APPROVED
by Order No V-133/4-88
of the Minister of Education and Science of the Republic of Lithuania and the Minister of Economy of the Republic of Lithuania of 20 February 2014

# ACTION PLAN OF PRIORITY "FUNCTIONAL MATERIALS AND COATINGS" OF "NEW PRODUCTION PROCESSES, MATERIALS AND TECHNOLOGIES" RESEARCH AND (SOCIO-CULTURAL) DEVELOPMENT AND INNOVATION DEVELOPMENT PRIORITY AREA

## SECTION I
## GENERAL PROVISIONS

1. The Action Plan (hereinafter referred to as the 'Action Plan') of Priority "Functional Materials and Coatings" of "New Production Processes, Materials and Technologies" Research and (Socio-Cultural) Development and Innovation Development (Smart Specialisation) Priority Area (hereinafter referred to as the 'RDI Priority Area') has been prepared for the implementation of the Programme on the Implementation of Priority Areas of Research and (Socio-Cultural) Development and Innovation Development (Smart Specialisation) and their Priorities approved by Resolution No 411 "On the Approval of the Programme on the Implementation of the Priority Areas of Research and (Socio-Cultural) Development and Innovation (Smart Specialisation) and their Priorities" (hereinafter referred to as the 'Programme') of the Government of the Republic of Lithuania of 30 April 2014.

2. The Action Plan has been prepared seeking to identify provisions for the implementation of Priority "Functional Materials and Coatings" (hereinafter referred to as the 'Priority') of the RDI Priority Area "New Production Processes, Materials and Technologies".

3. The Action Plan is implemented in 2015–2020.

4. Terms used in the Action Plan shall be construed in this legal act as follows:

4.1. **Functional coating** – a coating providing the surface with special properties. The coating may acquire the special properties due to both its constituent material and the coating structure.

4.2. **Functional materials** – materials of any chemical and physical nature with specific properties (e.g. magnetic, charge transfer, optical, piezoelectric, ferroelectric) enabling their use for certain functions (e.g. response to physical or chemical changes in the environment, energy storage, charge separation, etc.).

4.3. **Hybrid photovoltaic cells** – photovoltaic cells consisting of organic and inorganic materials.

4.4. **Mesoscopic photovoltaic cells** – photovoltaic cells containing structures with their properties depending on their size but which are larger than atoms and molecules. The term of mesostructures predated that of nanostructures, it covers nanostructures and slightly larger structures, depending on the situation, up to the size of micrometres.

4.5. **Organic photovoltaic cells** – photovoltaic cells consisting of organic compounds.

4.6. **Tribologically effective compound** – a compound effectively reducing friction and wear of a material coated with it.

5. Other terms used in the Action Plan have the same meanings as the terms in the Programme.

## SECTION II
## DESCRIPTION OF THE CURRENT SITUATION

6. Semiconductor physics and electronics are branches of science with over four decades of scientific traditions and the potential concentrated in the major Lithuanian research institutes and universities. Research in semiconductor physics is characterised by complexity and the diversity of subject matters. Researchers of the materials science and nanotechnology field have also received wide international recognition in the fields of metal corrosion, microbiological degradation of materials, nanostructured surface structures and electro-catalysis.

7. Lithuania's industries have to become smart in the context of higher production costs, aggressive competition and changing production technologies, i.e. in addition to applying knowledge and technologies in the development of new high-quality products, they must apply such production systems which would be readily modernised by easy and effective integration of new technologies and functions; provide opportunities for quicker preparation of prototypes and placement of new products on the market; easily adapt to orders of different scope, manufacture of different products and niche needs.

Departments of Lithuanian higher education and research institutions (Vilnius University and Kaunas University of Technology) and small business companies have developed the small-scale niche production of complex organic compounds for optoelectronics. Over 100 patents of the United States, Japan and the International Patent Cooperation Treaty have been issued in Lithuania in this field.

8. About 20 knowledge-intensive companies employing about 0.5 thousand specialists are currently operating in Lithuania. This number is forecasted to increase to 1.1 thousand in 2015. The value added generated by these production and installation services companies amounted to EUR 52 million in 2012 and it is forecasted to reach EUR 350 million in 2015. 89 companies employing 4.9 thousand employees as of 2010 are operating in the chemicals and chemical products production sector, and the generated value added amounted to EUR 370 million. Some companies of this sector can apply new materials and technologies developed during the implementation of the Priority. The expected export of companies of this sector will amount to about EUR 290 million in 2015.

9. In 2007–2013, the volume of business investments in projects on research and (socio-cultural) development (hereinafter referred to as the 'R&D') was about EUR 16 million.

10. The rapidly evolving global market of organic optoelectronics accounting for about EUR 11.7 billion is demonstrating the annual growth of 60 per cent. The global demand for organic and printed electronics is forecasted to amount to EUR 55 billion in 2020. Materials produced in Lithuania for organic optoelectronics are already supplied to such foreign companies as Samsung Corporation, Samsung Novaled, BASF Corporation, Cambridge Display Technology, Ltd., Sumitomo Shoji Chemicals Co., Ltd., Chisso Chemical Corporation, Synthon Chemicals GmbH & Ko. KG, Chukan Butsu, Ltd., etc. The volume of export of the computer, electronic and optical products production sector was about EUR 5 billion in 2012.

11. There is a close cooperation between Lithuanian higher education and research institutions and business companies for participation in activities of the Photovoltaic Technology and Business Association, the Photovoltaics Technology Cluster consolidating 24 business companies and research institutions, the Plastics and New Materials Cluster and the Space Association. The unique synergies with companies and higher education and research institutions engaged in the fields of chemistry, physics and electronics can be used successfully.

12. The potential of Lithuanian higher education and research institutions in the field of semiconductor physics, optoelectronics and materials sciences is relatively high as a significant progress has already been made through research, and the research results have been successfully commercialised in some cases. Scientists with the high international level involved in the R&D activities in all areas relevant to the Priority (physics, chemistry) are concentrated in higher education and research institutions. The volumes of training of specialists in these fields are increasing annually.

A significant progress has already been made through support of research under measures of the European Union structural funds for 2007–2013 as researchers involved in the R&D activities in the fields of semiconductor physics, materials science, as a result of their active cooperation with the private sector in commercialisation of the research results, have a high potential for participation in

the implementation of the measures actively supported by the state for promotion of science-business cooperation.

Research in such field as functional materials and coatings is rather important for the national economy and is not going to be abandoned in the future. The implementation of the new national education programme "Towards Future Technologies" supported by budgetary funds of the Republic of Lithuania is going to start in 2015 aiming at creation of the favourable international context and conditions for research to lay the foundation for development of future technologies, promotion of innovations and improvement of the competitiveness of Lithuania and will serve considerably for the implementation of the Priority.

In implementing the Programmes on Development of Integrated Centres for Science, Studies and Business (Valleys), research centres are being created in higher education and research institutions with their R&D infrastructure being used for activities relevant to the implementation of the Priority. Worth mentioning among such research centres is the largest research centre in Lithuania being created in the Vilnius Saulėtekio (Sunrise) Campus – the National Centre for Physical and Technology Sciences to consolidate the semiconductor physics, electronics, materials science potential of Vilnius University and the State Research Institute Centre for Physical Sciences and Technology. This research centre will serve the needs of not only the scientific community but also of the private sector.

The new European Union Framework Programme for Research and Innovation "Horizon 2020" makes a provision for the Industrial Leadership Challenge – leadership in enabling and industrial technologies with the likely active involvement of Lithuanian researchers and other specialists during its implementation. Active involvement of Lithuanian researchers in the implementation of the Progressive Education Challenge "Future and Emerging Technologies" is also expected.

In spite of the fact that the system support of the R&D activities important for the implementation of the Priority started in the period of 2007–2013 of the European Union structural funds, the volume of commercialisation is not sufficiently high and has no noticeable effect on the national economy. This gap is expected to be filled by the successful implementation of the Priority.

13. In order to implement the Priority, it is also useful to strengthen and concentrate R&D resources in such thematic R&D fields as surface physics, materials science, thin-film structure technology, sensor and controller technology, condensed matters, special-purpose textile technology, organic chemistry, physical chemistry, chemical engineering and technology, semiconductor physics, electronics. Also, it is useful for Lithuania seeking to promote reconstruction and competitiveness of the national economy by means of the resources available to strengthen business skills to contribute to development and introduction of the developed technologies in such fields of economy as chemical industry, electronic devices production, precision instrument production, lighting systems production, imaging and identification devices production. For the high-quality implementation of the Priority with the expected practical results, it is useful, if needed, to upgrade the R&D infrastructure and to maximise its use for training of the highest-qualification specialists, to create possibilities for young researchers and employees of industrial companies to undergo internship training in foreign technological laboratories, for specialists in the fields of chemistry and physics – to improve their qualification in adjacent fields of science, to provide support for patenting and licensing activities.

## SECTION III
## COMPLIANCE OF THE ACTION PLAN WITH THE PROGRAMME AND OTHER STRATEGIC LEGAL ACTS

14. The Action Plan contributes to the implementation of the strategic objective and objectives provided for in subparagraphs 19.1 and 19.2 of the Programme and to the implementation of the task set in subparagraph 20.4 of the Programme – to promote those RDI activities that would enable the development of advanced technologies, innovative processes, products and services, increase business productivity and efficiency of business processes by cutting costs, increase the efficiency and synchronisation of the supply chain to achieve flexibility, shift from mass production to mass

adaptation, shift to more valuable parts of the added value chain (with a focus on international markets: become at least a technology partner in the international value chains, offer high value added products based on new knowledge and technologies, characterised by exceptional properties and improved applications; enhance trademark development including product design).

15. Actions of the Action Plan:

15.1. create new technologies, products, processes, methods and place them on the market;

15.2. promote the creation of knowledge-intensive business, the development of high-potential companies;

15.3. promote clusterisation, integration into international value added generation networks and investments in R&D and innovations;

15.4. promote science-business cooperation, knowledge and technology transfer to commercialise the R&D results;

15.5. strengthen the potential and abilities of higher education and research institutions to create and commercialise knowledge and to train specialists.

16. The Implementation of the Action Plan is designed to contribute to changes expected from the implementation of the National Progress Programme for 2014–2020 approved by Resolution No 1482 "On Approval of the National Progress Programme for 2014–2020" of the Government of the Republic of Lithuania of 28 November 2012 which, in turn, implements the National Progress Strategy "Strategy for the Progress of Lithuania "LITHUANIA 2030" approved by Resolution No XI-2015 "Concerning Approval of the National Progress Strategy "Strategy for the Progress of Lithuania "LITHUANIA 2030" of the Seimas (Parliament) of the Republic of Lithuania of 15 May 2012. The results created during the implementation of the Priority should contribute to solving major tasks of the Lithuanian economy – to promote orientation of the economy towards the high value added, the sustainable use of resources and to ensure the stability of ecosystems.

## SECTION IV
## PRIORITY IMPLEMENTATION STAGES

17. The Priority implementation measures have been selected in accordance with the Lithuanian Programme on the Development of Innovation for 2014–2020 approved by Resolution No 1281 of the Government of the Republic of Lithuania of 18 December 2013, the State Programme on the Development of Studies, Research and (Socio-Cultural) Development for 2013–2020 approved by Resolution No 1494 of the Government of the Republic of Lithuania of 5 December 2012 and their implementing legislation.

18. The set of study, R&D and innovation policy measures necessary to implement the Priority has been established having regard to the report "Priorities Implementation Signposts" of the international working group of independent experts of 21 February 2014. The following Priority implementation stages are distinguished having regard to this report:

18.1. scientific potential's critical mass generation stage covers activities related to creation of the appropriate environment to search for new ideas, solutions, create technologies, prototypes and to preparation to perform these activities;

18.2. search for new ideas and their solutions covers general and targeted fundamental research necessary to implement the Priority;

18.3. stage for creation of technologies and their prototypes covers industrial research and experimental applied activities necessary to implement the Priority;

18.4. market placement stage covers activities related to the placement of new products on the market;

18.5. business potential's critical mass generation stage covers activities related to knowledge and innovation transfer and dissemination in the society and to the large-scale use.

19. The actions set out in subparagraphs 15.1–15.5 of the Action Plan are implemented through measures set out in Annex 1 to the Action Plan.

20. Annex 2 to the Action Plan makes a provision for the set of study, R&D and innovation policy measures relevant at every stage of the implementation of the Priority.

21. The actions and measures set out in Annex 1 to the Action Plan are implemented having regard to the set of study, R&D and innovation policy measures provided in Annex 2.

## SECTION V
## THEMATIC SPECIFICS OF THE PRIORITY

22. The implementation of the Action Plan seeks to:

22.1. research and develop organic semiconductors, their synthesis and layer formation technologies;

22.2. research and develop organic electronics materials, functional layers and device production technologies;

22.3. research and develop metal oxide layers, ceramic and polymeric coatings and their production technologies;

22.4. research and develop technologies for production of magnetic layers and structures;

22.5. create physical impact measurement and material identification technologies and devices;

22.6. research and develop technologies for modification of surfaces by material layers and nanostructures;

22.7. research and develop physical and chemical methods and technologies for deposition of thin layers and structures;

22.8. research and develop new lithographic processes and technologies;

22.9. research and develop thin-film structure and system analysis methods.

23. The successful performance of activities mentioned in subparagraphs 22.1-22.9 of the Action Plan is inseparable from the R&D activities performed by the public and private sector institutions.

24. The important role in implementing the Priority rests with the joint study, research and (socio-cultural) development and innovation initiatives (hereinafter referred to as the Joint Initiatives) intended to address problems relevant to the economic sectors through the R&D activities in subject matters relevant to the economic sectors and in anticipation of involvement of the private sector entities in the implementation of results of the R&D activities. During the implementation of the Joint Initiatives having regard to the activities provided for in subparagraphs 22.1-22.9 of the Action Plan and the actions set out in subparagraphs 15.1–15.5 of the Action Plan, the R&D activities are performed to:

24.1. search for electroactive materials for organic light-emitting diodes, flexible displays and thin-film transistors, synthesise and purify these materials, research links between their structure and functions, search for multifunctional materials for organic light-emitting diodes and cheap casting technologies adaptable for transistors, search for new structures of derivatives of organic light-emitting diodes and transistors;

24.2. search for materials for organic photovoltaic cell technologies, synthesise, purify these materials, research links between their functions and structure, optimise structures of organic photovoltaic cell derivatives;

24.3. form targeted microstructures, research specific functional materials and their layers, evaluate their properties, search for functional structures with the identifiable response to compounds harmful to people, research links between properties of the detectable compound and the measured signal;

24.4. select functional oxide materials with good structural and physical properties, research their production methods and conditions, produce functional oxide materials and their layers which would be suitable for application in optics, acoustic optics and optoelectronics;

24.5. search for new technologies for chemical (currentless) deposition of transition and noble metals on semiconductors and dielectrics, research the structure and properties of metal coatings

suitable for creation of microelectronics and photovoltaic cells, search for temperature-resistant and abrasion-resistant coatings suitable for space technologies and evaluate their properties;

24.6. search for chemicals reducing friction and wear by saturating porous coatings with them and by other means, research and develop new chemical and physical technologies to improve tribological properties of coatings and surfaces;

24.7. research nanofiber-forming technologies and physical and chemical activation of the surface;

24.8. synthesise materials and develop technologies for organic, hybrid and mesostructured photovoltaic cells, determine their characteristics, develop technologies for synthesis and purification of large quantities of materials, optimise the structure of organic photovoltaic cells;

24.9. develop technologies for production of functional materials and their targeted microstructures with the identifiable response to compounds harmful to people, develop sensor signal scanning and processing concepts, design and produce microsystems with response-generating functional structures, develop technical methodologies for testing of combined micro-sensors;

24.10. develop methods for synthesis of functional oxide materials and their layers, prepare technologies for production of oxide materials and their layers;

24.11. research possibilities for obtaining metal coatings on semiconductors and dielectrics using various types (charge transfer, hydrogen, etc.) of reducers, research their physical and chemical properties, optimise these processes and develop technologies for their implementation;

24.12. develop the most appropriate methods for introduction of wear-inhibiting compounds into nanostructured coatings and other techniques, develop technologies for coating of a large surface area with tribologically effective coatings, prepare physical technologies ensuring development of tribologically effective coatings and surfaces;

24.13. produce pilot batches of new materials for organic light-emitting diodes, flexible displays and thin-film transistors, laboratory prototypes of light-emitting diodes and transistors;

24.14. produce pilot batches of new organic photovoltaic cell materials, laboratory prototypes of organic photovoltaic cells;

24.15. prepare trial versions of autonomous sensors, produce their prototypes with the remote signal registration;

24.16. produce prototypes of functional oxide materials with good properties and their layers, test them in the optical and optoelectronic equipment;

24.17. produce prototypes of new chemical coatings for microelectronics, photovoltaic cells as well as prototypes used in space technologies;

24.18. develop laboratory prototypes of new components with tribologically effective coatings, test technologies of tribologically effective coatings under semi-industrial conditions;

24.19. prepare and test prototypes from nanofiber materials for filters, medical and personal protective equipment and for other applications and produce their pilot batches.

25. The implementation of the Joint Initiatives seeks that the activities listed in subparagraphs 24.1–24.19 of the Action Plan enable the placement on the market of:

25.1. technologies for synthesis of electroactive materials for organic light-emitting diodes, flexible displays and thin-film transistors;

25.2. technologies for synthesis of materials for organic photovoltaic cells;

25.3. compact, cheap and durable, autonomous sensors and sensor systems for monitoring of environmental parameters;

25.4. technologies for production of functional oxide materials and their layers;

25.5. technologies for obtaining of new chemical coatings on different substrates;

25.6. technologies for introduction of tribologically effective compounds into coatings and tribologically effective plasma, vacuum and laser coating technologies;

25.7. filters for air and liquids, medical products and personal protective equipment using nanomaterials.

26. Subparagraphs 24.1–24.19 of the Action Plan may be amended by deleting or supplementing the provided activities as proposed by the Group for the Coordination of

Implementation of the Research and (Socio-Cultural) Development and Innovation Priorities formed by Order No V-576/4-409 of the Minister of Education and Science and the Minister of Economy of 20 June 2014 (hereinafter referred to as the Coordination Group) having regard to the data and proposals collected during monitoring and evaluation of the implementation of the Programme and the Action Plan or other reasonable data and proposals.

## SECTION VI
## IMPLEMENTATION OF THE ACTION PLAN

27. Possible sources of the implementation of the Action Plan:

27.1. funds of the state budget of the Republic of Lithuania:

27.1.1. the European Union Structural Funds‘ assistance for 2014–2020 (assistance under measures of Priority 1 “Promotion of Research, Development and Innovations” of the Action Programme of the European Union Structural Funds for 2014–2020 (hereinafter referred to as the ‘Action Programme’), Priority 3 “Promotion of Competitiveness of Small and Medium-Sized Business” of the Action Programme and Priority 9 “Public Education and Increase in Human Resources Potential” of the Action Programme);

27.1.2. funds of the state budget of the Republic of Lithuania (without the European Union Structural Funds);

27.2. funds of higher education and research institutions;

27.3. funds of private legal entities;

27.4. funds of the European Union Programme for Research and Innovation “Horizon 2020” and other international programmes.

28. A part of funds under measures of Priority 1 and Priority 9 of the Action Programme is earmarked for direct support of activities necessary to implement the Priority, therefore, a preliminary amount to be used for the implementation of the Priority as needed is provided next to these measures in the table of Annex 1.

29. A part of funds under measures of Priority 1 of the Action Programme is not earmarked for specific priorities of research and (socio-cultural) development and innovation development (smart specialisation) priority areas (hereinafter referred to as the RDI priorities), their implementation results may contribute to the implementation of all or the majority of the RDI priorities. These measures are marked with an asterisk in the table of Annex 1 to the Action Plan.

30. The measures implemented using a part of funds of Priority 9 of the Action Programme and funds of the state budget of the Republic of Lithuania are relevant to the whole study, R&D and innovation system and should not be earmarked for the specific RDI priorities, however, results of their implementation may also contribute to the implementation of the Priority. These measures are marked with two asterisks in the table of Annex 1 to the Action Plan.

31. Measures of Priority 3 of the Action Programme, although relevant to the whole business conditions improvement and business assistance system, will indirectly contribute to the implementation of the Action Plan, mainly by creating conditions for private sector entities to place new products on the market and by generating the business potential’s critical mass.

During the implementation of measures of Priority 3 of the Action Programme, it is planned to support such activities relevant to the implementation of the Priority as product design development, introduction of enabling technologies in traditional industries, presentation of products at international exhibitions and/or fairs, certification of planned export products and services, new production and service provision capacity building, business incubator infrastructure development, membership in international networks (platforms), raising awareness of new products and services, business start-up consultations.

32. Funds of higher education and research institutions are to be attracted during support of activities related to creation and upgrade of study and R&D infrastructure necessary to implement the Priority (a partial contribution of higher education and research institutions from own funds is

expected during the implementation of infrastructure projects). These funds are included in column "State budget and other funds" in the table of Annex 1 to the Action Plan.

33. Funds of private legal entities are to be attracted during the implementation of measures under which state co-financing is provided for the ongoing projects – business companies will have to cover a part of the project value using their own funds. These funds are provided in column "Private sector funds" in the table of Annex 1 to the Action Plan.

34. The Priority may be partially implemented through participation in the European Union Programme for Research and Innovation "Horizon 2020" and other international programmes. The table of Annex 1 to the Action Plan does not include funds attracted through participation in international programmes.

35. The implementation of the Action Plan is aimed at quantitative and qualitative results complying with the evaluation criteria set out in Annex 1.

36. The deadlines for announcement of calls for proposals for measures implementing actions of the Action Plan or the deadlines for making lists of projects will be provided for in accordance with the plans for announcement of calls for proposals and making lists of projects developed by the ministries as provided for in the Rules for Administration of the Action Programme on Investments of the European Union Funds for 2014–2020 approved by Resolution No 1090 "On Approval of the Rules for Administration of the Action Programme on Investments of the European Union Funds for 2014–2020" of the Government of the Republic of Lithuania of 3 October 2014.

37. The development of research and (socio-cultural) development and innovation development (smart specialisation) priority areas and the implementation of their priorities are coordinated by the Coordination Group.

38. The Programme and the Action Plans of the RDI Priorities are implemented to promote and support interaction and cooperation between business entities and science and education institutions. The promotion of cooperation between business entities and science and education institutions, in accordance with the procedure established by the Ministry of Education and Science and the Ministry of Economy, is implemented by the Agency for Science, Innovation and Technology. The implementation process of the Programme is continuously monitored by analysing and assessing the implementation of the Action Plans of RDI Priorities. Monitoring and assessment of the Programme implementation, in accordance with the procedure established by the Ministry of Education and Science and the Ministry of Economy, is carried out by the Science and Studies Monitoring and Analysis Center (MOSTA).

39. The infrastructure created and the equipment purchased in the course of projects implemented under study, R&D and innovation policy measures set out in Annex 1 to the Action Plan with their financing planned from the EU assistance funds or other financing sources must not duplicate the equipment currently existing in higher education and research institutions or other public sector entities, unless capacities of the existing equipment are not sufficient to ensure the implementation of the Priority.

40. The list of measures provided in Annex 1 to the Action Plan may be amended having regard to results of the interim evaluation of the implementation of the Priority planned for 2018 as well as having evaluated the needs of potential measure promoters.

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Annex 1
to the Action Plan of
Priority "Functional Materials and
Coatings" of
"New Production Processes, Materials and
Technologies" Research and
(Socio-Cultural) Development and Innovation
Development (Smart Specialisation)
Priority Area

# ACTIONS, MEASURES OF THE ACTION PLAN, PRELIMINARY NEED FOR FUNDS FOR THEIR IMPLEMENTATION AND EVALUATION CRITERIA

| Actions and measures | Preliminary funds, thousand EUR | | | Responsible institution | Criteria for evaluation of actions and measures | Values of the criteria | |
|---|---|---|---|---|---|---|---|
| | European Union Structural Funds' assistance | State budget and other funds | Private sector funds | | | 2018 | 2023 |
| **Action 1. Create new technologies, products, processes, methods and place them on the market:** | | | | | **Created prototypes (concepts) of products, services or processes within 3 years after the project implementation (items)** | **8** | **18** |
| Measure 1.1. Joint science and business projects contributing to the implementation of smart specialisation | 2 433 | - | - | Ministry of Education and Science | Number of joint projects of business and higher education and research institutions (items) | 2 | 5 |
| | 376 | - | 340 | Ministry of Economy | Number of certified products (items) | 0 | 1 |
| Measure 1.2. Support for creation or development of the corporate RDI infrastructure and performance of the RDI activities ("Intellect") | 4 943 | - | 4 500 | | | | |
| Measure 1.3. Support for the corporate RDI through innovation vouchers ("Innovation Vouchers") | | | | | | | |
| Measure 1.4. Support for international patenting of inventions and designs ("InoPatentas LT") | | | | | | | |
| Measure 1.5. Support for pre-certification of new products and technologies and their testing in laboratories and under real conditions ("Inosertifikavimas") | | | | | | | |
| **Action 2. Promote the creation of knowledge-intensive business, the development of high-potential companies:** | 1 303 | - | 145 | | **New companies which received investments within 3 years after the project implementation (items)** | **1** | **2** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Measure 2.1. Support for innovation advisory services ("Inogeb LT") | | | | | Number of companies receiving financial support in a form other than subsidy (items) | 1 | 3 |
| Measure 2.2. Support for RDI companies through financial instruments ("Technostartas LT", "Koinvest LT") | | | | | | | |
| **Action 3. Promote clusterisation, integration into international value added generation networks and investments in R&D and innovations:** | | | | | **New cluster members within 3 years from the beginning of the project implementation (items)** | **0** | **1** |
| | | | | | **Private investments attracted to the RDI field by smart specialisation areas within 3 years after the project implementation (thousand EUR)** | **42 353*** | **95 295*** |
| Measure 3.1. Support for cluster operation ("InoKlaster LT") | 191 | - | 191 | | Number of legally binding agreements with international partners (items) | 4 | 10 |
| Measure 3.2. Support for participation in international RDI initiatives ("InoConect LT") | | | | | | | |
| Measure 3.3. Support for attraction of direct foreign investments in the RDI field ("Smartinvest LT") | 5 792* | - | - | | | | |
| Measure 3.4. Support for direct foreign investments in the RDI field ("SmartInvest LT+") | 28 962* | - | 32 011* | | | | |
| **Action 4. Promote science-business cooperation, knowledge and technology transfer to commercialise the R&D results:** | | | | Ministry of Education and Science | **Business R&D orders performed by higher education and research institutions (thousand EUR)** | **1 100** | **1 430** |
| | | | | | **Income of higher education and research institutions from results of intellectual activities (thousand EUR)** | **4,2** | **7,9** |
| Measure 4.1. Creation and development of the resource base in higher education and research institutions for the implementation of science and business projects (creation and development of infrastructure of the centres of excellence) | 8 690* | - | - | | Patent applications (items)<br><br>Doctoral studies conducted in conjunction with business entities (number of doctoral students) | 3<br><br>1 | 10<br><br>2 |
| Measure 4.2. Support for the implementation of the R&D activities of the centres of excellence | 11 580* | - | - | | | | |
| Measure 4.3. Implementation of market-oriented science and business projects through the cross-border network | 284 | - | - | | | | |
| Measure 4.4. Promotion of commercialisation of results of the R&D activities in higher education and research institutions | 163 | 504** | - | | | | |
| **Action 5. Strengthen the potential and abilities of higher education and research institutions to create and commercialise knowledge and to prepare specialists:** | | | | | **External users from foreign higher education and research institutions, Lithuanian and foreign business companies that used the upgraded open-access research infrastructure** | **246** | **320** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | **(funds received from these users (thousand EUR)** | | |
| | | | | | **Number of publications in frequently quoted scientific periodicals (items)** | **200** | **230** |
| Measure 5.1. Upgrade of the RDI and study infrastructure in the fields of smart specialisation | 52 132* | - | - | | Number of researchers working in the improved research infrastructure base (all full-time employment equivalents) | 60 | 79 |
| Measure 5.2. Creation and development of European research infrastructures and integration of Lithuania into the European research infrastructures following the roadmap for Lithuanian research infrastructures and ESFRI | 26 066* | 1008** | - | | Number of spin-off knowledge-intensive companies in higher education and research institutions (items) | 0 | 2 |
| Measure 5.3. Upgrade of the equipment used in open-access centres by areas of smart specialisation | 4 026 | - | - | | | | |
| Measure 5.4. R&D activities of Lithuanian higher education and research institutions | 1 265 | - | - | | | | |
| Measure 5.5. Subscription to databases necessary for the RDI activities | 28 960* | - | - | | | | |
| Measure 5.6. Creation of infrastructure of centres of excellence and parallel laboratories | 26 640* | 504** | - | | | | |
| Measure 5.7. Development of information infrastructure for research and higher education (LITNET) | 4 340* | - | - | | | | |
| Measure 5.8. Involvement of foreign scientists and the R&D activities | 14 481* | - | - | | | | |
| Measure 5.9. Promotion of activities of innovation and technology transfer centres of higher education and research institutions | 14 480* | - | - | | | | |
| Measure 5.10. Doctoral studies process assurance; Doctoral studies, travelling, scholarship, R&D, resettlement, funds for visits (including foreign doctoral students) | 644 | 62 154** | - | | | | |
| Measure 5.11. Employment of scientists and other researchers in knowledge-intensive companies | 2 896* | - | - | | | | |
| Measure 5.12. Brain gain and reintegration | 5 792* | - | - | | | | |
| Measure 5.13. R&D activities of students | 2 317* | - | - | | | | |
| Measure 5.14. Post-doctoral internship promotion | 7 240* | - | - | | | | |
| Measure 5.15. Training of specialists under study programmes related to the priorities of smart specialisation | 140 | - | - | | | | |
| Measure 5.16. Development of the science promotion system | 12 000** | | | | | | |
| Measure 5.17. Financing for first- and second-cycle studies and integrated and non-degree studies | - | 220 032** | - | | | | |
| Measure 5.18. Support for the mobility of Lithuanian and foreign students and teachers | - | 3 438** | - | | | | |

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| Measure 5.19. Practical training for scientists and other researchers, participation of scientists and other researchers in targeted events of international programmes, participation of Lithuanian researchers in targeted meetings for preparation of project applications, participation of Lithuanian representatives in the European Union and other international working groups, committees, commissions related to research and (socio-cultural) development. / H2020 participation promotion | 4 503** | 258** | - | | | | |
| Measure 5.20. Ensuring financing of the R&D activities relevant to solving of the highest level social and national strategically important problems and to the economic development | - | 94 314** | - | | | | |
| Measure 5.21.Support for cross-sector cooperation in the R&D field | - | 2 364** | - | | | | |
| Measure 5.22.Creation of conditions for researchers to use digital scientific data resources | - | 450** | - | | | | |

* Funds not earmarked for specific priorities of research and (socio-cultural) development and innovation development (smart specialisation) priority areas, their implementation results may contribute to the implementation of all or the majority of the RDI priorities.
** Funds for measures relevant to the whole study and RDI system and not earmarked for the specific RDI priorities, their implementation results will contribute to the implementation of the Priority.

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Annex 2
to the Action Plan of
Priority "Functional Materials and
Coatings" of
"New Production Processes, Materials and
Technologies" Research and
(Socio-Cultural) Development and Innovation
Development (Smart Specialisation)
Priority Area

## SET OF STUDY AND RDI POLICY MEASURES

| Scientific potential's critical mass generation | Search for new ideas and their solutions | Development of technologies and their prototypes | Placement on the market | Business potential's critical mass generation |
|---|---|---|---|---|
| Measure 5.1. Upgrade of the RDI and study infrastructure in the fields of smart specialisation | Measure 1.1. Joint science and business projects contributing to the implementation of smart specialisation | | | Measure 3.1. Support for cluster operation ("InoKlaster LT") |
| Measure 5.2. Creation and development of European research infrastructures and integration of Lithuania into the European research infrastructures following the roadmap for Lithuanian research infrastructures and ESFRI | Measure 1.2. Support for creation or development of the corporate RDI infrastructure and performance of the RDI activities ("Intelektas LT") | | | Measure 3.2. Support for participation in international RDI initiatives ("InoConect LT") |
| Measure 5.3. Upgrade of the equipment used in open-access centres by areas of smart specialisation | Measure 5.4. R&D activities of Lithuanian higher education and research institutions | 1.5. Support for pre-certification of new products and technologies and their testing in laboratories and under real conditions ("Inosertifikavimas") | | Measure 5.11. Employment of scientists and other researchers in knowledge-intensive companies |
| Measure 5.5. Subscription to databases necessary for the RDI activities | Measure 2.1. Support for innovation advisory services ("Inogeb LT") | | | |
| Measure 5.6. Creation of infrastructure of centres of excellence and parallel laboratories | Measure 2.2. Support for RDI companies through financial instruments ("Technostartas LT", "Koinvest LT") | | | |
| Measure 5.7. Development of information infrastructure for research and higher education (LITNET) | Measure 3.3. Support for attraction of direct foreign investments in the RDI field ("Smartinvest LT") | | | |
| Measure 5.9. Promotion of activities of innovation and technology transfer centres of higher education and research institutions | Measure 3.4. Support for direct foreign investments in the RDI field ("Smartinvest LT+") | | | |
| Measure 5.10. Doctoral studies process assurance; Doctoral studies, travelling, scholarship, R&D, resettlement, funds for visits (including foreign doctoral students) | Measure 4.4. Promotion of commercialisation of results of the R&D activities in research and higher education institutions | | | |
| Measure 5.12. Brain gain and reintegration | Measure 5.20. Ensuring financing of the R&D activities | Measure 1.3. Support for the corporate RDI through | - | - |

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|---|---|---|---|---|
| | relevant to solving of the highest level social and national strategically important problems and to the economic development | innovation vouchers (“Innovation Vouchers”) through the cross-border network | | |
| Measure 5.14. Post-doctoral internship promotion | Measure 3.2. Support for participation in international RDI initiatives (“InoConnect LT”) | | | |
| Measure 5.15. Training of specialists under study programmes related to the priorities of smart specialisation | Measure 5.13. R&D activities of students | | | |
| Measure 5.8. Involvement of foreign scientists and the R&D activities | | Measure 1.4. Support for international patenting of inventions and designs (“InoPatentas LT”) | | |
| Measure 5.16. Development of the science promotion system | - | Measure 4.3. Implementation of market-oriented science and business projects through the cross-border network | | |
| Measure 5.17. Financing for first- and second-cycle studies and integrated and non-degree studies | | - | | |
| Measure 5.18. Support for the mobility of Lithuanian and foreign students and teachers | | | | |
| Measure 5.19. Practical training for scientists and other researchers, participation of scientists and other researchers in targeted events of international programmes, participation of Lithuanian researchers in targeted meetings for preparation of project applications, participation of Lithuanian representatives in the European Union and other international working groups, committees, commissions related to research and (socio-cultural) development. / H2020 participation promotion | | | | |
| Measure 5.21:Support for cross-sector cooperation in the R&D field | | | | |
| Measure 5.22.Creation of conditions for researchers to use digital scientific data resources | | | | |
| Measure 4.1. Creation and development of the resource base in research and higher education institutions for the implementation of science and business projects (creation and development of infrastructure of the centres of excellence) | | | | |
| Measure 4.2. Support for the implementation of the R&D activities of the centres of excellence | | | | |