



## **Executive Summary**

This document represents the first evaluation report made within the service agreement no. 16182/26.02.2020 **“Implementation of the Competitiveness Operational Program (POC) Evaluation Plan 2014-2020, Lot 1: Evaluation of POC interventions in the field of research-development-innovation”** concluded between the Ministry of European Funds and the association formed by the National Scientific Research Institute for Labour and Social Protection (Leader) and S.C. ERNST & YOUNG SRL (Associate). The agreement is carried out within the project **“Implementation of the Evaluation Plan of Competitiveness Operational Program 2014-2020”**. The first evaluation report presents the conclusions related to the evaluation exercise carried out in 2020 on the interventions financed by the POC 2014-2020 related to Priority Axis 1-Research, technological development and innovation in support of economic competitiveness and business development.

Priority Axis 1 directly contributes to the implementation of the National Strategy for Research, Development and Innovation 2014-2020 and supports the Partnership Agreement 2014-2020, especially through the direct contribution to the achievement of thematic objective 1 - Development of research, technological development and innovation.

Specific objectives of Priority Axis 1 POC, which also represented the evaluation themes of this report, are:

- 1.1 Increasing scientific capacity in the fields of smart specialization and health
- 1.2 Increasing involvement in research at EU level
- 1.3 Increasing private investment in research-development-innovation (RDI)
- 1.4 Increasing the transfer of knowledge, technology and staff with RDI skills between the public and private research environment

The evaluation methodology included a broad set of tools and types of analysis. The counterfactual impact assessment carried out added value to the findings and conclusions issued, representing an important exercise at national level, from the perspective of the complex methodology applied in order to highlight the impact of the POC, but also their sustainability.

The horizontal limits of the evaluation depend on the time of evaluation and the small number of projects completed by May 2020. In order to analyze the distribution in regional profile and by areas of smart specialization of project results, it was necessary to consider the information extracted from the MySMIS database for projects contracted before March 2020 (thus ensuring a sufficient number of observations). However, the limitations are related to the fact that the program indicators declared at project level are validated at the end of the projects, and in the MySMIS database provided to the evaluation team no complete information was found for all ongoing projects. The validation of data used was performed by comparison with the information contained in the Annual Implementation Report of the POC for 2018 and with other data collected.

The difficulty of investigating the effects and their sustainability at such a short distance from the completion of interventions is an important limitation of the evaluation process. In these conditions, a very important lesson learned in the evaluation process refers to the need to perform the evaluation at a time distance at which the effects can be adequately observed.

An important contextual factor that has hampered the implementation of projects and the achievement of results is the economic and social context generated by the COVID-19 pandemic.

Overall, the POC answered the needs and challenges related to the low level of economic competitiveness at national level, ensuring the relevance of the program for the economic context and the research-development-innovation field from 2014-2020. The period 2014-2018 was mainly characterized by a very small increase (by 0.16 percentage points) of private RDI expenditures, amid underfunding of the field, negative developments in the number of innovative enterprises and the number of employees in these enterprises. In 2018, the share of Gross Domestic Product (GDP) of private research and development



(R&D) expenditures represented only 0.3% compared to the assumed target of Romania, amounting 1% of GDP, but placing us on the third most unfavorable place in the European Union. Although private R&D spending increased during this period, public spending as a percentage of GDP declined. Thus, the total expenditures from research and development activity registered in 2018 as a percentage of GDP place Romania on the last place in the European Union, with only 0.5% of GDP, while the average in the European Union was 2.12% of GDP.

Effective execution of funds in the regional profile is unbalanced, the Bucharest-Ifov region contributing with almost two thirds to the achievement of the total expenses from the activity of R&D. On the other hand, the most significant increases compared to 2014 were registered in the West region and the smallest in the North-East region. In addition, although the number of units with research and development activity decreased during this period, there is a slight increase in the number of employees in research and development, mainly due to the positive evolution of the business environment.

The need for continuous implementation of the activities provided for in the POC was also substantiated by strategic developments at national and European level. The strategic framework at European Union level on research-development-innovation pursues the vision of long-term strategic development, mainly related to the consolidation of an European Research Area. At national level, however, the delayed adoption of the National Research, Development and Innovation Strategy 2014-2020 by one year, as well as the National Research-Development-Innovation Program 2015-2020 by another eight months, negatively influenced the development of POC interventions, delaying their start. Moreover, at the level of legislative regulation there is an insufficiently developed framework not adapted to the strategic objectives. The process of adapting the legislation on the functioning of RDI system and the implementation of the National Strategy for Research, Development and Innovation 2020, was not predictable and coherently staged on priorities, which negatively affected achieving correlated results. Moreover, the existing institutional framework in the field of research-development-innovation moves away from its governance character, and the non-establishment of the National Council for Science, Technology and Innovation Policy is an obstacle in applying the institutional framework provided in research legislation.

Despite recent changes in tax legislation to increase the attractiveness of RDI activities, the assessment reveals that the **modernization of the legislative and institutional framework** is necessary in order to be better adapted to the strategic objectives of increasing scientific capacities, better strategic programming and planning, favorable conditions and financial instruments support to stimulate the participation of private companies in RDI activity and to increase the attractiveness of RDI career.

Overall, the research infrastructures in our country had a development trend during the implementation of the 2014-2020 POC, and the number of public-private co-publications and international scientific co-publications per million inhabitants increased, the POC having an important contribution from this perspective. However, Romania remains well below the European average in terms of developments in the period 2014-2018.

*Interventions on increasing scientific capacity in the fields of smart specialization and health* have proved to be successful interventions, supporting the recruitment of new researchers and increasing the number of researchers working in improved research infrastructures. Researchers belonging to the supported organizations benefited more from access to research and development infrastructures, having in 2019-2020 16% higher chances of making public-private co-publications, compared to similar researchers from non-beneficiary organizations. Moreover, the evaluations showed that the POC also contributed positively to increasing the chances of achieving new or improved products, methodologies and technologies, or of obtaining results with potential transferability in the economy. The areas with the most important positive effects were Health and Energy, Environment and Climate Changes. At the level of beneficiary research organizations, POC has had positive effects by improving research and development infrastructure, developing new technologies, modernizing research areas and diversifying the RDI offer, while beneficiary companies have improved their products and services by developing new technologies and methods.

POC also generated positive effects on the increase of Romanian participation in European and international projects, via *interventions aimed at increasing research involvement in the European Union*. The implementation of the projects contributed to the increase in the number of projects submitted under

the program of Research and Innovation carried out by the European Union Horizon 2020, noting at the same time a modest increase in the contribution of Horizon 2020 attracted by the participating institutions in Romania. Currently, Romania is in the middle of the European Union ranking on the contribution of Horizon 2020, but registering an increasing trend of the number of participants and applications submitted, as well as the funding received. The main category of beneficiaries of Horizon 2020 projects were private enterprises, although the number of small and medium enterprises participating in Horizon projects decreased in the period 2014-2020. Regarding the regional distribution of participants at the country level, the Bucharest-Ilfov and North-West regions stand out, with the largest contributions. POC contributed positively, but quite modestly, to the increase of the Romanian contribution to the progress of knowledge. Through the interventions made, the evaluations showed that the number of patent applications developed, filed and accepted during the implementation of projects and the number of published articles increased. The implementation of projects also contributed to increasing the quality of human resources, by creating groups with advanced scientific skills around the researcher from abroad, by integrating young people in research and by accumulating new knowledge and key skills.

*Interventions on increasing private investment in RDI* had positive effects on enterprises with research activity, confirming a positive impact, although modest, on the increase of private expenditures on research and development. However, the beneficiaries consider that in the absence of this source of financing, the start-up of the activities of companies would have been more difficult or not possible at all. The evolution of the program indicators shows a positive contribution of POC to the increase of the number of supported companies and to the attraction of new researchers in the supported entities, implicitly leading to the increase of RDI expenses. There are also positive effects on the increase in patent applications resulting from projects, while the contribution of these interventions to the increase in the number of public-private co-publications is much more modest. In regional profile, the Bucharest-Ilfov region stands out with priority with a majority contribution to achieving the indicators. In the sectoral profile, the distributions by fields of smart specialization are relatively balanced.

The effects of POC are also observed in the development of products and services directly applicable in the market, the level of technological maturity of the research results transferred to the economy advancing significantly. In addition, the risk capital instruments supported by Action 1.2.2 have contributed to the creation of the first entrepreneurship accelerators in Romania, which can support the development of the local energy industry of *private equity* and *venture capital*.

Although POC interventions *on increasing private investment in RDI* did not support the evolution of the number of employees among the applicant enterprises, it was observed that the POC stimulated in the short term the increase of the profitability of the enterprises with R&D activity and their chances of survival in the period 2018-2019. Even against the background of the effects of COVID-19 crisis on the economy, companies and research organizations keep their optimistic estimates of order volume, turnover and profitability.

Regarding the evolution of the progress observed in the behavior of research organizations and enterprises for the transfer of knowledge, technology and personnel, since the adoption of POC, there is an intensification of cooperation between small and medium enterprises, although large firms continue to collaborate more. Business cooperation with universities also intensified between 2014 and 2016, although universities were the second most important partner for cooperating companies, according to suppliers of material equipment, components or software. At the same time, there is an improvement in the cooperation of enterprises with public administration and public or private research institutes.

In this context, *interventions dedicated to increasing the transfer of knowledge, technology and staff with RDI skills between the public and private research environment* had positive effects on them. Both research organizations and partner small and medium-sized enterprises appreciate that in the absence of funding, the achievement of the same research products would have taken many years, or could have never been done. Research organizations appreciate that the very development of partnerships with the business environment or the expansion of existing ones would have been much more difficult to achieve in the absence of project funding. In addition, it was highlighted that small and medium-sized enterprises

considered valuable the opportunity to access the knowledge, expertise, laboratories and equipment they need to develop, test and calibrate new innovative products to be placed on the market.

Analyzing the collaboration networks between the participants, it is observed that between them the information circulates quite difficult, and the new connections cannot be established very easily, which can disadvantage the transfer of knowledge, technology and personnel between the network entities. The partnerships between the organizations involved are based on old collaboration relations, which also explains the very high degree of clustering at the level of the collaboration network, by the presence of groups of entities with a high density of collaborations within the group. The funded projects led to the attraction of new researchers in research institutions and led to the creation of jobs in production and in some of the partner companies. In general, there is a concentration of investment through POC around large university centers, which is natural given the concentration of research organizations around these centers. The financing instruments developed through POC Specific Objective 1.4 proved to be attractive for the four areas of smart specialization, but not for the public priority area of "Health".

In the case of POC Specific Objective 1.4 interventions, the evolutions of the program indicators have had some contributions to reaching the targets set for 2023, but more visible effects are expected to occur after 2020, when the funded projects will enter the sustainability period. The POC has made a positive contribution to increasing the number of supported companies collaborating with research institutions or receiving support for the introduction of new products on the market. The projects have led to the filing of new patent applications and the creation of public-private co-publications, the project indicators in this respect being reached and even exceeded in some cases, although the sustainability period lasts until 2025.

**The effects attributed to POC have the potential to be sustainable.** The investments and equipment purchased of the latest generation can help achieve R&D results with potential for capitalization through publication and transfer in economy and/or society. In order to ensure the sustainability of the effects, other new investments must be considered for the exploration, expansion and modernization of the developed infrastructures. In some cases, the maintenance of effects at the level of the beneficiary companies was affected by the reduction of orders and industrial production caused by the COVID-19 pandemic. However, the companies benefiting from financing are perceived as being more resistant to economic crises and shocks compared to other companies in the economy.

Also, evaluations have shown that the positive effects of the intervention on the number of employees tend to be maintained. It is estimated to keep the newly created jobs, to continue the collaboration with the specialists from abroad and to look for new financing. Also, the services and products resulting from the funded projects have the capacity to sustain and generate new products.

POC also has a lasting but low positive impact on the chances of business survival. The positive effects on turnover, profit and number of employees continue to be maintained over time, but their growth rate is declining. However, the effects on the volume of research activities and the number of research posts decreased significantly after the completion of interventions dedicated to increasing private investment in RDI.

At the same time, POC has a lasting positive impact on the intentions of research organizations and enterprises to develop long-term partnerships within projects, through which to continue collaborations on new research topics, for the development of new innovative products, but also for application and implementation of new projects. Also, the research staff attracted in the projects will be retained in the research institutions even after the completion of the projects, continuing the career progress to the next degrees specific to the occupation of scientific researcher.

However, the sustainability of the effects will depend on the existing funding sources for stimulating partnerships and technology transfer, but also on the dynamics of economic activities at regional and national level, respectively on the evolution of COVID-19 crisis and its effects on the economy and society.

**Mechanisms** that facilitated or prevented the achievement of the effects are multiple, but some of them manifested themselves in a horizontal manner, for all or most of the specific objectives. Among them, the most important mechanisms that have supported the positive effects are: the pre-financing mechanism, the

relatively good collaboration of beneficiaries with funding bodies and progress in simplifying administrative procedures for setting up and running a business.

Instead, the specific POC factors that prevented the effects are:

- long evaluation period and late signing of financing contracts,
- lack of clarity of funding guidelines,
- high bureaucracy and changes in reporting documents during implementation,
- long processing period for reimbursement requests,
- the non-intuitive MySMIS platform,
- centralized procurement at the level of innovation clusters.

Other contextual factors that significantly affect the achievement of positive effects at the POC level include: duration and bureaucracy associated with public procurement procedures, duration and procedures for obtaining the necessary authorizations, lack of predictability of the legal and institutional framework but also of research funding and not lastly, the economic situation generated by the COVID-19 pandemic.

**The findings of the evaluation led to the formulation of recommendations addressed in particular to the Program Management Authority, but which also have effects on other institutions in the European funds management system (intermediate bodies, other departments within the Ministry of European Funds).**

The evaluations signaled the need to increase the funding and predictability of funding mechanisms at the level of RDI sector, in order to increase the complementarity of POC interventions with other programs in order to consolidate and develop the RDI sector.

**Recommendations for improving the implementation strategy** aim mainly at streamlining the contracting and implementation process of projects, along with greater transparency and flexibility on eligibility criteria for participation in POC interventions. In the case of the selection of researchers from abroad, it is recommended to simplify the process and find solutions for their preservation and financing even after the completion of the project. It is also recommended to make the procedures for implementing POC interventions more flexible and adaptable, so as to allow beneficiaries to quickly adapt the activity schedule, budget structure and investments to external constraints generated by procurement, authorizations, exchange rate fluctuations, technological developments, epidemiological situation, etc. At the same time, it is advisable to identify ways to support by transfer, including social innovation and applications useful for optimizing the activity of public services.

**Recommendations for improving monitoring procedures** aim to reduce bureaucracy, increase the clarity of guidelines, improve the use of the MySMIS platform to facilitate communication between program beneficiaries and technical and financial monitoring people, and build more flexible communication framework between Intermediate Bodies and beneficiaries.

**Recommendations for improving the financial circuit** of the projects concern, in particular, the efficiency of payments to beneficiaries, the improvement of procurement procedures in RDI projects, as well as the flexibility of the framework for the procurement of equipment and the calculation of depreciation for them.

Thus, the Evaluation Team considers that, in the future, it is essential to continue funding the 2014-2020 POC interventions to increase the capacity of RDI in order to reach the critical mass necessary for performance, supporting the connection of as many research organizations as possible to national and international research and development networks, scientific literature and international databases. In this regard, it is necessary to ensure future sources of funding to support the consolidation, expansion, operation and popularization of enhanced RDI capacities to upgrade software, purchase the necessary complementary equipment and consumables, change or adapt certain components and popularize available services.

It is also recommended to increase the financial allocations for the projects dedicated to creating synergies with the RDI actions of the Horizon 2020 framework program, where the interest of the beneficiaries was very high and very good results were obtained. It is also necessary to continue funding the action to attract



staff with advanced skills from abroad to strengthen research and development capacity, which has proven to be very successful and for which there is a continuous demand.

At the same time, it is necessary to continue funding POC Specific Objective 1.3 interventions and adapt them to the economic situation generated by the COVID-19 crisis, as well as increase financial allocations for projects dedicated to innovative start-up and spin-off enterprises, where the interest of beneficiaries was high, and the results obtained were very good, especially in the less developed regions. Thus, in the context of the crisis generated by the COVID-19 pandemic, it will be necessary to adapt the procedures for implementing interventions to the new conditions, by adjusting and making more flexible the mandatory minimum targets for achievement and outcome indicators and/or implementation periods. In addition, specific policies are needed to stimulate the participation of small and medium-sized enterprises in RDI activities, targeting fast-growing companies, as well as specific policies on the development of "start-ups", with integrated actions to stimulate the number of jobs in start-ups.

Last but not least, it is recommended to continue implementing programs that stimulate the establishment and development of collaborative relationships between research organizations and enterprises, including activities that allow research institutions to increase their visibility in the business environment, to make known the expertise and endowments they have. In this respect, it is necessary to introduce the possibility to increase the value of subsidiary agreements for type C and D activities in case of attracting more partner companies (not necessarily through reallocations of unspent amounts in other types of activities). These changes could lead to the intensification of effective collaborations between research organizations and enterprises, which are needed to develop new innovative products to be placed on the market.

**The success of POC and its funded RDI interventions is significantly influenced by the legislative and institutional context in which it is implemented.** Thus, the evaluations highlighted the need to redesign the legislative framework, to be better adapted to strategic objectives, respectively to support the implementation of the principles of an "Open Science", an absolutely necessary step for the participation of Romania in creating a European Research Area. The legislative framework must be transparent, predictable and easy to implement. It is also necessary to review the institutional framework in order to establish a governance that ensures the necessary conditions for the development of the RDI field.