

Evaluation Criteria of the Applications for Public Funding and Their Role in Increasing Innovative Potential of Enterprises:

The Case of the Opolskie Voivodeship Regional Operational Programme 2014–2020

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Abstract

The aim of the study is to assess the innovative potential of the selected companies in Opolskie Voivodeship through comparing and contrasting meeting by them criteria used for the evaluation of projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020. The study process is focused around the following research questions: (1) What criteria are used for evaluation of projects in the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020? (2) How has the innovation level of project outcomes i.e. products/ services/ technologies changed? (3) What is the level of cooperation with the R&D sector in the evaluated companies? (4) Are there any changes observed in regard to developing by companies their in-house R&D capabilities?

Keywords: innovativeness, innovation management, innovative potential, regional operational programme, evaluation criteria.

1. Introduction

There are several ways of funding investments supporting the implementation of innovations. Among them, funding can be received e.g. from the Smart Development, Eastern Poland and regional operational programmes. They subsidise similar types of undertakings – the major difference is their size and area coverage. A common feature linking all subsidies for innovation implementation is the required effect of an undertaking. As result of the investment, new or substantially improved products, services or processes must be introduced into the market. It is a significant difference in comparison with subsidies obtained by entrepreneurs in previous years. Provision of funding depends mainly on what is introduced into the market as a result of the investment. Newly acquired machinery or equipment is of secondary importance – they are considered as tools necessary to generate innovative products or services. An additional consequence can be progressive solutions concerning manufacturing processes, new organisational or marketing methods, workplace organisation or environment relations. The required scale of innovativeness of new products or services depends on the programme the aid is provided from (e.g. in the case of national programmes, the outcome should be considered as an innovation at least in the national scale). In the evaluation process, additional points are given when the implemented results of R&D works will be patented or registered for patent protection, or will concern a registered utility model.

The aim of the study is to assess the innovative potential of the selected companies in Opolskie Voivodeship through comparing and contrasting meeting by them criteria used for the evaluation of projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020. The study process is focused around the following research questions: (1) What criteria are used for evaluation of projects in the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020? (2) How has the innovation level of project outcomes i.e. products/ services/ technologies changed? (3) What is the level of cooperation with the R&D sector in the evaluated companies? (4) Are there any changes observed in regard to developing by companies their in-house R&D capabilities?

The analysis covers three selections of projects submitted under the umbrella of Measure 1.1. ‘Innovations for enterprises’ in the Opolskie Voivodeship Regional Operational Programme 2014–2020. It is focused

on the evaluation of criteria related directly to innovations or innovation processes. It combines quantitative and qualitative evaluation of all documents submitted during the selection of projects as a part of subsidisation of innovative activity of enterprises.

2. Regional policy support for innovations

The main purpose of the contemporary regional policy is the continuation of offsetting the developmental differences in regions and initiation of activities aimed at economic growth in regions. There is a dilemma of whether to support rich regions, which have a better developmental potential, or poor regions, which are generally less effective. According to the European Union, the regional policy is a convergence policy (offsetting the differences between regions). Strengthening weaker regions and countries is a way of improving competitiveness and the EU's economic potential. Regions are to compete with one another. We can observe a convergence between countries (poorer countries gradually reduce the disproportions), but there is a divergence between regions in particular countries. In the UE industrial policy, the industry plays a key role for the EU's competitiveness and innovativeness is a key factor in this scope. Industry is responsible for 80% of the European export. Nearly 65% of investments into research and development (R&D) in the private sector is derived from the manufacturing industry. Therefore, European industrial modernisation must be widespread and must include: (1) successful commercialisation of product and service innovations, (2) industrial utilisation of innovative manufacturing technologies, and (3) innovative business models (European Innovation Scoreboard, 2018).

Studies show that companies which give priority to innovations are also those achieving the highest growth in turnover. Around 79% of companies that have introduced at least one innovation since 2011 recorded turnover growth by approximately 25% until 2014 (Innobarometer, 2014). Small and medium-sized enterprises (SMEs) are a special target of the innovation policy. The smaller the company, the more probable the limitations for innovation or commercialisation of its innovation. Around 63% of companies hiring from 1 to 9 employees have declared introducing at least one innovation since 2011 in comparison with 85% of companies hiring at least 500 employees.

Around 71% of companies hiring from 1 to 9 employees had difficulties with commercialising their innovation due to lack of financial resources in comparison to 48% of companies hiring at least 500 employees (European Innovation Scoreboard, 2018).

New developmental capabilities result from providing new products and services, technological breakthroughs, new business models and processes, non-technological innovations and service-related innovations. Innovation is key for European competitiveness in the global economy. The EU implements the policy and programmes supporting the development of innovation in order to increase investments in R&D and to improve the conversion of research into better products, services or market processes. Poland is effectively adapting to these guidelines by promoting various criteria that support enterprises intending to develop their innovative potentials. Companies investing in innovative solutions can receive EU subsidies both from national and regional programmes. Nearly half of Polish companies regards innovativeness as a strategic goal of their activity, as stated by the *Innovation Maturity of Polish Enterprises 2014* report. According to the study, as many as 78% of medium and large enterprises develop innovative solutions. Slightly less, i.e. 71% of companies implement their results. Over 80% of companies intend to increase the scale and area of related activity. Indeed, the aforementioned data concerns mainly companies with stable situation and long-term presence on the market, however the trend is on increase. A growing number of enterprises – including small and medium ones – notices a chance for competitiveness and capturing new foreign markets through developing innovative and unique solutions. A challenge for enterprises is also the growing number of foreign employees, and then managing such teams. It is also a field for creating innovations (Kubiciel-Lodzińska, 2017, pp. 482–495; Kubiciel-Lodzińska and Ruszczak, 2017, pp. 77–91).

3. Innovativeness and managing innovations

An enterprise operating in the conditions of intensive competition should aim at introducing innovations and being innovative regardless of the enterprise's size (Cho and Pucik, 2005, pp. 556–575). Management theory treats innovativeness as an important feature of an enterprise characterised by the ability to introduce innovations. It is

the ability to create something new or introduce significant changes. Unquestionably, innovativeness is a skill, the ability to introduce new products or services, and seeking and entering or opening new markets. Innovation itself is a direct change in the area of technology, organisation, ecology or substantially impacting social organisation (Hawrysz, 2016, pp. 587–594). Innovations also appear in the area of human resources management, and the factor that stimulates their development is, among others, influx of foreign workers (Kubiciel-Lodzińska and Maj, 2017, pp. 178–191).

Innovativeness becomes the main guideline in the policy of contemporary enterprises as it is increasingly difficult to compete without developing and implementing an innovation strategy. According to Statistics Canada (2006), small and medium enterprises achieve successes due to: their awareness that innovativeness becomes a feature strongly related to success; sense that innovativeness leads to faster development or greater successes than in the case of non-innovative enterprises; belief that innovativeness will lead to a greater share in the market and improvement in profitability (Tidd et al., 2006; Hawrysz and Maj, 2017). Innovative activity of enterprises is profitable in many ways. R&D activity demonstrates strong correlation between achieved research results and new products. Thanks to introducing new or improved products, an enterprise maintains its market position or gains new market space, thereby increasing its profits. Shorter lifetime of products and quick reaction or the ability to replace products with newer versions are worth noticing, too. Another aspect is competing with the use of time. An important feature is to do something quicker than competitors, but this is not always related to the rate of introducing new products as such. There are also situations in which rivals introduce new products into the market that jeopardizes the market situation. The only answer to this situation can be innovativeness or an enterprise's entire innovation strategy. Innovativeness is often perceived by the market in categories of new products, but the process of innovativeness also plays a strategic role. The ability to produce something that no one else has invented yet or to invent a process also becomes an important source of competitive advantage. The ability to offer a better, faster and cheaper service is also a feature of building an advantage over other enterprises. It is necessary to remember that building competitive advantage resulting from innovative activities declines in time, because others start to duplicate our activities, often doing so

even more effectively and thereby better. Therefore, enterprises should learn to continue their innovative processes, because in any other case competitors will improve their products or processes more quickly and effectively, thereby becoming leaders in their industries (Bębenek, 2015, pp. 165–175).

Innovation management is deemed as one of the most important enterprise abilities aimed at achieving success in the contemporary market. It is necessary to notice certain abilities in its development. The fundamental skills can include such aspects as project planning and management or understanding consumer needs (Tidd and Bessant, 2013). In the case of many of the analysed enterprises, planning and then implementation of innovative projects are most often detached from day-to-day activity. These fundamental procedures should be integrated with other skills that constitute an enterprise's ability to manage innovativeness. In innovation management, the three following trends are dominant: market orientation, creation of networks of relations with the environment, and knowledge management (Jakubiec, 2016).

Innovation management can be studied from a narrow or a broad perspective. According to Knosala and associates (Knosala et al., 2014), in a broad perspective, innovation management covers organisational, cultural and environmental factors as well as the company strategy. In a narrow perspective, innovation management encompasses management of R&D activity and technology within the innovation process consisting of such components as: basic research, applied research, technological development, product development, manufacturing and sales. It is clear that enterprises make attempts to integrate external knowledge absorbed from co-operating networks including research institutions and knowledge resources generated within the company.

An enterprise should be able to measure the effects of its innovative activity (Hawrysz, 2017, pp. 2023–2033). The use of a suitable methodology of selecting proper measures and indicators provides the ability to evaluate an enterprise's innovative activity. A common methodology used in international standards is provided e.g. in Oslo Manual (OECD and Eurostat, 2005), which uses the subjective approach to innovativeness and innovative behaviour (Pomykalski, 2013). The scope of evaluation is as follows:

- scope of innovative activity: an innovator is an enterprise that implemented at least one innovation, whereas a product or

- process innovator is defined as a company that implemented a product or process-related innovation;
- innovative activities expenditures: total expenditures on innovative activity, incurred by an enterprise in a given year or period;
 - sources of innovative activity: the subject of measurement is the quality and availability of internal and external knowledge sources. Internal R&D activity: creative work undertaken in a systemic manner as a part of enterprise's efforts to increase knowledge resources and use them to create new applications. It includes the all R&D activity conducted by an enterprise, including basic research. Acquisition of R&D from external sources: The same activity as in the case of internal R&D activity, but purchased from public or private research institutes or other enterprises (including other enterprises in the same group);
 - co-operation in terms of innovation: active co-operation with other enterprises or public research institutions for the purposes of innovative activity (which can cover knowledge and technology purchases).

4. Context and method of the study

In the conducted study, we took into consideration enterprises that submitted applications under the umbrella of Measure 1.1 'Innovation in enterprises' in the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020. The subject of the competition was the funding of the following elements:

- construction, expansion, purchase of equipment for the R&D facilities in order to develop innovative activity of enterprises;
- funding the process of creating innovations (from the concept to the market) or their selected elements.

While applying for financial support, it was important for enterprises to develop their innovation implementation strategies taking into account indicators to be achieved, but also related criteria of selection of projects for funding. Aside from formal criteria, relative/absolute substantive criteria were also important, including criteria for which points were granted and which constituted the basis for being included

in the list of enterprises eligible for funding. Combining these criteria in three project selections, it was possible to create a list of indicators enabling a substantive evaluation of the projects (Bębenek, 2017). The list of criteria selected for evaluating innovative projects included such items as:

- criterion 1: Project implemented in co-operation with the R&D sector;
- criterion 2: Innovation level of project outcomes i.e. products/services/technologies. The products/services/processes constituting the project's result should be innovative at least in the regional scale (voivodeship). In this criterion, the applicant should rely on the opinion issued by an independent (not affiliated with the applicant) expert (scientist/researcher) from the given field of expertise, confirmed by a representative of the R&D sector. Projects are better rewarded in the case of innovativeness evaluation at the national or worldwide level. Marketing and organisational innovations are not supported;
- criterion 3: Experience in co-operation with the R&D sector or having an in-house R&D unit. The length of co-operation or functioning of an in-house R&D unit is evaluated as of the time of application submission. The applicant's co-operation with the R&D sector is confirmed by documentation, e.g. agreements, research orders, research results, other elaborations and documents confirming co-operation;
- criterion 4: Increase in the number of research job positions as an outcome of the project. Research vacancies concern science and research job positions, i.e. employees dealing with conceptual work and development of new knowledge, products, services, processes, methods and systems, as well as managing research projects.

The details concerning the aforementioned criteria and the scoring system are explained in Table 1.

Other evaluation criteria for the projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020 are as follows:

- a project encompasses activities mitigating environmental pressure, including emissions into the environment;
- a project is performed as a part of a partnership by an enterprise from the SME sector;
- a project is implemented by a large enterprise in co-operation

Table 1. Project evaluation criteria

No.	Criterion	Weight	Points	Definition
1	Project implemented in co-operation with the R&D sector	4	0-1	0 points – no co-operation 1 point – co-operation with the R&D sector
2	Innovation level of project outcomes i.e. products/ services/ technologies	4	0, 2, 4	0 points – project outcomes i.e. products/ services/ technologies are innovative in the regional scale (voivodeship) 2 points – project outcomes i.e. products/ services/ technologies are innovative in the national scale 4 points – project outcomes i.e. products/ services/ technologies are innovative in the global scale Assessment is provided by an independent expert (researcher) from the given field of expertise, not affiliated with the applicant, confirmed by a representative of the R&D sector.
3	Experience in co-operation with the R&D sector or having an in-house R&D unit	2	0-4	0 points – no co-operation/no internal R&D unit 1 point – co-operation shorter than 6 months/ internal R&D unit operating shorter than 6 months 2 points – co-operation lasts for at least 6 months, but less than 1 year/ internal R&D unit operating for at least 6 months, but less than 1 year 3 points – co-operation lasts for at least 1 year, but less than 2 years/ internal R&D unit operating for at least 1 year, but less than 2 years 4 points – co-operation lasts for at least 2 years/internal R&D unit operating for at least 2 years
4	Increase in the number of research job positions as an outcome of the project	1	0-3	0 points – no research job positions established as a result of the project; 1 point – one research job position established as a result of the project; 2 points – two research job positions established as a result of the project; 3 points – three or more research job positions established as a result of the project.

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014-2020.

with a small or medium enterprise and/or non-governmental organisations and/or research institutions;

- a project is implemented by an enterprise from the SME sector.

The project selection procedure consists of two stages. Stage I – formal evaluation, which is obligatory, lasts for up to 90 calendar days. The formal evaluation aims at checking the fulfilment of the formal criteria by the submitted project documentation. In case of any shortages in the application identified during the formal evaluation, the applicant is able to make relevant corrections and supplementation. The project can be rejected during formal evaluation. Stage II – substantive evaluation, which is obligatory as well, lasts for up to 90 calendar days from the day following the formal evaluation's conclusion. In case of identifying any shortages in the application during the substantive evaluation, the applicant is able to make relevant corrections and supplementation. The substantive evaluation is conducted by a single member of the independent experts' project evaluation committee, the knowledge and experience of whom ensure reliable project evaluation. The evaluation procedure assumes the possibility of an additional element, i.e. meeting of the evaluation team with an applicant, the purpose of which will be for the applicant to provide a shortened presentation of the solutions/ technologies specified in the application, especially their functionality, application and planned further use as well as provide answers to the questions and possible doubts.

A project which did not meet any of absolute criteria or received less than 50% of the maximum score in the substantive evaluation (not including the score for additional criteria, if such are applied), due to which it cannot be selected for subsidisation or met all absolute criteria and received 50% of the maximum score, however the amount allocated for the project's subsidisation in the contest is not sufficient to select it for subsidisation, receives a negative rating and the applicant is notified about this fact in writing. According to the guidelines, the project selection time is 180 days until the publication of the projects' ranking list. Formalities related to agreement conclusion and commencement of project execution is a period of 60 days. In case of protests, the project's execution starts after 10 to 12 months from the time of application submission.

The stages of the benchmarking process applied in the study were as follows: selection of issues for comparison, development of the analysis plan and selection of data collection methods, data collection, data

comparison, analysis and conclusions. Data analysis was conducted with the use of the MAXQDA software, which corresponds to four key areas of the qualitative data analysis. The analysis included the benchmarking of the project evaluation criteria. The analysed project criteria were selected according to the so-called primary indicators, which mainly included project innovativeness evaluation indicators. In the case of a single selection, the basic criteria were supplemented with an additional criterion that was excluded from the analysis for comparative purposes. It is necessary to add that while excluding the 'readiness for investment execution' criterion, all enterprises received the same number of points. The number of analysed enterprises subjected to substantive evaluation was 67, including: 12 large enterprises, 21 medium enterprises, 23 small enterprises and 11 micro-enterprises.

5. Data presentation and analysis

Table 2 provides the scores received by the projects under the study in three selections (i.e. selections I, II and IV). Basic score includes the four basic project evaluation criteria i.e.: (1) whether a project is implemented in co-operation with the R&D sector, (2) innovation level of project outcomes i.e. products/ services/ technologies, (3) experience in co-operation with the R&D sector or having an in-house R&D unit, and (4) increase in the number of research job positions as an outcome of the project. Total score covers all the criteria taken for the evaluation and selection of projects for funding. Graphical illustrations of basic and total scores of average results for the three selections under the study are presented in Figures 1 and 2.

The institution managing the selection of projects had a limited amount of subsidy funds. On average, in each selection cycle, the value of projects submitted for evaluation exceeded the announced value of subsidy funds by two times. Therefore, in the case of selection I and II, the score threshold for receiving founding amounted to 69.23%, while in the case of selection IV – 84.09%.

When comparing selection I and II to the last cycle, it becomes evident that in the case of selection I, as many as 35.71% of projects would not be granted a subsidy and in the case of selection II – 40% of projects would be excluded from the subsidy list. It is possible to conclude that in the case of the last cycle, applicants started strengthening

Table 2. Scores received by the projects under the study [%]

Project number	1	2	3	4	5	6	7	8	9
Average result of substantive evaluation – basic score [%]	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2
Selection I	70.9	70.9	70.9	74.1	74.1	80.7	87.1	90.3	90.3
Selection II	51.4	85.7	88.6	91.4	91.4	91.4	91.4	97.1	97.1
Selection IV	61.5	69.2	71.8	71.8	71.8	71.8	71.8	71.8	71.8
Average result of substantive evaluation – total score [%]	69.2	69.2	69.2	71.8	71.8	74.4	76.9	82.1	84.6
Selection I	47.7	70.5	75.0	81.8	84.1	84.1	84.1	84.1	84.1
Selection IV	10	11	12	13	14	15	16	17	18
Project number									
Average result of substantive evaluation - basic score [%]	90.3	90.3	90.3	93.6	96.8	96.8	96.8	100.0	100.0
Selection I	90.3	90.3	93.5	93.5	93.5	96.7	100.0	100.0	100.0
Selection II	97.1	97.1	97.1	97.1	97.1	97.1	97.1	97.1	97.1
Selection IV	82.1	84.6	84.6	84.6	87.2	87.2	89.7	89.7	89.7
Average result of substantive evaluation - total score [%]	84.6	84.6	87.2	87.2	87.2	89.7	92.3	92.3	92.3
Selection I	84.1	84.1	88.6	88.6	88.6	88.6	88.6	88.6	88.6
Selection IV	19	20	21	22	23	24	25	26	27
Project number									
Average result of substantive evaluation - basic score [%]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Selection I	100.0	100.0	-	-	-	-	-	-	-
Selection II	97.1	-	-	-	-	-	-	-	-
Selection IV	89.7	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3
Average result of substantive evaluation - total score [%]	92.3	92.3	-	-	-	-	-	-	-
Selection I	93.2	-	-	-	-	-	-	-	-
Selection II	-	-	-	-	-	-	-	-	-
Selection IV	-	-	-	-	-	-	-	-	-

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

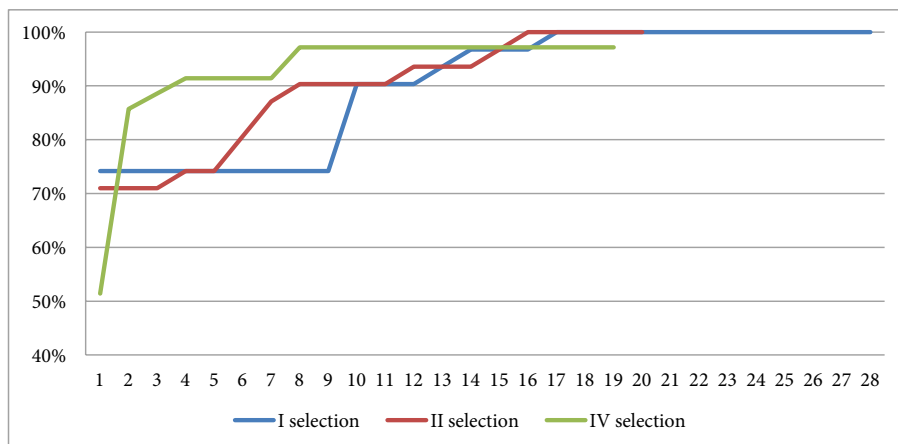


Figure 1. Average result of substantive evaluation – basic score [%]

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

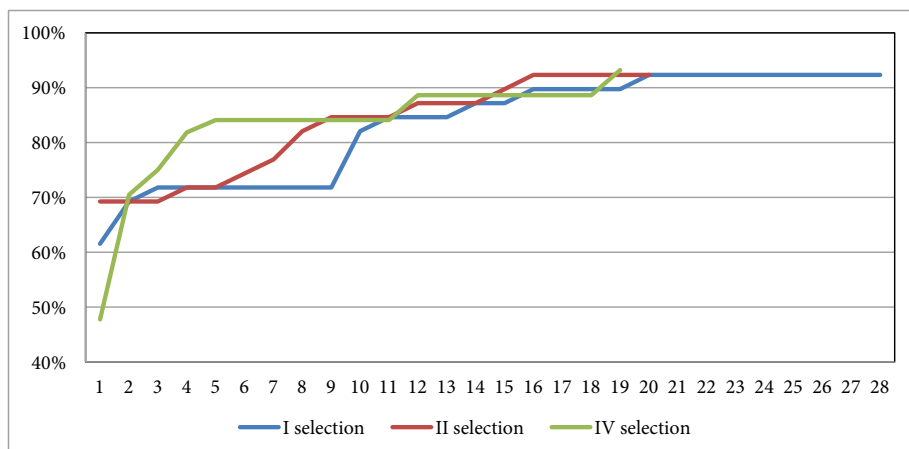


Figure 2. Average result of substantive evaluation – total score [%]

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

their innovative potentials much earlier. Such an approach forced many entrepreneurs to make long-term plans and prepare their enterprises for bidding for public funding of innovative projects.

Let's compare one of the most important and highly scored criteria concerning the innovativeness of products/services/technologies being the project outcomes. The highest score, i.e. 16 points was granted to projects that demonstrated that their product/service/process would be world-class. Only 8 points were granted to projects of a national innovativeness level. Detailed data concerning the evaluation of projects under the study is provided in Table 3.

Table 3. Evaluation of the innovation level of project outcomes i.e. products/ services/ technologies

Enterprise size	National innovation [N of projects]	Share [%]	Global innovation [N of projects]	Share [%]
Selection I				
large enterprises	2	7	4	14
medium enterprises	3	11	6	21
small enterprises	2	7	8	29
micro-enterprises	0	0	3	11
Total	7	25	21	75
Selection II				
large enterprises	0	0	4	20
medium enterprises	2	10	4	20
small enterprises	0	0	7	35
micro-enterprises	0	0	3	15
Total	2	10	18	90
Selection IV				
large enterprises	0	0	2	11
medium enterprises	0	0	6	32
small enterprises	1	5	5	26
micro-enterprises	0	0	5	26
Total	1	5	18	95

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

Analysis shows that in selection II, enterprises demonstrated the level of innovativeness of 15% higher than in selection I, whereas in selection IV, it was improved by 20%. It is necessary to notice that in the case of selection, the innovativeness level must have been justified and the project was to be supplemented with the opinion from a research institution. Additionally, in some cases, the managing institution asked for an independent expert's opinion on the given project's innovativeness level (including the product/service/process).

In the case of this criterion, the evaluation is based on the innovation's description completed by the research unit, the employer of which is the applicant (entrepreneur). The innovativeness evaluation assumes proving that the solution presented in the project has not yet been invented. The innovativeness opinion does not feature information on what product or process is to be introduced. There is no information concerning the new solution's parameters in relation to an existing similar solution. The evaluation specifies whether the project meets or does not meet the innovation criterion at the global/national level. It can be clearly realized the dependency of particular recruitments correlated with the score in the innovativeness criterion, where the entrepreneur can receive the highest score.

The next evaluated criterion was the experience in co-operation with the R&D sector or possessing an in-house R&D unit. Detailed data concerning the evaluation of projects under the study in accordance with this criterion is provided in Table 4.

In the case of nearly all enterprises, the degree of co-operation is similar. Over 88% of the enterprises proved co-operation with an external R&D unit or having an in-house R&D unit for over 2 years. Data gathered in Table 5 also shows that internal R&D units are embedded within organisational structures of nearly 80% of enterprises under the study. This may be considered as a manifestation of enterprises' preferences for investing in their own research structures rather than spending time and funds for co-operation with external R&D entities.

The analysed documentation provides evidence regarding differentiation in placing research units within the organisational structures of the enterprises under the study. In the majority of the enterprises, the R&D units were separate entities. Nevertheless, in some companies, R&D activity was assigned to the structures of other units, most often responsible for production processes. It is necessary to notice that one of the additional criteria was the evaluation of co-operation

Table 4. Experience in co-operation with the R&D sector or having an in-house R&D unit [N of projects]

Enterprise size	longer than 2 years	between 1 and 2 years	shorter than 1 year	no co-operation
Selection I				
large enterprises	6	0	0	0
medium enterprises	9	0	0	0
small enterprises	9	1	0	0
micro-enterprises	3	0	0	0
Total	27	1	0	0
Selection II				
large enterprises	2	0	0	2
medium enterprises	6	0	0	0
small enterprises	7	0	0	0
micro-enterprises	1	0	1	1
Total	16	0	1	3
Selection IV				
large enterprises	2	0	0	1
medium enterprises	5	1	0	0
small enterprises	5	0	0	0
micro-enterprises	4	1	0	0
Total	16	2	0	1

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

Table 5. Internal R&D units within the enterprises under the study

Enterprise size	No in-house R&D unit		An in-house internal R&D unit	
	N	%	N	%
large enterprises	3	4.48	10	14.93
small enterprise	3	4.48	19	28.36
medium enterprise	4	5.97	17	25.37
micro-enterprise	4	5.97	7	10.45
Total	14	20.90	53	79.10

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

and partnership within the project. However, only a single enterprise demonstrated such a partnership.

The next evaluation criterion was the increase in the number of research vacancies declared by enterprises to be established after the completion of the project (cf. Table 6).

Table 6. Increase in the number of research job positions as an outcome of the project [N of companies]

Enterprise size	Selection I				Selection II				Selection IV			
	New R&D positions				New R&D positions				New R&D positions			
	0	1	3	>=3	0	1	3	>=3	0	1	3	>=3
large enterprises	0	0	1	5	0	1	2	1	0	0	0	2
medium enterprises	2	0	1	6	2	0	1	3	0	1	0	5
small enterprises	0	1	1	8	2	1	0	4	0	0	0	6
micro-enterprises	0	0	1	2	0	2	1	0	0	0	0	5
Total	2	1	4	21	4	4	4	8	0	1	0	18

Source: Own elaboration based on the evaluation criteria for projects of the Opolskie Voivodeship Regional Operational Programme (RPO WO) 2014–2020.

In terms of employment of new R&D personnel, substantial differences were observed between selection I and II. On the other hand, selection IV demonstrates that nearly all enterprises hire 3 or more R&D personnel. The increase is relatively high when compared to previous selection cycles, but as stated above, the enterprises noticed prospective added value of hiring highly specialised research personnel.

6. Discussion

The conducted analysis shows that in regard to quality of application documents, selection IV was substantially better in terms of all indicators. When analysing particular selection cycles, enterprises develop specific strategies related not only to achieving the highest scores, but also to the quality of their projects implementation. The entrepreneurs' way of thinking changes year after year. They are beginning to rely on quality and the possibility of gaining competitive advantage by

introducing new products or processes into the market. It is clear that investments in knowledge are starting to yield measurable economic and financial effects. This approach also changes a series of indicators used to evaluate the Polish economy in comparison to other European and non-European countries (cf. Table 7).

Table 7. European Innovation Scoreboard 2017 indicators selected for Poland in comparison to the project selection criteria in Poland

Selection criteria in Poland	European Innovation Scoreboard 2017
Innovation and co-operation	
Scale of innovativeness of products/services/processes The criterion is supported by regions in Poland	– Small and medium enterprises, product or process innovation 3.1.1 - EU average 81.80, Poland 5.9, i.e. 34 th position in the ranking
The number of small and medium size enterprises which have introduced at least one new product or process to one of the markets	
The criterion is not supported by regions in Poland	<ul style="list-style-type: none"> – Small and medium enterprises, marketing innovation 3.1.2 – EU average 82.40, Poland 0.60, i.e. 35th position in the ranking – Innovative small and medium enterprises, co-operation with other entities 3.2.1 – EU average 100.5, Poland 23, i.e. 33rd position in the ranking – Public-private co-operation 3.2.2 – EU average 86.50, Poland 22.70, i.e. 29th position in the ranking
Intellectual activity	
The criterion is not supported by regions in Poland	<ul style="list-style-type: none"> – Patent applications 3.3.1 - EU average 99.80, Poland 39.60, i.e. 30th position in the ranking – Trademark applications 3.3.2 - EU average 108.1, Poland 79.70, i.e. 26th position in the ranking – Employment of R&D specialists 4.1.1 – EU average 106.4, Poland 55.1, i.e. 33rd position in the ranking

Source: European Innovation Scoreboard (2017).

Statistical analysis based on the European Innovation Scoreboard (2016) demonstrates that the Polish indicators are improving, while analyses in particular groups show that human resources (Maj, 2015,

pp. 780–793) and company investments are Poland’s strengths. According to the European Innovation Scoreboard (2017) report, Poland has improved its innovation indicator and occupies 23rd position. An improvement in the ranking concerned 14 out of 25 indices. A particularly noticeable improvement was noticed in regard to:

- share of company expenditure for R&D (BERD) in GDP (by 15 %);
- revenue on licenses and patents deriving from abroad (by 15%);
- applications for (PCT) patents concerning social challenges (by 11%);
- community industrial designs (by 8.4%);
- community goods designs (by 8.2%);
- applications for PCT patents (by 8%).

Innovative processes differ substantially depending on the sector in terms of degree of development, rate of process changes, relations and access to knowledge, as well as in terms of organisational structures and institutional factors (e.g. Malerba, 2005). Some sectors are characterised by sudden changes and radical innovations, whereas others experience smaller, gradual changes. Research and development play a key role in innovative activity in the high-technology sectors, whereas other sectors rely more on knowledge and technology acquisition. The differences in the scope of innovative activity between sectors (e.g. advantage of incremental or radical innovations) are also related to different requirements for the company’s organisational structure, whereas the role and significance of institutional factors, such as legal regulations or intellectual property protection, can vary. It is important however to take these differences into consideration when creating a public policy. They also play an important role when conducting measurements, both when collecting data for conducting analysis of various sectors and regions, and when it is necessary to ensure the measurement system’s usefulness for a broad group of activity types.

7. Conclusions

The study has analysed the innovative potential of selected companies in Opolskie Voivodeship through comparing and contrasting meeting by them criteria used for the evaluation of projects of the Opolskie

Voivodeship Regional Operational Programme (RPO WO) 2014–2020
i.e.:

- whether projects are implemented in co-operation with the R&D sector;
- innovation level of project outcomes i.e. products/ services/ technologies;
- experience in co-operation with the R&D sector or having an in-house R&D unit;
- increase in the number of research job positions as an outcome of the project.

The findings of the study indicate that this innovativeness potential has increased. Nevertheless, the companies in Opolskie Voivodeship should still be considered as relatively weak innovators. Therefore, further measures aimed at creating the conditions for the development of their innovative activities should be undertaken. Firstly, it is recommended to take up measures favouring the use by potential beneficiaries of support programmes aimed at investments on innovation implementation. It would be justified to take up broad information and promotional activities concerning the ability to use financial support for projects related to innovative activity and R&D. Secondly, it is necessary to strengthen co-operation of business and research, and the cluster policy to enable better transfer of technology and knowledge, better ability to use innovative solutions, and development of competitiveness with simultaneous use of the strong position of industrial enterprises willing to co-operate within cluster initiatives. Thirdly, it is necessary to support enterprises which are active in developing innovations and R&D to facilitate them extending of these activities.

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