilot projects and hints how to change the structure of financing of the research, how to include the innovative elements into policy-making at different administrative levels and how to answer to the diagnosed problems. The first task was to plan financial contribution of the project beneficiaries in the R&D area (mainly contribution given by the enterprises). (Chart 1.). The continuous change in the way of thinking on R&D investing should bring the effects in the form of higher private spending on research and development.

In 2004-2006 (which was the perspective for the New Member States) the Structural Funds distributed by the Ministry of Science for the co-operation between the scientific area and the enterprises were spent within the Sectoral Operational Programme Improvement of the Competitiveness of Enterprises years 2004-2006 (Action 1.4.). Almost 88,5 mln euro from the European Regional Development Fund (ERDF) was spent for projects within that Action. Since the start of the Programme until 2007 677 applications were delivered, 214 contracts were signed for total amount of 121,3 mln euro. The value of the ERDF grant is equal to 13% of the state Budget – Section “Science” in 2006.⁹

The applicants have the greatest interest in investment projects, yet significantly fewer submitted applications and signed contracts related to the implementation of R&D projects. This is a typical feature of undercapitalized structures, but changes in the infrastructure should result in an increased number of research projects, due to the modernized infrastructure. Furthermore, the reasons for such a structure of applications should be attributed to not very flexible and complicated procedures and general construction of applied instruments when scientific entities are involved. The majority of projects is implemented by scientific entities from the public sector. Projects carried out by entrepreneurs relate mainly the areas of “computer science and related activity” and “conduct of research and development works”.¹⁰

⁹ Operational Programme Innovative Economy

¹⁰ Ibidem

In 2007 with the beginning of new financial perspective, due to “n+2” rule, the projects can be implemented until 2015. In those years the actions within R&D and higher education sectors are included into:

- Operational Programme “Innovative Economy” 2007-2013 (OP IE)
- Operational Programme “Human Capital” 2007-2013 (OP HC).

In both programmes the Intermediate Institutions is the Minister for Science and Higher Education and the total budget for the sphere coming from the national OPs is almost **4,1 bln euro**. The annual share of the Structural Funds in GERD in 2007-2015, depending on year, varies from 8% to 15% (Tab. 2.).

The objectives of both programmes are the answer to the problems defined in the Strategy of Development of the Polish Science until 2015. The programmes aim at:

- 1) strengthening cooperation between R&D and economy,
- 2) improvement of quality of research and increase in quantity of scientists,
- 3) improvement of efficiency of the R&D entities and institutions of the system of financing R&D,
- 4) development of the research infrastructure.¹¹

In the OP IE the strong necessity of research infrastructure creation and modernization is underlined. Therefore, the following activities are required:

- a) direct investment
- b) consolidation of dispersed infrastructure
- c) increased efficiency of the use of the research infrastructure.

Very important element of the strategy of R&D infrastructure development in Poland is the list of individual infrastructural projects within the 2. Priority Axis of the OP IE, which was prepared by the Ministry of Science and Higher Education. The list comprises set of research laboratories and equipment of value higher than 100 mln PLN. Those infrastructural solutions help the Polish scientist get new experience in conducting investment and exploitation in the area, and at the same time, improve the position of research centres at the international arena. One of main criterion of choosing the projects to be co-financed form the OP IE is co-operation with the enterprises.

¹¹ Those aims are conformed to the EU strategic goals as well as the COM (2005) “Common actions for growth and employment. The Community Lisbon Programme”

Besides, modernization of existing infrastructure should be financed from the budgetary sources. In such context priority is given to the projects led by the consortia or networks of the universities, research entities etc.

As a supplement the “horizontal investment” i.e. in information technologies development for the R&D sphere, are prepared. Those investment are implemented according to the objectives of the “Programme of development of the ICT infrastructure 2007-2013”.

Within the objective of the strengthening cooperation between R&D and economy the instruments encouraging the entrepreneurs to undertake activities that help improve their competitiveness are programmed. Such improvement can be obtained through commissioning R&D that are potentially giving them advantage on the market and further implementation of the R&D results. The constant increase of money spent on R&D in enterprises is estimated in the budget. Also growing role of soft instruments such as strengthening the business support institutions and their networks with the particular focus on the innovative set of institutions (i.e. technology parks, incubators, centres of advanced technologies) is underlined.

The main expected results of the implementation of the priority axis in the OP IE are i.a.:

- a) improvement of infrastructure and laboratory equipment of national research centres of the highest research potential,
- b) improvement of the level of competitiveness of Polish research centres,
- c) widening and enriching the offer of research services provided by scientific entities for enterprises,
- d) increasing transfer of R&D results to the economy,
- e) improvement of the quality of Polish science management through creation of efficient mechanisms for access to information

Another sectoral operational programme that aims at the improvement of the education quality at all levels and many forms, as well as the research quality and human potential increase¹², is the Operational Programme “Human Capital” financed from the European Social Fund. Within the programme there are activities concentrated on the entrepreneurs and scientists’ skills increase in order to pursue common projects aiming at the increase of

¹² “While analyzing the quality of human resources potential in R&D in Poland some bibliometric data states that: In 2003, Poland’s share in the world scientific publications stood at 1.45% (11,600 citations) and was the highest over the last twenty years. However, as compared to other EU countries, the number of citations of Polish scientists per one thousand inhabitants was substantially lower. The average for the EU-15 in 2002 accounted for 673, whereas for Poland it was 266.” OP Innovative Economy p. 34.

innovativeness of economy. Those activities include i.e. intellectual property issues, ability to commercialize the R&D results (efficient knowledge transfer).

In Poland recently decentralization and the involvement in the economic, social and territorial development programming by the regional authorities, has played a role. The authorities of each Polish region (voivodship) prepared their own Regional Operational Programme (ROP). In some Polish regions, according to contemporary development paradigms, the implementation of the Regional Innovation Strategies is the key point. Therefore, in some Regional Ops one can also find activities or priorities that support R&D sphere, commercialization of the results of R&D and research, ICT and social infrastructure development.

The actions complimentary to the OP “Innovation Economy” actions one can find in the 16 Regional Operational Programmes and the sectoral Operational Programme “Development of Eastern Poland

All areas referring to R&D and higher education present in all Polish Programmes are the following:

- Infrastructure: social (didactic), information technology, research one
- Academic incubators
- Clustering
- Research and development projects (goal-oriented, commissioned, applied and basic)
- Education offer improvement and staff mobility
- Postgraduate studies improvement
- Expertise and analysis
- Promotion of entrepreneurship and knowledge transfer
- International co-operation.¹³

Projects related to R&D can be implemented within the following sectoral OPs: Innovative Economy, Human Capital, Development of Eastern Poland, as well as within the Regional OPs.¹⁴

¹³ Detailed classification of the actions and operations in the R&D and higher education financing is included in Annex 1.

¹⁴ In 10 ROPs research infrastructure financing is included, in 3 of them – clustering and in 3 – R&D Project.

Projects related to higher education can be implemented within the sectoral OP: Infrastructure and Environment, Human Capital, Innovative Economy, Development of Eastern Poland and Regional OPs.¹⁵

Observing the distribution of resources and aims of the OPs one can ask if the proposed system of financing of the R&D and higher education will be efficient. While counting only the number of programmes that co-finance similar operations from those 2 areas, the following questions rise:

- are the EU Structural Funds dispersed?
- is there a risk of double financing of the projects under the different OPs, especially in case, the same operations are included in sectoral and regional OP?
- what are the possibilities of the monitoring of efficiency of spending?

The most dangerous is the question of double financing of the projects. However, regulatory solutions included in the European Union regulations and Polish legal acts¹⁶ ban the double financing the same project from different OPs. In that case the special focus is given to demarcation lines elaborated jointly by all involved parties, between programmes on a national level and regional operational programmes and also operational programmes financed from other funds, which was accepted by the NSRF Coordinating Committee. This fact constitutes an appropriate reference to determine the issue of intervention scope proper for a given operational programme.

In order to ensure the observance of the elaborated demarcation between the ROP and other operational programmes at the stage of their implementation, additionally the following coordination tools will be provided:

- **Monitoring Committee** whose task is to watch over the effectiveness and quality of implementing the IE OP.
- a certain role in the process of the coordination of awarded support and avoidance of double financing will be introduced on the operational level, i.e. through obliging beneficiaries to declare, before signing a contract on financing, that eligible expenditures presented within a given project approved for implementing are not financed in an unallowable extent (double, within ineligible expenditures) from other operational programmes.¹⁷

Referring to another two risks defined, one can postulate that the Managing Authority, Intermediary Bodies and the Monitoring Committees acting in the sphere of R&D and higher education should inform themselves mutually:

¹⁵ In each ROPs financing of the social infrastructure is included.

¹⁶ Article. 54 of Council Regulation EC/1083/2006, 11th July 2006

¹⁷ OP Innovative Economy

- on the stage of the formulation criteria of choosing the project within different OPs, Priorities and Measures
- while setting strategic criteria and preferred types of projects/ operations/ to be chosen in particular calls for proposals
- after report delivery showing the level of achieving results in R&D area and audit results;
- detection of irregularities/ abuses in certain operations
- ways of solving problems in case of similar tendencies and problems common for particular group of beneficiaries.

Only institutional cooperation and coordination of activities can help to achieve the aims of the strategic documents and OPs.

4. Conclusions

Polish science and economy still have to face continuous challenges in the light of increasing international competitiveness. Those challenges requires response in the form of formulating and pursuing active research, scientific, technological and innovative policies. The activities proposed in the “Strategy for the Development of the Science in Poland until 2015” shall enable “increase in intensity and quality of research in Poland and enhancing economic and social utility of the Polish science”. The main actions, within the framework of the country research policy, should comprise:

- increase of efficiency of financing research from public resources;
- strengthening co-operation between the research entities and enterprises;
- legal, organizational and system changes that help implement research, scientific, technological and innovative policy in more effective way and increase R&D financing from non-budgetary sources;
- enhancing the international co-operation, especially in the EU area;
- promotion of science and innovativeness among the Polish society.¹⁸

The majority of the above mentioned activities are included in the sectoral and/ or regional Operational Programmes, thanks to which the Structural Funds in Poland can be used.

While negotiating all Polish OPs With the European Commission the demarcation lines between programmes were carefully examined. The risk of double financing of projects i.e. from sectoral and regional programme was at the special interest of the Commission. The acceptance of the OPs by the European Commission certifies that the projects will not be

¹⁸ The Strategy for the Development of Science in Poland until 2015

double financed. However, very tight co-operation between the set of institutions from the R&D and higher education sphere, involved in the management of the Structural Funds in Poland is required, in order to:

- 1) monitor demarcation lines between the OPs,
- 2) elaboration of the criteria and preferences while choosing the projects and formulating the individual lists of projects from R&D and higher education,
- 3) monitor irregularities in the process of implementation and achieving by beneficiaries the predicted effects, referring to the strategic objectives of the OPs,
- 4) co-ordination of the annual budget expenditure and financial instruments at the EU and state level devoted to the science and higher education.

The role of the pilot-projects co-financed from the Funds seems to be crucial when necessary reforms in the sphere of Polish R&D and higher education are concerned. Those projects will serve as benchmark ones and decide to some extent on the successful changes in both areas.

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Annex 1. Classification of the operations in the R&D and higher education in the Polish Operational Programmes

Area	Types of Operations	Operational Programme	No of Measure	Financial allocation on the Measure
I Social Infrastructure I a didactics	1. New buildings or modernization of existing infrastructure together with accompanying social infrastructure 2. complex Project on ICT in didactics 3. Internet Access for students (i.e. hot-spots) 4. Project application preparation (i.e. feasibility studies etc.)	Infrastructure And Environment	Measure 13.1.	588,24 mln euro
	New buildings or modernization of existing infrastructure together with accompanying social infrastructure Revitalization of historical buildings E-learning infrastructure	Wielkopolskie ROP	Measure 5.1 Measure 4.2.	88,15 mln euro
		Development of Eastern Poland	Measure 1.1	28,673 mln euro
		Dolnośląskie ROP	Measure 7.1	396,868 mln euro
		Pomorskie ROP	Priority 2	87,81 mln euro
		Zachodniopomorskie ROP	SubMeasure 7.1.1	4,5 mln euro
		Śląskie ROP	Measure 8.1	65,208 mln euro
		Kujawsko-Pomorskie ROP	Measure 3.1	64,982 mln euro
		Małopolskie ROP	Measure 1.1	125,291 mln euro
		Podlaskie ROP	Measure 6.1	23,529 mln euro
		Opolskie ROP	SubMeasure 5.1.1	25,627 mln euro
		Łódzkie ROP	Measure 5.3	35,519 mln euro
		Podkarpackie ROP Lubelskie ROP	Measure 5.1 Measure 8.1	73,868 mln euro 42,96 mln euro
		Mazowieckie ROP	Measure 7.2	127 mln euro

		Świętokrzyskie ROP	Measure 5.2	34,155 mln euro
		Warmia i Mazury ROP	Measure 3.1	27,358 mln euro
		Lubuskie ROP	Measure 4.2	42,633 mln euro
Area	Types of Operations	Operational Programme	No of Measure	Financial allocation on the Measure
I b) ICT Infrastructure	ICT infrastructure of information society, including education service, e-learning, hot-spots for students, public administration functioning etc. :	Innovative Economy	Measure 7.1	788, 235 mln euro
			Measures 8.1-8.4.	1415,865 mln euro
		Infrastructure and Environment	Measure 13.1	-
			Measure 5.1	88,15 mln euro
		Wielkopolskie ROP	Measure 2.1	-
			Measure 2.7.	94,66 mln euro
		Dolnośląskiego ROP	Measure 2.1.	62 mln euro
		Pomorskie ROP	Priority Axis 2	-
		Zachodniopomorskie ROP	Measure 3.1	30 mln euro ¹⁹
		Śląskie ROP	Measure 2.1	-
		Kujawsko-Pomorskie ROP	Measure 4.1	24,614 mln euro
		Małopolskiego	Measure 1.2	85,444 mln euro
		Podlaskiego	Measure 4.1	59,878 mln euro
Opolskie ROP	Measure 2.1	27,136 mln euro		
Łódzkie ROP	Measure 4.1	38,538 mln euro		
Podkarpackie ROP	Measure 3.1	95,025 mln euro		

¹⁹ Contribution from the EU Funds .

		Lubelskie ROP	Measure 4.1	69,43 mln euro
		Mazowieckie ROP	Measure 2.1	193 mln euro
		Świętokrzyskie ROP	Measure 2.2	34,155 mln euro
		Warmia i Mazury ROP	Measure 7.1.	22,682 mln euro
		Lubuskie ROP	Measure 1.3	34,597 mln euro
		Zachodniopomorskie	Measure 3.2 Measure 3.3	9 mln eur
		Podlaskie ROP	Measure 4.1	as above

Area	Types of Operations	Operational Programme	No of Measure	Financial allocation on the Measure
I c) Research Infrastructure	<p>a) development of high research potential centres, including those operating as scientific and industrial consortia¹³⁷ and regional scientific and industrial consortia by means of co-financing of development of their research infrastructure (e.g. in Advanced Technology Centres and laboratories providing specialist services for entrepreneurs, as well as in within the EIT + programme),</p> <p>b) development of R&D infrastructure in specialist laboratories, including those operating as scientific networks¹³⁸ (e.g. Centres of Excellence),</p> <p>c) support for projects implemented within the Polish Roadmap in the field of the Large Facilities of Research Infrastructure (buildings construction and purchase of equipment),</p> <p>d) projects in regard of investments connected with the creation of the new, common scientific and research infrastructure as well as with the transfer of the scientific and research infrastructure aimed at the creation of a new scientific and research centre,</p> <p>e) projects aimed at maintaining and developing of the modern IT infrastructure for science through financing investments in networks and equipment of supra regional importance, taking into account their crucial importance for the science,</p>	Innovative Economy	Measure 2.1.- 2.3.	1299,271 mln euro

	f) providing constant access to digital resources for scientific sector , g) projects in regard of the development of digitalised information resources for science, (creation and maintenance of databases on scientific results as well as providing access to scientific publications), h) projects in regard of the development of advanced applications and teleinformation services for the scientists	Wielkopolski ROP Development of Eastern Poland Śląskie ROP Kujawsko-Pomorskie ROP Małopolskie ROP Podlaskie ROP Opolskie ROP Łódzkie ROP Lubelskie ROP Mazowieckie ROP Świętokrzyskie ROP	Measure 1.4. Measure 1.3 Measure 1.3 Measure 5.4 Measure 4.3 Measure 5.1 Measure 1,1 Sub Measure 1.3.1 Measure 3.1 Measure 2.2 Measure 1.1 Measure 2.1	183,67 mln euro 479,525 mln euro 111,573 mln euro 111,883 mln euro 84,128 mln euro 25,941 mln euro 49,4 mln euro 23,056 mln euro 29,262 mln euro 21,39 mln euro 52 mln euro 34,155 mln euro
Area	Types of Operations	Operational Programme	No of Measure	Financial allocation on the Measure
I d) Academic incubators	Creation of academic incubators and business support institutions.	Innowacyjna Gospodarka	Measure 3.1.	110 mln euro
I e) Clustering	Clusters and creation of networks of co-operation	Podlaskie Wielkopolskie ROP	Measure 1.1 Measure 1.4. Measure 1.7.	49,4 mln euro 9,46 mln euro

		Development of Eastern Poland	Measure 1.4	17,657 mln euro
		Śląskie ROP	Measure 1.3	-
II. R&D Projects	<p>Identification of scientific research and development works directions in view of enhancing sustainable economic growth for raising life quality of the Polish society and rationalising funds available for scientific research by means of co-financing of projects related to:</p> <p>i. <i>Foresight Polska 2020</i> National Programme and the following foresight programmes,</p> <p>ii. preparation of strategies for development of specific disciplines of science and the economy,</p> <p>iii. preparation of strategies for technology platforms operating in Poland benefiting from the results of the foresight method;</p> <p>b) support for the implementation of the state scientific, scientific-technical as well as innovation policy through the financing of strategic programmes in regard of scientific research and development work in the thematic areas specified in the IE OP.</p> <p>c) implementation of programmes of the minister responsible for science, aimed at increasing the interest in taking up scientific career by students and graduates, including:</p> <p>i. application projects carried out by students, graduates¹³³ and doctoral students that can be applied to the needs of economy,</p> <p>ii. projects in which students, postgraduates and participants of doctoral internships would take part, focusing in the areas of priority importance in accordance with the areas specified in the IE OP, that carried out by the best research teams in Poland,</p> <p>iii. projects implemented during doctoral studies within the international cooperation of scientific institutions;</p> <p>d) implementation of a programme of the minister responsible for science in regard to improving qualifications of scientific and research staff, including the employment of outstanding scientists from abroad as managers establishing research teams in Polish scientific institutions;</p> <p>e) co-financing of research projects which results are aimed at direct application and responding to the needs of specific sectors of the economy or sectors of particular</p>	Innovative Economy	<p>Measures 1.1.-1.4. (Measure 1.1. – should be implemented in enterprises under-Measure 4.1. OP IE)</p> <p>(Measure 1.2. – Foundation of the Polish Science programme),</p>	<p>465 mln euro</p> <p>70,037 mln euro</p>

	<p>social importance (development projects);</p> <p>f) support for acquiring protection of industrial property developed in scientific entities based in Poland as a result of R&D works;</p> <p>g) co-financing of projects that cover technical, technological or organizational undertakings (applied industrial research and development works) carried out by enterprises, groups of enterprises or other entities that are able to directly apply the results of projects in practice (goal-oriented projects);</p> <p>h) support to EIT+ programme.</p> <p>.</p>			<p>373,881 mln euro</p> <p>390,352 mln euro</p>
		Małopolskie ROP	Measure 2.2	45,504 mln euro
		Mazowieckie ROP	Measure 1.2	27,5 mln euro
		Lubuskie ROP	Measure 2.4	35,682 mln euro
III. Studies programmes, didactics, staff mobility ,	<p>1.Programmes of the university developments</p> <p>i) support for mobility between sectors,</p> <p>ii) improvement of qualifications of the staff of the R&D system in the area of research management and commercialisation of R&D works,</p> <p>iii) popularisation of R&D and innovative activities,</p> <p>iv) creation of conditions for better cooperation between institutions of the education system and scientific units, as well as the establishment of the network of cooperation between tertiary education institutions and enterprises,</p> <p>v) scholarships for participants of doctoral studies, young doctors (<i>postdocs</i>) and professors supervising research projects and visiting professors, as a complementary element of so-called comprehensive programmes of the development of tertiary education institutions ,</p> <p>vi) support for the higher education system that enables the improvement of qualifications of academic staff, the implementation of programmes of international cooperation, scientific studies plus experts' reports and analyses for higher education),</p> <p>vii) support for the developing of the scientific research management system in respect of analyses and expertise reports, including, among other things, analyses of directions of scientific research, analyses of organizational solutions of D&R financing, evaluation of scientific</p>	Human Capital	<p>Measure 4.1.</p> <p>Measure 4.2.</p>	<p>898,867 mln euro²⁰</p> <p>61,5 mln euro</p>

²⁰ Allocation for the Measure 4.1.

		Małopolskie ROP	Measure 8.1	4,706 mln euro
V. Promotion of entrepreneurship, knowledge transfer	1. stages and trainings for scientists and entrepreneurs 2. academic enterprises creation – spin-offs and spin-outs 3. co-operation between science and economy 4. Regional Innovation Strategies implementation Regional system of business support institutions creation.	Human Capital	SubMeasure 8.2.1.	317,696 mln euro ²⁷
		Opolskie ROP	SubMeasure 8.2.2 PodMeasure 1.1.1	50,696 mln euro
VI. International co-operation	1. International co-operation of different partners from the EU countries	European Territorial Co-operation / ENI	-	-

Own elaboration

Projects related to R&D can be implemented within the following OP: Innovative Economy, Development of Eastern Poland, Human Capital, Regional OPs.
Projects related to higher education can be implemented within the following OP: Infrastructure and Environment, Human Capital, Innovative Economy, Development of Eastern Poland and Regional OPs. .

²⁷ Allocation for Measure 8.2.

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