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Evaluation of Scale and Impact of European Union Funds' and other Investments in Education and Science Infrastructure

SUMMARY OF THE FINAL REPORT OF THE EVALUATION CASE STUDY OF INVESTMENTS IN INTEGRATED SCIENCE, STUDIES AND BUSINESS CENTERS (VALLEYS)

Creating the future of Lithuania

2014-2020 Operational Programme for the European Union Funds Investments in Lithuania

MINISTRY OF FINANCE of the Republic of Lithuania

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PURPOSE, OBJECT AND TASKS OF THE EVALUATION

The main aim of the case study was to evaluate the effectiveness, efficiency and long-term impact of the implementation of Integrated Science, Studies and Business Centers' (*hereinafter – Valleys*) Development Programmes and to assist the Ministry of Education, Science and Sports of the Republic of Lithuania (*hereinafter – MESS*) in implementing the recommendations submitted by the National Audit Office by reporting on the results of the implementation of the Valley Development Programmes.

In this case study, the Valley is defined as a collective of research, education and knowledge-intensive business entities, usually concentrated in one area with shared or related infrastructure and a common aim to contribute to the knowledge society and further knowledge economy. Thus, the Valleys are understood to encompass three related elements: research and experimental development (*hereinafter – R&D*), education and knowledge-intensive businesses, together with their shared infrastructure and interconnections.

The main object of the case study was the European Union (*hereinafter – EU*) Structural Funds' investments into the 5 Valleys (Sunrise Valley, Santara Valley, Santaka Valley, Nemunas Valley and Maritime Valley) for the 2007–2013 and 2014–2020 funding periods. Throughout the evaluation, special attention was paid to the investments, designed to foster the cooperation between research and education institutions and the private sector.

The case study focused on the measures that invested in R&D and businesses, affiliated with Valleys, infrastructure and its management without analyzing investments directed exclusively at the study infrastructure and its management. Therefore, in order to successfully assess the effectiveness, efficiency and long-term impact of the Valley Development Programmes, the main focus of the evaluation was on the results and impact achieved with regards to the cooperation between research and education institutions and private sector entities.

In this study, the Valleys were analyzed by assessing the investments received by specific entities that form the Valleys and the impact resulting from this investment. During the analysis, investments, designed to foster closer cooperation between research and education institutions and private sector entities were divided into 3 groups: 1) investments in the infrastructure of the Valleys; 2) investments in the infrastructure of businesses affiliated with the Valleys; 3) investments in the management of Valleys' infrastructure.

EVALUATION CRITERIA AND METHODS

The case study focused on **three main evaluation criteria: effectiveness, efficiency, and long-term impact of the implementation of the Valley Development Programmes**, with a special focus on their impact on the cooperation between research and education institutions and private sector entities.

Whilst analyzing the **effectiveness** of the Valley Development Programmes, 157 indicators were first identified across five Valley Development Programmes, the target values of which were set for 2015. A review of these indicators provided in the Valley Development Programmes showed that there is a distinct lack of a unified monitoring system that would track indicators across all five Valleys. Also, due to prolonged investment projects, lack of a unified system of monitoring and lack of detailed monitoring responsibilities, systematic monitoring of the implementation of the Valley Development Programmes was not carried out.

Given the need to harmonize the monitoring system of the Valley Development Programmes and reduce the number of monitoring indicators to those, for which analytical activities could be performed, a smaller

sample of 11 indicators was selected for further analysis. This sample encompasses indicators, which are the most common and at least partially reflect the results (as oposed to only products) achieved by the Valleys. These indicators were divided into 3 thematic groups. The first thematic group, called "Development and Use of R&D Infrastructure", evaluates indicators, such as the number of R&D base and innovation improvement projects, established and operating research and education institutions, newly established (or equipped) research laboratories, number of national and international R&D projects implemented as well as the joint research jobs created. Another thematic group, called "Private Sector Use of Valley Infrastructure", analyzed indicators, such as the number of small and medium-sized enterprises (SMEs) located in a science and technology park or a business incubator and the number of new knowledge-intensive enterprises. The third thematic group, named "Science and Business Cooperation", focused on indicators reflecting the number of completed R&D projects (according to the orders of Lithuanian economic entities), signed R&D cooperation agreements between research and eduction institutions and businesses, and the amount of private investment.

Given that, as already mentioned, consistent monitoring of the Valley Development Programmes was not carried out, the values of the analyzed indicators achieved in the Valleys until 2020 were compared with the 2020 recalculated target values (not with the values planned in the Valleys' Development Programmes for 2015).

In assessing the **efficiency** of the implementation of the Valley Development Programmes, the volumes of EU Structural Funds' investments in the Valleys for the 2007–2013 and 2014–2020 funding periods were determined. Then, investments were allocated across three categories: 1) investments in the infrastructure of the Valleys; 2) investments in the infrastructure of businesses affiliated with the Valleys; 3) investments in the management of Valleys' infrastructure.

In the efficiency analysis, the ratio of costs to the achieved indicator value was determined for each Valley (i.e., the amount of funds needed to create one unit of the achieved indicator value was calculated). For the analysis of the efficiency of investments in the Valleys, 4 monitoring indicators were selected. These indicators reflected the number of completed national and international R&D projects, the number of completed R&D projects ordered by Lithuanian economic entities as well as the number of signed R&D cooperation agreements between research and education institutions and enterprises.

Whilst assessing **the long-term impact** of the implementation of the Valley Development Programmes, the main focus was on evaluating the achievement of one of the main goals of the Valley Development Programmes – strengthening cooperation between business and scientific entities.

Data relevant for the evaluation was obtained from various primary and secondary sources. Strategic documents that enabled the Valleys' development processes, descriptions of relevant EU Structural Funds measures and financing conditions of such measures as "Inogeb LT-1", "Inoklaster LT +", "Idėja LT", "Inoklaster LT", "Intelektas LT" were scrutinized. Data collected by the EU Structural Assistance Computerized Information Management and Monitoring System were also analyzed and previous studies and evaluations of the Valleys were examined.

From 9th of March 2021 to 29th of March 2021 questionnaire surveys for 5 groups of respondents (representatives of Valley associations; representatives of universities operating in the Valleys; representatives of research and education institutions operating in the Valleys; representatives of R&D and business incubators operating in the Valleys; and representatives of business enterprises affiliated with the Valleys) were undertaken. A total of 16 semi-structured interviews were conducted with representatives of Valley Associations, policy makers, business associates, representatives of companies and individual entities operating in the Valleys.

MAIN FINDINGS OF THE EVALUATION

This section contains the summary of the main findings in the analysis of the EU Structural Funds' investments in the establishment and management of the Valleys for 2007–2013 and 2014–2020 funding periods. According to the criteria of effectiveness, efficiency, and impact, it can be stated that the process of building the Valleys falls into two periods of implementation of the EU Structural Funds investments (periods of 2007–2013 and 2014–2020) and was mainly financed by the EU Structural Funds. A total of 22 measures financed by the EU Structural Funds were allocated to the development and improvement of the Valleys, under which 379 projects were implemented. Most of the projects for the development of the Valleys' infrastructure were implemented until the spring of 2016.

Throughout the analyzed period of 2007 to 2020, the total investments in the Valleys amounted to EUR 571.77 million. Most of them (83 percent) were invested during the 2007–2013 funding period, while the remaining 17 percent were invested during the 2014–2020 funding period. Also, the majority (more than 80 percent) of the funds were invested in the development of infrastructure, about 12 percent were allocated to the management of the Valleys, and 8 percent were invested in the infrastructure of the businesses affiliated with the Valleys.

The largest share of investments (almost 34 percent, or about EUR 211 million) was provided to the Sunrise Valley, slightly less was distributed to the Santara and the Santaka Valleys, about 25 percent (EUR 143 million) and 21 percent (EUR 121 million), respectively. Meanwhile, the smallest share of EU Structural Funds' investments (10 percent (EUR 55 million) and 7 percent (EUR 42 million), respectively) were given to the Nemunas and the Maritime valleys.

EFFECTIVENESSS

In general, Valleys reached the values of more than 80 percent (9 out of 11) of the analyzed indicators. It should be noted that the Valleys were not able to fully reach the target values of attracted private investment and newly created knowledge-intensive enterprises. Also, none of the Valleys were able to fully meet all target values set for the analyzed indicators – in most cases, the values of attracted private investment and the number of SMEs located in the science and technology park were not reached.

Considering the ratio of the values of the indicators achieved and planned, the Sunrise Valley can be considered as the most productive of all the Valleys, with the average performance being 24.19 percent higher than the overall performance of the Valleys. Meanwhile, the Santaka and Maritime valleys had the lowest performance. The average performance of the Santaka Valley was only 1.81 percent higher than the average performance of the Valleys, while the performance of the Maritime Valley was 5.91 percent lower than the average Valley performance.

Assessing the current scope of activities, the Santara Valley can be considered as the most active one, where 327 R&D projects are currently being implemented (both at the national and international level as well as privately financed by business entities). The least active is the Maritime Valley, where a total of 46 R&D projects are being implemented.

EFFICIENCY

Assessing the efficiency of investments in the Valleys (the cost of creating one unit of result), the relatively highest investment efficiency is seen in the Nemunas Valley, and the relatively lowest – in the Sunrise and Maritime Valleys.

LONG-TERM IMPACT

The creation of the Valleys was timely and important both for the state, scientists and (or) researchers and businesses, since it provided the framework conditions and impetus for more intensive science and business cooperation. Investments in the Valleys helped to substantially renew the infrastructure needed for research and raised it to be on par to the international standards, enabled the emergence of international research centers, helped to create the image of Lithuanian science as a representative and reliable partner for foreign countries and, in some cases, helped to attract Lithuanian researchers who worked abroad.

In addition, the development of the Valleys provided the necessary testing and certification services to ensure compliance with the standards required for exports to Western Europe. Investments in the Valleys also helped to mobilize the potential of researchers working in one specific field, assess the progress made by Lithuanian scientists and create coordination mechanisms between different fields of science and parts of the innovation chain. This was especially crucial to the businesses that had already identified their needs and thus could establish regular contacts with relevant research and education institutions.

Nevertheless, the assessment of the change in the volume of science and business cooperation at the national level since 2016 (when most of the infrastructure investments were completed) shows that investments in the Valleys did not create a significant change in science and business cooperation.

However, when assessing the impact of investments in the Valleys on the development of scientific and business cooperation, it is necessary to consider the expectations during the development of the Valleys and the extent of their implementation. For example, representatives of the Valleys consider their contribution to the promotion of science and business cooperation to be significant (6.2 points out of 7), although they agree that the results achieved do not fully meet the expectations of the scale and intensity of joint R&D projects with business entities (estimated at 5.2 and 4.9 points out of 7, respectively).

The analysis shows that about 5 percent of the Valleys' R&D activities were successfully commercialized through the establishment of new knowledge-intensive companies, and more than a third of all implemented R&D projects were implemented on behalf of business entities. It is also of paramount importance that the shared use of open-access centers in the Valleys by external users meets the expectations set during their development. Slightly more than a third of all open-access centers' users in the Valleys are external users, about half of the external users are business entities, and the share of joint business-to-business projects with open-access centers' users range from one-third to almost half of all open-access centers' services provided to business entities.

This is illustrated by the relatively favorable evaluation of the companies in terms of the quality of the services provided by open-access centers and the expected cooperation (assessed with 6.4 and 5.8 points out of 7, respectively).

However, despite these positive aspects of the impact, it can be observed that, after the realization of the initial potential of science conversion into businesses and the satisfaction of the initial needs of business cooperation, further development of science and business cooperation in the Valleys is much slower. It depends on several reasons:

- ☐ Lack of information on business services and topics of ongoing research in the Valleys.
- ☐ Lack of coordination whilst responding to business inquiries between the different actors in the Valleys.
- ☐ The prevailing tendency to focus on the implementation of new projects with the regular business partners, rather than on the search for new partners.

- In some cases, bureaucratic and inflexible mechanisms for cooperation with business applied by research and study institutions.
- Very small share of knowledge-intensive businesses engaged in financing of R&D activities and, accordingly, low demand for R&D services, new knowledge and solutions, insufficient understanding of the added value of R&D activities and their specifics.
- Inconsistent implementation of incentives for businesses to carry out or finance R&D activities as well as to create and implement R&D-based innovations.
- Often limited ability of businesses to articulate current needs.
- Lack of systematic monitoring of market needs during the development and operation of the Valleys.
- Lack of clearly set goals and expectations (by the responsible institutions) for further development and activities of the Valleys, as well as for scientific and business cooperation that would be in line with long-term state progress goals (as opposed to solely the needs of institutions situated in Valleys), especially after the end of the planned period of implementation of the Valley Development Programmes.
- Limited human and financial resources of Lithuanian science, which contribute to the needs of some businesses in Lithuania not being met.
- Different scientific and business expectations for the results of joint activities, especially in the cooperation during the later stages of technological readiness (from prototyping to commercialization).
- Criteria for evaluating the activities of researchers, which are in no way related to the activity of cooperation with business enterprises.
- Lack of infrastructure suitable for prototyping.
- Lack of qualified intermediaries between research institutions and business, especially in the stages of the innovation chain from prototyping to commercialization.
- Insufficient volume of business incubators and R&D infrastructure, emerging need for equipment upgrades.
- Lack of programmes to promote the development of systemic business incubators and the creation of new knowledge-intensive companies.

Finally, it is important to note that there are some differences between the Valleys in terms of scientific cooperation. For example, the Sunrise and Santara Valleys have intensified cooperation with businesses, partly due to the relatively high number of new knowledge-intensive businesses in the fields of lasers and biotechnology. Also, companies cooperating with these Valleys are less dependent on the financing of European Structural and Investment Funds' measures. Meanwhile, the Santaka and Nemunas Valleys are more responsive to the needs of traditional industries implementing R&D-based innovations, and companies cooperating with these Valleys are more reliant on the financing of EU Structural Funds, therefore their interest in cooperation opportunities is more fluctuat. In general, the Maritime Valley functions as one institution with several divisions and not as all other Valleys, which unite a group of entities. In this Valley, co-operation takes place mainly with several long-term partners, and establishment of new knowledge-intensive companies is extremely rare.