BGI consulting

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The cooperation of the Republic of Lithuania and the Swiss Confederation in research and development

EVALUATION STUDY

ŠVIETIMO IR MOKSLO MINISTERIJA

LIETUVOS IR ŠVEICARIJOS BENDRADARBIAVIMO PROGRAMA

BGI Consulting, UAB Business | Government | Innovation | Didžioji g. 25-6, LT-01128 Vilnius, Lithuania
Tel. + 37052154075 | Fax. + 370 5 215 4837 | info@bgiconsulting.lt | www.bgiconsulting.lt

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ABBREVIATIONS

CPMA	Public enterprise Central Project Management Agency
IF	Impact Factor
EU	European Union
EU 7FP	EU seventh framework programme for research and technological development
ICT	Information and communication technologies
JSC	Joint selection committee
USA	United States of America
JCR	Journal citation reports
Lithuania	Republic of Lithuania
RCL	Research Council of Lithuania
MES of RoL	Ministry of Education of Science of the Republic of Lithuania
MITA	Agency for Science, Innovation and Technology
MOSTA	Research and Higher Education Monitoring and Analysis Centre
RHEI	Research and higher education institutions
R&D	Research and Development
SME	Small and medium enterprises
Programme	Lithuanian-Swiss Cooperation Programme 'Research and Development'
Sciex-NMS^{ch}	Scientific Exchange Programme between Switzerland and the New Member States of the European Union
Switzerland	Swiss Confederation
WOS	Web of Science

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INTRODUCTION

On the basis of the agreement No. S-5 on the evaluation study of the cooperation of the Republic of Lithuania and the Swiss Confederation in research and development signed between the Ministry of Education of the Republic of Lithuania (*hereinafter – the MES RoL*) (Contracting authority) and BGI Consulting UAB (Evaluator) on 12 January 2017, the final report on the evaluation study is submitted to the Contracting authority.

The final report on the evaluation study was drawn in accordance with the requirements laid down in the Terms of reference of evaluation and includes the analysis by all evaluation objectives specified in Paragraph 4 of the Terms of reference of evaluation.

When preparing the final report on the evaluation study, the internet based and phone surveys of the following six respondent groups were conducted: beneficiaries of the Programme of Lithuanian-Swiss cooperation 'Research and Development' (*hereinafter – the Programme*), Programme project partners from Lithuania and Switzerland, representatives of the central units and faculties/units of the Lithuanian state universities and state research centres/institutes responsible for science; the representative of the Programme administering institution Research Council of Lithuania (*hereinafter – the RCL*) was interviewed; databases of the projects implemented in the framework of the international research and development programmes (EUROSTARS, EUREKA, COST, EU 7FP and Horizon 2020) were analysed; the reports on the scientific publications based on the Programme projects results and on the project implementation were analysed; other available information was reviewed.

The final report on the evaluation study consists of five main chapters, which contain the evaluation methodology (*1 Chapter*), evaluation results reflecting the duality of the evaluation object – evaluation of the Lithuanian and Swiss cooperation within the framework of the Programme (*2 Chapter*), and evaluation of the cooperation of the Lithuanian and Swiss state research and higher education institutions outside the Programme (*3 Chapter*), evaluation conclusions (*4 Chapter*) and evaluation recommendations based on the latter conclusions (*5 Chapter*).

1. METHODOLOGY OF EVALUATION

The main aim of the study was to evaluate the cooperation of the Republic of Lithuania (*hereinafter – Lithuania*) and the Swiss Confederation (*hereinafter – Switzerland*) in research and development.

The main research object of the evaluation considering the objectives of the study **could be divided into two parts**: (1) evaluation of the cooperation of Lithuania and Switzerland that took place during the implementation of Lithuanian-Swiss Cooperation Programme 'Research and Development' and (2) evaluation of Lithuanian and Swiss public research and higher education institutions (*hereinafter - RHEI*) cooperation during 2010-2016 time period in forms not related to the Programme (e.g. by implementing bilateral/multilateral cooperation agreements, carrying out joint research projects funded by other programmes such as EUREKA, EUROSTAS, FP7, Horizon 2020, COST, taking part in the activities organized by international cooperation networks).

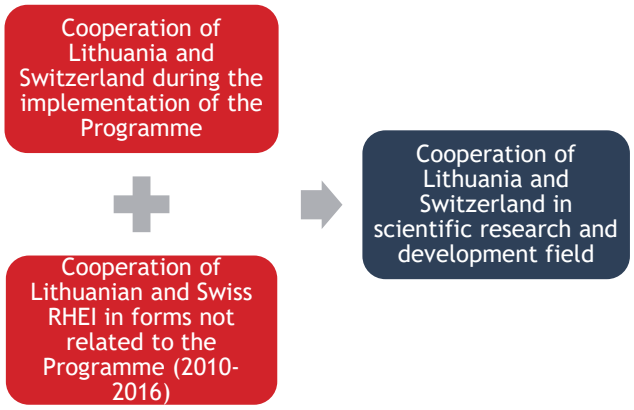

FIGURE 1. OBJECT OF EVALUATION

Source: BGI Consulting, based on the Terms of reference of evaluation

The main aim of the evaluation of cooperation of Lithuania and Switzerland during the implementation of the Programme was to assess: how and to what extent the results of the Programme have contributed to the attainment of the main goal of the Programme; what was the input of the Programme in establishing new cooperative relations among Lithuanian and Swiss scientists; what issues have emerged during the implementation of Programme projects and what measures were employed to resolve them; what are the prospects of continuing the cooperation after the termination of the Programme activities; what is the input of the Programme in implementing horizontal priorities.

The main aim of the evaluation of cooperation of Lithuanian and Swiss RHEI in forms not related to the Programme was to assess: what was the extent of cooperation among Lithuanian and Swiss scientists; what were the main spheres of interest for cooperation; what where the most popular forms of cooperation; what kind of problems and issues related to cooperation were encountered.

Once the research addressing each objective of the study was finished and all the information gathered was summarised, recommendations regarding the future cooperation of Lithuania and Switzerland in research and development (if agreements regarding future Swiss Confederation financial assistance to Lithuanian R&D sector were made) were formulated. Additionally, Lithuanian and Swiss scientists interest spheres, priority themes and forms regarding the cooperation in research and development were identified, the good practice of Programme implementation as well as implementation aspects to which attention should be payed if similar programmes were to be implemented were singled out.

1.1 METHODS OF EVALUATION

Various research methods were employed to implement the study including internet and phone based surveys of Programme project beneficiaries, project partners from Lithuania and Switzerland, representatives of Lithuanian RHEI, semi-structured interview with the representative of the institution responsible for the administration of the Programme, desk-based research of all available information including analysis of the databases of international R&D funding programmes, analysis of the scientific publications published during the implementation of the Programme, analysis of the final reports of project implementation, Programme documents and secondary Programme related sources.

1.1.1 SURVEYS AND SEMI-STRUCTURED INTERVIEWS

In order to collect necessary information internet based surveys of four respondent groups, namely Programme project beneficiaries, Programme project partners from Lithuania, Programme project partners from Switzerland and representatives of Lithuanian RHEI were carried out. The internet based survey took place on 18-27 January 2017 using internet based survey platform ©SurveyMonkey. After the termination of the internet based survey potential survey respondents that had not provided data up to that date were contacted and surveyed by phone. The overall response rate was acceptable based on social science standards for researchers to be able to generalize the data and draw meaningful conclusions.

Considering the need to expand the analysis of the data collected from the survey, a semi-structured interview with the representative of the institution responsible for the administration of the Programme was carried out.

1.1.2 INTERNATIONAL R&D PROGRAMMES DATABASES ANALYSIS

In order to collect information about Lithuanian RHEI cooperation with Swiss scientists implementing joint research projects funded by international R&D programmes other than the Programme the databases of EUREKA, EUROSTARS, COST, FP7 and Horizon 2020 programmes were analysed. The analysis helped to create a designated database of all the projects funded by the aforementioned programmes and implemented in 2010-2016 where Lithuanian scientists were involved, where Lithuanian scientists cooperated with Swiss scientists and where Lithuanian scientists employed in Lithuanian RHEI cooperated with Swiss scientists employed in Swiss RHEI. Later, this database was analysed according to various criteria.

1.1.3 ANALYSIS OF SCIENTIFIC PUBLICATIONS

Aiming to assess the extent and quality of the scientific production released during the implementation of the Programme, analysis of all the publications published in relation with the implementation of the Programme was conducted. First of all, the database of all the publications related to Programme activities and published up to the date of evaluation (25th of January, 2017) was created. Secondly, the database was analysed aiming to select publications that were published in scientific journals referred to in WOS database and having a citation index in JCR database. As most of the publications were published only recently, the citation index of each single publication was decided not to be an accurate indicator at the time of the conduction of the study. Therefore, as a third step, analysis of the publications according to the journal ranking in which it is published was carried out. The result of this analysis enabled the researchers to collect the data on the amount of Programme activities related publications that were published in scientific journals falling to the first, second, third or fourth quartile of the most cited journals.

1.1.4 ANALYSIS OF OTHER AVAILABLE INFORMATION

In order to address all of the evaluation objectives analysis of additional Programme related information was carried out. Other analysed information sources include final project implementation reports that provided information needed for assessment of input of the Programme in implementation of horizontal principles, analysis of the prospects of further cooperation of project beneficiaries and partners, identification of issues related to project implementation. In addition to final project implementation reports other sources of information such as various Programme related primary and secondary sources, Programme projects and Lithuanian RHEI websites, gender composition indicators of project teams were analysed. The information found in the aforementioned sources was used to prepare the survey questionnaires, find contacts of potential respondents, identify the input of the Programme in implementation of horizontal priorities, identify international research and development cooperation networks that Lithuanian RHEI belong to.

2. LITHUANIAN AND SWISS COOPERATION WITHIN THE FRAMEWORK OF THE 'RESEARCH AND DEVELOPMENT' PROGRAMME

The evaluated programme is a part of the Lithuanian and Swiss cooperation programme aimed at reducing economic and social disparities in the enlarged European Union (*hereinafter – the EU*). The Programme is implemented under the tripartite agreement on the project No. CH-3-ŠMM-01 'Research and Development' of 8 November 2011 between the Ministry of Education and Science of the Republic of Lithuania (intermediary body), Central project management authority (*hereinafter – the CPMA*) (performing the functions delegated to it by the intermediary body) and the Research Council of Lithuania (project promoter). The Programme implementation period is **from 15 December 2010 until 31 December 2016**, the Swiss support of **CHF 10 679 000** was granted to it[1]. The aim of the Programme is to strengthen the ties and friendly relations between both countries, to promote productive cooperation in the research and development field, to deepen knowledge on the selected topics of research, to promote interinstitutional cooperation thus contributing to the social and economic progress of Lithuania. In pursuit of the above-mentioned aim, two types of projects were implemented – **joint research** and **institutional partnership.** The detailed information about the projects implemented under the 'Research and Development' Programme is provided in Annex 7.

The projects of joint research cover joint researches conducted by the Lithuanian and Swiss scientists in the fields of **natural sciences, environmental sciences and technologies or health (life) sciences.** During the implementation of this type of projects, not only research but other related activities were carried out: visits to the project participants'[2] institutions and organisation of project participants' meetings, acquisition of necessary aids and equipment, organisation of various events (scientific conferences, round-table discussions, seminars, etc.), preparation and publication of various printed materials (joint articles, publications, etc.). The total number of **11 joint research projects** was implemented, including: two projects in the field of environmental sciences and technologies, three in the field of health (life) sciences, six in the field of natural sciences, the total budget of which is **LTL 25 302 711** (EUR 7 328 171.63)[3]. These projects were implemented in 2012–2016.

During the internet based survey, the beneficiaries and partners of the joint research projects from Lithuania and Switzerland were asked to name the R&D stages that benefited most from the projects they were implementing. Based on the methodology of the definitions of the R&D stages, the R&D process consists of 10 stages (nine stages of research and development and one stage of innovations), which express a certain level of technological maturity and readiness of technologies for their placement on the market:

[1] On the basis of the details provided in the application for the 'Research and Development' project of the Lithuanian and Swiss cooperation Programme. Due to ongoing fluctuations in the exchange rate of the Swiss Franc against the Euro, the amount is given in Swiss Franc rather than Euro.

[2] For the purpose of this report, **project beneficiaries** are Lithuanian scientists who submitted applications for implementation of the projects under the 'Research and Development' Programme, **project partners from Lithuania** are Lithuanian scientists who joined the implementation of the projects in the capacity of partners, **project partners from Switzerland** are Swiss scientists who joined the implementation of the projects in the capacity of partners. All of them together are called **project participants.**

[3] During the first invitation to submit applications, the funds for the projects implementation were allocated in Litas.

1. acquisition of fundamental knowledge;
2. formulation of knowledge application concept;
3. proof/validation of the concept feasibility;
4. development and testing of a mock-up (model);
5. mock-up (model) testing by imitating the real conditions;
6. prototype (pilot version) development;
7. prototype (pilot version) demonstration;
8. pilot batch manufacturing (final testing of the version);
9. assessment of the newly-developed product (pilot samples of the newly-developed product assessed by the consumer and/or client);
10. introduction into the market[4].

This type of the Programme projects mostly contributed to the first three R&D stages, i.e. **acquisition of fundamental knowledge** (33 per cent of projects), **formulation of knowledge application concept** (21 per cent of projects), and **proof/validation of the concept feasibility** (17 per cent of projects) (Figure 2). Individual projects also contributed to further R&D stages, with the exception of the eighth (pilot batch manufacturing (final testing of the version)) and the tenth (introduction to the market). Majority of the joint research projects contributed to more than one (2–4) R&D stages.

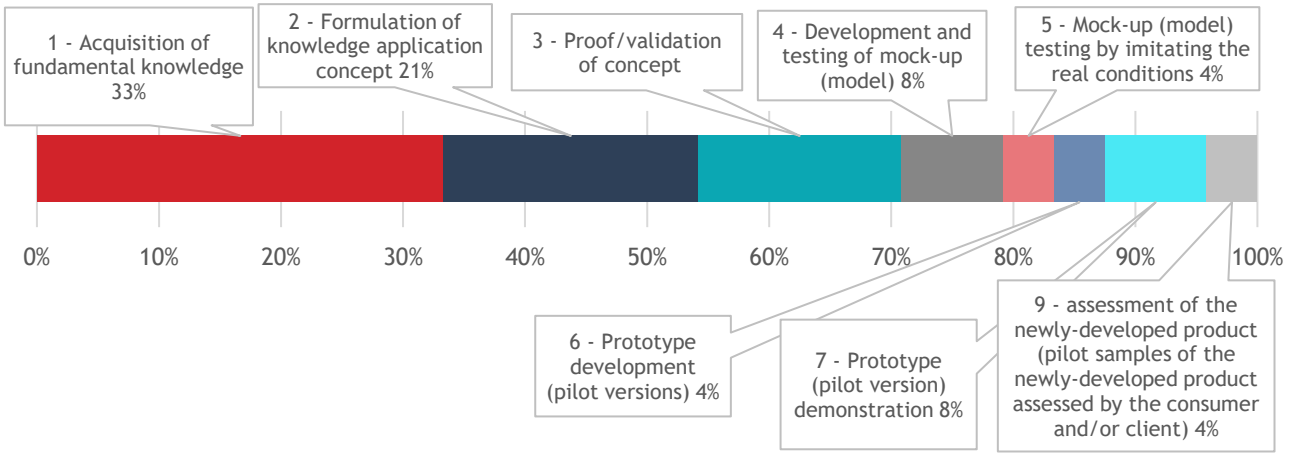

FIGURE 2. R&D STAGES WHICH BENEFITED MOST FROM THE JOINT RESEARCH PROJECTS OF THE PROGRAMME

Source: based on the internet based questionnaire surveys of the Programme project beneficiaries, Programme project partners from Lithuania and Switzerland conducted by BGI Consulting

Institutional partnership projects embrace the partnership of the Lithuanian and Swiss RHEI by organising internships and joint events in the fields of **humanities, social, physical, biomedical, agricultural sciences** or **technologies**. During the implementation of this type of projects, the project researchers were sent for internships in other project participants' institutions, joint events (conferences, seminars, training, etc.) were organised, participation in the events directly related with the project implementation (scientific conferences, round table discussions, seminars, etc.) was promoted, publications (joint articles, publications, etc.) were prepared and published. The total number of **nine institutional partnership projects** were implemented (two in the field of humanities, one in the field of social sciences, two in biomedical sciences, four in technologies),

[4] Methodology of the definitions of R&D levels, 2014, available on: http://www.mita.lt/uploads/documents/leidiniai/mtep_lygiu_apibrezciu_metodologija.pdf.

with the total budget of EUR 1 077 043.11[5]. Implementation of this type of projects did not start until 2016[6]. No research was carried out in the institutional partnership projects, therefore evaluation of their contribution into various R&D stages would be incorrect.

2.1 CONTRIBUTION OF THE PROGRAMME INTO THE DEVELOPMENT OF NEW SCIENTIFIC COOPERATION PARTNERSHIPS

4.1.2. to assess and summarise the Programme's contribution into the establishment of new research cooperation partnerships with consideration of the specifics of joint research projects and institutional partnerships.

4.1.4. to assess and summarise the Programme's ties with Switzerland (i.e. established relations, partnerships, popularisation of the name of Switzerland, possibilities created for Switzerland to participate in public procurements, new opportunities created for Swiss products/services, etc.) and other meaningful relations.

In order to identify the contribution of the Programme into the establishment of new research cooperation partnerships, the changes of the Lithuanian and Swiss cooperation in the R&D field were analysed (by comparing the periods before and after the Programme implementation). When comparing the periods, it was important to determine the scope of the research cooperation that took place between the beneficiaries and project partners from Lithuania, from one side, and project partners from Switzerland or other Swiss RHEI, from the other side, before preparing the application for the Programme project. Former cooperation between Lithuania and Switzerland was analysed at different levels – at **individual** (between individual researchers or their groups) and **institutional** (between RHEI). Main sources of information were the findings of the questionnaire surveys of the project beneficiaries, project partners from Lithuania and project partners from Switzerland and the reports on project implementation.

2.1.1 FORMER RESEARCH COOPERATION AT THE INDIVIDUAL LEVEL

Half (50 per cent/9 out of 18) surveyed project beneficiaries stated that they were already cooperating with the project partners from Switzerland, as individual researchers or their group, **before starting preparing an application for the Programme project**. Before starting preparing an application for the Programme project, one third (30 per cent/3 out of 10)[7] institutional project beneficiaries were already cooperating with the individual researchers or groups of researchers from Switzerland, and as many as three quarters (75 per cent/6 out of 8)[8] beneficiaries of the institutional partnership projects. Before preparing an

[5] During the second invitation to submit applications, the funds for the projects implementation were allocated in Euro.
[6] Based on the information provided on the website of the MES RoL (https://www.smm.lt/), CPMA website (https://www.cpva.lt/) and website of the Ministry of Finance of the RoL (http://finmin.lrv.lt/).
[7] Before preparing an application for the Programme project, the researchers from the Centre for Physical Sciences and Technology and Vilnius University had already contacts established with the partners from Switzerland.
[8] Before preparing an application for the Programme project, the researchers from the National Cancer Institute, Vilnius University, Kaunas University of Technology had already established contacts with the partners from Switzerland.

application for implementation of the Programme projects, Lithuanian project beneficiaries established individual contacts with the partners from Switzerland mainly through participation in the activities of international research networks/organisations/associations/societies. Before starting preparing an application for implementation of the Programme projects, Lithuanian and Swiss project participants were already cooperating at the individual level within the framework of the joint projects of international R&D programmes (EU 7FP, COST) and the programme of scientific exchanges between the Swiss and New EU Member States (Sciex-NMS^{ch}) .

Before starting preparing an application for the Programme project, **more than half (53 per cent/8 out of 15) of all surveyed project partners from Switzerland stated that they were already cooperating with the beneficiaries from Lithuanian, as individual researchers or their group)** (50 per cent/3 out of 3 in joint research projects and 56 per cent/5 out of 9 at institutional partnership projects). Both types of Swiss project partners named the joint participation in the activities of international research networks/organisations/associations/societies as the main format of former cooperation at the individual level, as well as implementation of RHEI bilateral international cooperation agreements. Partners of joint research projects from Switzerland also mentioned their former cooperation in the implementation of the joint EU 7FP programme project, while the partners of the institutional partnership projects indicated the cooperation under RHEI multilateral international cooperation agreements.

2.1.2 FORMER RESEARCH COOPERATION AT THE INSTITUTIONAL LEVEL

Only slightly **over one fifth (22 per cent/4 out of 18)[9] surveyed representatives of the project beneficiaries identified the existence of cooperation between their represented RHEI and Swiss project partners represented RHEI in the field of R&D before the commencement of Programme project implementation.** One third (30 per cent/3 out of 10) surveyed representatives of joint research and less than over fifth (13 per cent/1 out of 8) surveyed representatives of the institutional partnership project beneficiaries. Mentioned formats of the former cooperation at the institutional level included joint participation in the activities of international research networks/organisations/associations/societies and cooperation in the implementation of the joint project under the EU 7FP. However, **more than half (56 per cent/10 out of 18) of all surveyed representatives of all project beneficiaries** (60 per cent/6 out of 10 in joint research projects and 50 per cent/ 4 out of 8 in the institutional partnership projects) stated that their represented RHEI did not cooperate at the institutional level with the RHEI represented by their Swiss project partners before the implementation of the Programme.

Nevertheless, **nearly half (44 per cent/8 out of 18)[10] of all surveyed representatives of all project beneficiaries** (20 per cent/2 out of 10 in joint research projects and as many as 75 per cent/6 out of 8 in the institutional partnership projects) **identified the former cooperation between their represented RHEI in the field of R&D with other Swiss RHEI** (other than represented by the project partners from Switzerland). The key platform of such cooperation at the institutional level included joint participation in the international research networks/organisations/associations/societies and RHEI bilateral agreements on international cooperation, other mentioned platforms were projects of international R&D programmes (EU 7FP, COST, Horizon 2020). Some surveyed representatives of the project partners from Lithuania further noted that their

[9] It must be noted, that the same share, i.e. 22 per cent, of all surveyed beneficiaries had no information about the former cooperation between their represented RHEI and the RHEI represented by their Swiss project partners, therefore they could not answer the question (i.e. chose the answer 'I don't know').
[10] It must be noted, that the same share, i.e. 44 per cent, of all surveyed beneficiaries had no information about the former cooperation between their represented RHEI and the RHEI represented by their Swiss project partners, therefore they could not answer the question (i.e. chose the answer 'I don't know').

represented RHEI previously cooperated with Swiss RHEI, other than represented by the project partners, through joint participation in the international research networks/organisations/associations/societies, on the basis of RHEI bilateral and multilateral agreements on international cooperation.

Before preparing an application for the Programme project, one out of three surveyed project partners from Lithuania was already cooperating with the Swiss project partners, who stated that the partnership with the Swiss researchers was carried out on the basis of bilateral agreements on international cooperation of RHEI.

Over one fourth (27 per cent/4 out of 15)[11] of the surveyed representatives of all project partners from Switzerland (33 per cent/2 out of 6 in joint research projects and 22 per cent/2 out of 9 in institutional partnership projects), **stated that their represented RHEI cooperated with the RHEI represented by the project beneficiary from Lithuania in the R&D field before the Programme implementation.** The main formats of the former cooperation at the institutional level included RHEI bilateral agreements on international cooperation, joint projects under the EU 7FP, and joint participation in the international research networks/organisations/associations/societies. However, about one half (47 per cent/**7 out of 15) of the surveyed representatives of all project partners from Switzerland** (33 per cent/2 out of 6 in joint research projects and 56 per cent/5 out of 9 in institutional partnership projects), **stated that their represented RHEI did not cooperate with the RHEI represented by the project beneficiaries from Lithuania before the Programme implementation.**

2.1.3 NEW SCIENTIFIC COOPERATION PARTNERSHIPS

The analysis above clearly shows that before preparing an application for the Programme project, the cooperation between the project beneficiaries or project partners from Lithuania and project partners from Switzerland mainly took place **at the individual level,** i.e. between individual researchers or their groups (Figure 3).

[11] It must be noted, that the same share, i.e. 27 per cent, of all surveyed project partners from Switzerland had no information about the former cooperation between their represented RHEI and the RHEI represented by project beneficiaries from Lithuania, therefore they could not answer the question (i.e. chose the answer 'I don't know').

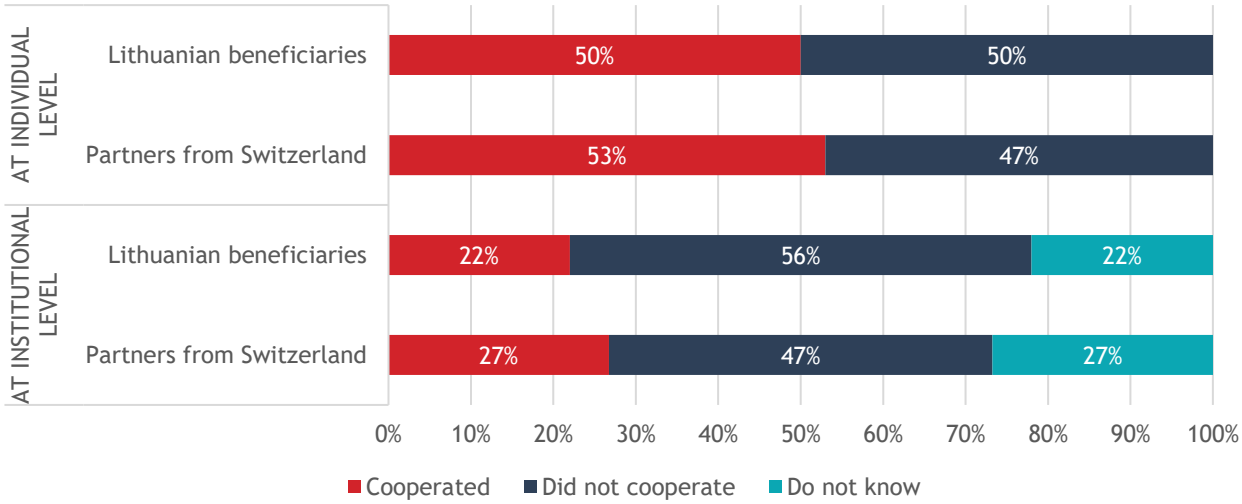

FIGURE 3. THE SCALE OF THE FORMER COOPERATION WITH THE PROJECT PARTNERS (AT INDIVIDUAL AND INSTITUTIONAL LEVELS) (PER CENT FROM ALL RESPONDENTS)

Source: based on the questionnaire surveys of the Programme beneficiaries and project partners from Switzerland conducted by BGI Consulting

It is supported also by the fact that nearly in all the cases, **cooperation in the implementation of the Programme projects was personally initiated either by individual researchers from Lithuania or Switzerland.** It was stated by as many as 89 per cent (16 out of 18) of the surveyed representatives of all project beneficiaries (90 per cent/9 out of 10 in joint research projects and 88 per cent/7 out of 8 at institutional partnership projects). When initiating partnership within the framework of the Programme, the researchers referred to personal contacts with their foreign colleagues which they established during the implementation of joint research projects in the past or international scientific conferences. Only in individual cases, cooperation stemmed from the Lithuanian and Swiss partnership at the institutional level – during the internships of doctoral students from Lithuania in the RHEI represented by the Swiss project partners.

The analysis further revealed that **entirely new partnership with the institutions of the Swiss partners was established in slightly more than one third of the projects (39 per cent/7 out of 18)** (in these cases, before the beginning of the Programme no partnership with the institutions of the Swiss partners was established either at individual or institutional level). Furthermore, considering that before the implementation of the Programme about half (47-56 per cent) surveyed project beneficiaries from Lithuania and project partners from Switzerland did not cooperate either at individual or institutional level in the R&D field, it can be stated that **the Programme helped to extend the partnership from the individual to the institutional level** and vice versa. Thus, **the contribution of the Programme to the development of new scientific cooperation partnerships between these two countries is significant.**

The Programme created the possibilities for the Lithuanian researchers to start cooperating not only with the RHEI represented by the project partners from Switzerland but also with other RHEI of Switzerland or other countries. For example, the beneficiaries of the projects 'Signalling Control of Pathogen Induced Plant Immunity' (CH-3-ŠMM-01/10) and 'Incidence of Micoviruses in Epidemic and Post-Epidemic Populations of the Ash Dieback Pathogen Chalara Fraxinea and Evaluation of Their Potential for Biological Control of the Disease' (CH-3-ŠMM-01/12) were pleased with establishing the partnership during the Programme implementation with other Swiss researchers who did not participate in the joint projects. Newly-initiated scientific partnerships within the framework of some joint research projects were not limited to Switzerland only and extended to other foreign countries. It was noted by the beneficiaries of the projects 'Asymptotic Problems and Applications' (CH-3-ŠMM-01/01), 'Swiss-Lithuanian Ferroelectrics: from Controlled Internal Fields to Energy Harvesting/Medical Diagnostics/Microelectronic Application' (CH-3-ŠMM-01/02), 'Climate Change in Peatlands: Holocene Record, Recent Trends and Related Impacts on Biodiversity and

Sequestered Carbon' (CH-3-ŠMM-01/05) and 'Signalling Control of Pathogen Induced Plant Immunity' (CH-3-ŠMM-01/10) that they launched cooperation with South Korean, Dutch, Italian, and Polish researchers, respectively. In exceptional cases, the implementation of the Programme had favourable impact also on **establishment of new scientific partnerships with the researchers from the same country, which did not participate in the joint project.**

GOOD PRACTICE IN ESTABLISHING NEW SCIENTIFIC PARTNERSHIPS. The Programme provided grounds for the new scientific partnerships with various foreign countries to emerge. Lithuanian researchers participating in the implementation of the Programme projects launched cooperation with their colleagues not only from Switzerland, but also from other countries (e.g., Italy, Poland, Netherlands, and South Korea).

However, even in the cases when the former cooperation between the Lithuanian and Swiss researchers or RHEI was in place, still certain **new quality parameters of partnership can be noticed.** For example, the beneficiary of the project 'Genetic Diabetes in Lithuania' (CH-3-ŠMM-01/09) – Lithuanian University of Health Sciences with its partner University of Geneva have been cooperating in various fields for years, including pedagogy, qualification improvement of human resources, introduction of new research and treatment methods, but the project implemented under the Programme paved the way for the **new type of partnership** – joint research. It was mentioned by the representatives of several project beneficiaries that individual Lithuanian and Swiss researchers were cooperating in the R&D field before, but the great majority of the research teams from both countries found the cooperation with their foreign partners as a new experience, therefore the Programme helped to **extend the cooperation from individual to institutional level**. It must be also noted that participation in the Programme activities, if compared with one of the most popular forms of cooperation in the past – partnership, when implementing joint projects funded by other international R&D programmes (EU 7FP, COST, Horizon 2020, etc.), **contributed to closer international cooperation of researchers.** Since within the framework of the Programme, cooperation took place between the research teams of two countries only, rather than in the framework of broad consortiums involving researchers from many countries, as is the case in the projects of other above-mentioned international R&D programmes, the opportunity to demonstrate Lithuanian researchers' capacities and to gain greater trust in them was created. Therefore, it is likely that this will encourage foreign partners to invite Lithuanian researchers to join international consortiums more frequently in the future[12].

[12] Based on the interview with the representative of the Research Council of Lithuania in charge of the Programme implementation of 23 February 2017.

2.2 CONTRIBUTION OF THE PROGRAMME TO INTEGRATION OF THE LITHUANIAN R&D SECTOR INTO THE INTERNATIONAL RESEARCH AREA.

4.1.1. to evaluate how and to which extent the Programme's results contributed to the achievement of the key aim of the Programme, i.e. To support the Lithuanian research and development sector by integrating it into the international research area, expressed through the indicator 'Increased effectiveness and competitiveness of the Lithuanian research and development system'.

The main aim of the Programme is to support the Lithuanian R&D sector by integrating it into the international research area. International cooperation between research institutions was one of the prerequisites for eligibility to support under the Programme: at least two partners, one of whom had to be based in Lithuania and perform the applicant's functions and at least one of whom had to be based in Switzerland and perform the partner's functions, had to participate in the project[13]. The contribution of the Programme in pursuit of the **indicator 'Increased effectiveness and competitiveness of the Lithuanian R&D system'** should be evaluated through the impact of the Programme made on individual elements, such as **enhancement of Lithuanian R&D human resources, development of specific fields of science in Lithuania** and **improvement of the performance of the Lithuanian scientists and dissemination of their attainments** (Figure 4). The contribution of the Programme to the enhancement of Lithuanian R&D human resources can be manifested by enhanced professional competences and acquired new knowledge, capacities and competences of researchers, which are needed in order to participate in other international cooperation projects or initiatives. Changes in the capacities of Lithuanian R&D human capital and the development of specific fields of science in Lithuania caused by the Programme implementation are reflected by the **subjective evaluation of the researchers participating in the Programme projects.** The contribution made by the Programme into the improvement of performance of the Lithuanian scientists and increase of the dissemination of their attainments is manifested at the **objective analysis of the research products developed during its implementation – scientific publications – and the scale of their dissemination.**

FIGURE 4. THE STRUCTURE OF THE PROGRAMME'S CONTRIBUTION INTO THE INCREASE OF THE EFFECTIVENESS AND COMPETITIVENESS OF THE LITHUANIAN R&D SYSTEM

Source: based on the questionnaire survey of the Programme project beneficiaries conducted by BGI Consulting

[13] Order No. V-182 of the Chair of the Research Council of Lithuania of 9 November 2011 'On the approval of the description of the implementation of the 'Research and Development' project under the Lithuanian-Swiss Cooperation Programme aimed at reducing economic and social disparities in the enlarged European Union'.

2.2.1 ENHANCEMENT OF THE LITHUANIAN R&D HUMAN RESOURCES AND DEVELOPMENT OF SPECIFIC FIELDS OF SCIENCE IN LITHUANIA

ENHANCEMENT OF THE LITHUANIAN R&D HUMAN RESOURCES

Lithuanian researchers participating in the Programme projects were requested at the questionnaire survey to evaluate the changes in their professional competences and knowledge, capacities and competences important for participation in other international cooperation projects or initiatives induced by the implementation of the Programme. The respondents believe that the Programme projects **contributed to enhancement of their professional competences and provided various new knowledge, capacities and competences that are important for participation in other international cooperation projects or initiatives** (Figure 5).

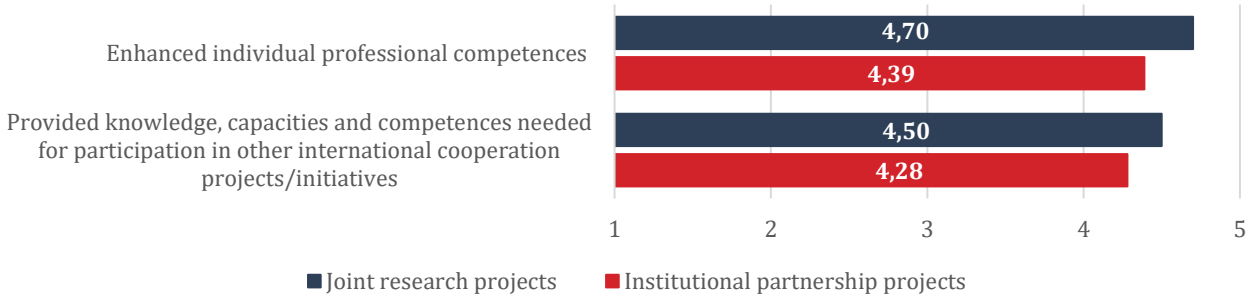

FIGURE 5. CONTRIBUTION OF THE PROGRAMME INTO THE ENHANCEMENT OF THE PROFESSIONAL COMPETENCES OF THE LITHUANIAN RESEARCHERS AND THEIR PROVISION WITH THE KNOWLEDGE NEEDED FOR COOPERATION (IN THE SCALE FROM 1 TO 5, WHERE 1 - VERY SMALL-SCALE CONTRIBUTION, 5 - VERY LARGE-SCALE CONTRIBUTION).

Source: based on the questionnaire survey of the Programme project beneficiaries conducted by BGI Consulting

By the summarised evaluation of the representatives of all project beneficiaries, participation in the projects contributed **at large or very large scale** (4.54 score out of 5) **to enhancement of their professional competences.** All researchers participating in the research projects shared this opinion (giving 4.7 score out of 5) and all, except one, institutional partnership project participants (giving 4.39 score out of 5). It must be noted that the surveyed representatives of the **project partners from Switzerland** also **gave a high evaluation** of the contribution of the projects to the **enhancement of the professional competences or competences needed for cooperation of the Lithuanian researchers**, though their evaluation was relatively lower (foreign partners of both joint research projects and institutional partnership projects gave 4.33 score out of 5) if compared with Lithuanian researchers'.

Based on the information provided in the reports on project implementation, changes in specific professional competences and scientific knowledge were mainly caused by the **participation of the beneficiaries' representatives in training or internships** in foreign partners' institutions[14]. Thus, the Lithuanian researchers were provided with a possibility to learn, make themselves familiar with the foreign partners' activities, to

[14] The information provided in the project reports is not sufficient to identify the exact number of training courses and internships organised within the Programme. But it is known that the members of the Lithuanian research teams trained in the Swiss institutions during the implementation of the project CH-3-ŠMM-01/02, when one researcher of this group spent a year in the Swiss partners' institutions learning to work with the technique planned to be introduced into Lithuania from other financing source than the Programme, one researcher of the project CH-3-ŠMM-01/03 also trained in the Swiss institutions, as well as other researchers working on the other projects.

exchange knowledge and experience. Enhanced competences and qualifications paved the way for further research activities of the Lithuanian researchers, broader practical application of their acquired knowledge and its dissemination, for example, by communicating the knowledge to students or implementing other projects.

GOOD PRACTICE IN ENHANCING LITHUANIAN R&D HUMAN RESOURCES. During the implementation of one institutional partnership project[15] of the Programme, researchers working in the Lithuanian research and health care institutions took over the experience of their Swiss partners of operating specific medical diagnostic equipment, which was introduced into Lithuania earlier. This way, the newly-acquired knowledge and skills could be immediately applied in practice, without waiting until they will be forgotten, lost.

The contribution of the projects to the provision of the Lithuanian researchers with the **knowledge, capacities and competences needed for international cooperation** received slightly lower score (4.39 of 5) but still was considered as of **large scale.** Project beneficiaries gave a relatively higher score to this contribution in the joint research projects (4.5 out of 5) than the participants of the institutional partnership projects (4.28 out of 5). Project beneficiaries distinguished **communication and organisational capacities** and the acquired **experience of preparation of applications for projects, project management and administration,** as valuable in order to ensure smoother implementation and coordination of similar projects in the future.

It must be noted that the evaluation of the contribution of the Programme projects to enhancement of professional competences and provision of the knowledge, capacities and competences needed for cooperation slightly differed by the types of the projects. The joint research project beneficiaries gave better evaluation to the impact of the projects on the changes of professional competences and knowledge, capacities and competences needed for cooperation than the institutional partnership project beneficiaries. Similar trends are observed when analysing the opinions of project partners from Lithuania. With consideration of this, it can be stated that **the contribution of joint research projects to the enhancement of Lithuanian R&D human resources was relatively higher.**

DEVELOPMENT OF SPECIFIC FIELDS OF SCIENCE IN LITHUANIA

During the survey, the representatives of the project beneficiaries and project partners from Lithuania were requested to evaluate the scale of the contribution of the Programme project, in which they participated, to the development of a specific field of science in Lithuania. By the summarised evaluation of the representatives of all project beneficiaries, the Programme contributed **at large or very large scale** (4.6 score out of 5) **to the development of a specific field of science in Lithuania.** The representatives of the project beneficiaries in the joint research projects gave relatively better evaluation (4.7 scoring out of 5), while the representatives of the project beneficiaries in the institutional partnership projects gave relatively worse evaluation (4.4 scoring out of 5). The surveyed representatives of the project partners from Lithuania shared similar opinion, according to whom the Programme contributed at a large scale (4 scoring out of 5) to the development of specific fields of science in Lithuania. Favourable evaluations by the surveyed researchers of Lithuania were determined by various reasons.

First, the Programme provided the **opportunity to develop new or underdeveloped fields of science or research in Lithuania.** For example, the project 'Incidence of Microviruses in Epidemic and Post-Epidemic Populations of the Ash Dieback Pathogen Chalara Fraxinea and Evaluation of Their Potential for Biological Control of the Disease' (CH-3-ŠMM-01/12) gave a significant impetus in genetic and virological research of

[15] Project 'State-dependent Information Processing: Implementation of Electrical Neuroimaging Approach in Lithuania' CH-3-ŠMM-02/03 (VU, Hospital of Psychiatry in Bern, University of Geneva).

phytopathogenic microorganisms in Lithuania, while the project 'Efficiency Research of Internet-Based Psychological Treatment for Cancer Patients' (CH-3-ŠMM-02/09) gave a drive to psycho-oncological science development in Lithuania.

Second, during the implementation of certain Programme projects, **important scientific results were obtained – new inventions were made, research problems were solved, etc.** For example, new significant results when identifying genetic changes and new genetic fields related with intellectual disability were obtained during the implementation of the project 'Unique Genome Variants in Congenital Neurodevelopmental Disorders: Origin, Genomic Mechanisms, Functional and Clinical Consequences' (CH-3-ŠMM-01/04), while during the implementation of the project 'Genetic Diabetes in Lithuania' (CH-3-ŠMM-01/09), for the first time in the history of Lithuania genetic research was carried out during which monogenic diabetes in children and youth population was identified, while the results obtained by the project 'Asymptotic Problems and Applications' (CH-3-ŠMM-01/01) are significant not only at Lithuanian but even at global scale, since the 80-year old mathematical problem was solved.

GOOD PRACTICE IN THE DEVELOPMENT OF VARIOUS FIELDS OF SCIENCE. Significant scientific discoveries in various fields of science were made during the joint research projects of the Programme. For example, genetic changes linked with intellectual disability and diabetes were determined in the health (life) science, while in the natural sciences an old-standing mathematical problem was solved.

Third, the Programme **provided an opportunity to enhance research capacities by acquiring new research instruments (equipment, programme, methods, model, etc.) or by gaining new capacities to operate them, to improve application of research methods, etc.** For example, during the implementation of the project 'Aerosol in Lithuania: Investigation of Primary–Secondary and Regional–Local Contributions to Particulate Matter in the South-Eastern Baltic Region' (CH-3-ŠMM-01/08), an squired new aerosol chemical composition analyser and developed data analysis model improved the competitiveness of aerosol investigations carried out in Lithuania, while during the implementation of the project 'Investigating Optomechanical Properties of Hybrid Polymer-Glass Devices Made Using Femtosecond Laser Processing' (CH-3-ŠMM-02/05), the participants took over the experience of their Swiss partners of working with specific technologies that were underused in Lithuania before.

Fourth, the Programme created the **prerequisites for the development of Lithuanian R&D human resources.** The programme support helped to form strong teams of Lithuanian researchers and to support their research activities. Besides, even in the cases when research activities carried out within the framework of the projects did not induce vital changes in the development of the science in Lithuania, the local researchers had an opportunity to exchange knowledge and experience with their colleagues from Switzerland and to apply their experience and knowledge in pursuit of joint scientific goals.

2.2.2 IMPROVEMENT OF THE PERFORMANCE OF THE LITHUANIAN SCIENTISTS AND INCREASE OF THE DISSEMINATION OF THEIR ATTAINMENTS

IMPROVEMENT OF THE PERFORMANCE OF THE LITHUANIAN SCIENTISTS

The contribution of the Programme into the improvement of the performance of the Lithuanian scientists should be evaluated in the light of quality and extent of dissemination of the products developed during the Programme. Scientific articles can be included among the measurable results of the research work financed by the Programme. Based on the results of the Programme projects, by 25 January 2017, 106 scientific articles were published, 93 (88 per cent) of which were published in the journals with the impact factor (*hereinafter – the IF*) in the journal citation reports (*hereinafter – the JCR*). A substantial number of these articles were published in the leading scientific journals in their categories by their CR – as many as 44.1 per cent of the articles were published in the publications of the first rating quarter in its category, 16.1 per cent – in the second (Table 1).

TABLE 1. VOLUMES OF SCIENTIFIC ARTICLES BASED ON THE RESULTS OF THE PROJECTS IMPLEMENTED WITHIN THE FRAMEWORK OF THE LITHUANIAN-SWISS COOPERATION PROGRAMME 'RESEARCH AND DEVELOPMENT', IN TOTAL

ARTICLES PUBLISHED IN THE SCIENTIFIC JOURNALS (ITEMS), IN TOTAL	*- INCLUDING:* PUBLISHED IN THE SCIENTIFIC JOURNALS WITH JCR RATING (ITEMS)	- SHARE OF THE ARTICLES PUBLISHED IN THE JCR RATED JOURNALS BY THE RATING OF JOURNALS, (PER CENT)				
		Q1[16]	Q2	Q3	Q4	IF of the journal is over 20 per cent of the aggregate CR of the category[17]
106	93	44.1	16.1	15.1	24.7	91.4

Source: based on the reports on the implementation of the programme projects conducted by BGI Consulting and Journal Citation Reports (Clarivate Analytics) data

It must be noted that the scientific articles based on the researches carried out during the implementation of the Programme were written and published by the scientists' groups of various compositions. In order to determine the impact of the Programme on the increase of the Lithuanian R&D sector integration into the international research area, i.e. attainment of the key goal of the Programme, the contribution of the Lithuanian researchers must be distinguished from the achievements in general. Groups of authors consisting of the researchers working in the Lithuanian RHEI only, published 24 scientific articles in total, 20 (83 per cent) of which were published in the journals with the impact factor in the ICR (Table 2).

If compared with the achievements of the Programme in general, Lithuanian researchers' articles were published in lower-ranking journals – none of the scientific articles was published in the first quarter journals, while the majority of the works were published in the journals with the lowest ratings in their categories (Q4). Accordingly, only 70 per cent of all the articles published in the rated journals come above the threshold applied to the articles assessed in the RHEI scientific (art) work assessment methodology used at the national level when evaluating the performance of research institutions – publication in the journals with the impact factor 20 per cent higher than the aggregated IF in the category concerned.

[16] 25 per cent of the journals with the highest impact factor in their fields.
[17] The factor is used in the methodology for evaluation of RHEI scientific (art) works, approved by the Order No. V-79 of the Minister of Education and Science of the Republic of Lithuania of 5 February 2015.

Publishing results when evaluating them by the rating of the journals noticeably improve when the researchers of Lithuanian institutions write the article together with their colleagues from foreign research institutions. Partners of several countries, with the participation of the Lithuanian representatives, wrote 42 articles in total, 38 (90 per cent) of which were published in the JCR journals. As many as half of these articles were published in the group of the highest-rating journals (Q1), while the impact factors of all relevant journals were above 20 per cent of the aggregate impact factor of the specific category. In the context of the goals of the Programme, it shows the contribution of the partnership within the framework of the Programme to **strengthening of the Lithuanian researchers' participation in relevant researches and their capacities to write articles that are published in higher rating journals**, improving the competitiveness of the Lithuanian R&D system accordingly. Preparation of joint publications with foreign partners was promoted also by the Programme administering institutions. Once it was noticed in the beginning of the Programme implementation that Programme participants (both from Lithuania and Switzerland) tend to prepare their scientific publications separately, the Joint Lithuanian and Swiss Selection Committee (*hereinafter – the JSC*) started encouraging the project participants to cooperate in preparation of scientific publications[18]. The data above proves this encouragement to be right and expedient.

GOOD PRACTICE IN INCREASING INTERNATIONALISM OF THE LITHUANIAN R&D SECTOR. International scientific cooperation developed within the Programme provided the Lithuanian researchers with the opportunity to have their scientific articles published in the scientific journals of the highest rating. Nearly all scientific articles written jointly by the Lithuanian and foreign researchers on the basis of the Programme project results were published in the IF rated journals, half of which in the group of journals with the top rating.

In respect of the Lithuanian RHEI researchers and Programme implementation, the fact that referring to the publication outcomes the Programme beneficiaries **managed to attract capable institutional partners, and in some cases also researchers from other RHEI not directly participating in the Programme is to be considered the success.** Groups of foreign authors wrote 35 articles, 62.9 per cent of which were published in the group of the most cited journals of different categories (Q1).

More active involvement of the Lithuanian researchers into broader international research groups is one of the most striking contributions of the Programme. Lithuanian researchers together with their colleagues from foreign research institutions participated in writing and publishing about 40 per cent of all articles, the great majority of which were the result of the cooperation of the researchers from two countries: Lithuania and Switzerland. Lithuanian researchers published articles also together with their colleagues, from France, Italy, Russia, Germany, Austria, United States of America (USA), individual articles were published in cooperation with the researchers from Spain, Cyprus, Estonia, Latvia, United Kingdom. Thus, the fact that the Programme (same as other international support programmes) induced higher level of internationalism of research is proven also by the historical publishing analysis of randomly selected works of the researchers participating in the Programme. **Relatively more active and more stable cooperation of the Lithuanian researchers with the colleagues from foreign RHEI, broader cooperation network** are observed during the Programme implementation. On the other hand, the analysis of publications of specific researchers revealed a certain 'sustenance' function being performed by the Programme to a certain extent, i.e. it allowed to sustain the existing growth of individual researchers and research groups in terms of quality. Considering that the majority of the projects of the Programme were implemented by the research groups holding the leading positions in their fields

[18] Based on the interview with the representative of the Research Council of Lithuania in charge of the Programme implementation of 23 February 2017.

in Lithuania, it is obvious that the Programme funds enabled continuation of the existing experience, additionally strengthening it with the contributions from the new partners.

TABLE 2. VOLUMES OF SCIENTIFIC ARTICLES BASED ON THE RESULTS OF THE PROJECTS IMPLEMENTED WITHIN THE FRAMEWORK OF THE LITHUANIAN-SWISS COOPERATION PROGRAMME 'RESEARCH AND DEVELOPMENT', BY THE GROUPS OF AUTHORS

GROUP OF AUTHORS	ARTICLES PUBLISHED IN THE SCIENTIFIC JOURNALS (ITEMS), IN TOTAL	- *INCLUDING:* PUBLISHED IN THE SCIENTIFIC JOURNALS WITH JCR RATING (ITEMS)	- SHARE OF THE ARTICLES PUBLISHED IN THE JCR RATED JOURNALS BY THE RATING OF JOURNALS, (PER CENT)				
			Q1[19]	Q2	Q3	Q4	IF of the journal is over 20 per cent of the aggregate CR of the category[20]
Lithuanian authors	24	20	0	15	25	60	70
Foreign authors	40	35	62.9	8.6	11.4	17.1	97.1
Lithuanian and foreign authors	42	38	50	23.7	13.2	13.2	100

Source: based on the reports on the implementation of the programme projects conducted by BGI Consulting and Journal Citation Reports (Clarivate Analytics) data

INCREASING THE DISSEMINATION OF THE LITHUANIAN SCIENTISTS ATTAINMENTS

During the survey, the representatives of the project beneficiaries and project partners from Lithuania were requested to evaluate the scale of the contribution of the Programme project, in which they participated, to raising the knowledge of the attainments of Lithuanian scientists working in a specific research field in foreign countries. By the summarised evaluation of the representatives of all project beneficiaries, the Programme contributed **at large or very large scale** (4 score out of 5) **to increasing the knowledge of the attainments of Lithuanian scientists working in a specific field of science.** The representatives of the project beneficiaries in the joint research projects gave relatively better evaluation (4.1 scoring out of 5), while the representatives of the project beneficiaries in the institutional partnership projects gave relatively worse evaluation (3.8 scoring out of 5). However, the majority of the surveyed participants of both types of the projects shared the opinion that the Programme contributed to raising the profile of the Lithuanian scientists' attainments in foreign countries at large or very large scale, but there were also participants who evaluated the contribution of the Programme as medium or small. The surveyed representatives of the project partners from Lithuania evaluated the contribution of the Programme to raising the profile of the Lithuanian scientists' attainments in foreign countries as large or very large.

The main modes within the framework of the Programme of raising the awareness of the Lithuanian scientists' attainments in the world named by the respondents include **presentation of the project outputs in scientific publications** (in particular, in those prepared together with foreign scientists and published in the highly-rated international scientific journals) and **reports at the international scientific events** (conferences, seminars, work groups, etc.). Based on the information provided in the reports on the Programme project implementation, the results of all the projects were presented in **146 unique scientific events** held in **31 country** (including the

[19] 25 per cent of the journals with the highest impact factor in their fields.
[20] The factor is used in the methodology for evaluation of RHEI scientific (art) works, approved by the Order No. V-79 of the Minister of Education and Science of the Republic of Lithuania of 5 February 2015.

countries of the project partners – Lithuania and Switzerland), in **five continents** (Europe, North America, South America, Asia, and Australia)[21] (Figure 6).

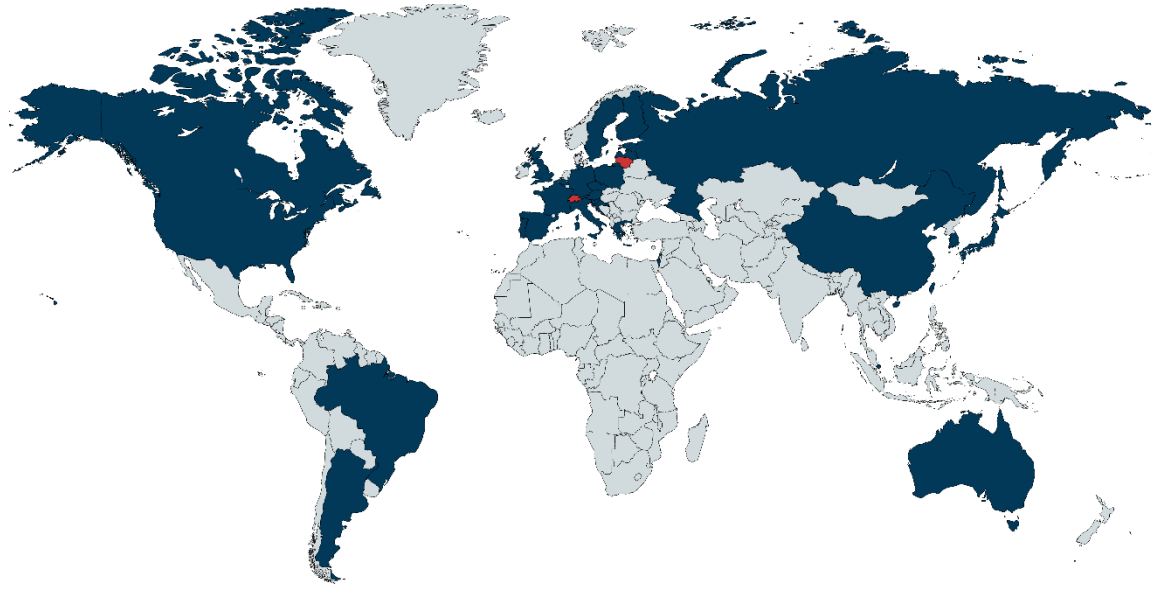

FIGURE 6. COUNTRIES[22] IN WHICH THE INTERNATIONAL SCIENTIFIC EVENTS WERE HELD AT WHICH THE RESULTS OF THE PROGRAMME PROJECTS WERE PRESENTED

Source: based on the reports of the implementation of the Programme projects conducted by BGI Consulting

GOOD PRACTICE IN DISSEMINATING SCIENTIFIC RESULTS. The dissemination of the research cooperation results within the framework of the Programme was quite broad. On the basis of the results of the Programme projects, 106 scientific articles were written, some of which were written by the Lithuanian researchers in cooperation with their colleagues from 12 foreign countries. The results of the Programme projects were presented at 146 unique scientific events held in 31 countries, in five continents.

The scale of the dissemination of the Programme implementation results at international scientific events varies by the types of the projects (Figure 7). The results of the joint research projects were publicised much more frequently at the international scientific events than those of the institutional partnership projects. Achievements of each project of the joint research projects were presented at 5–25 scientific events held in many different countries in the world, while the results of the institutional partnership projects were presented at 1–4 scientific events, which were mainly organised in the countries of the project partners: Lithuania and Switzerland. These differences were determined by the different types of the projects. The joint research projects involved innovative research or its results, presentation of which to the broader scientific audience was

[21] The five continents are distinguished based on the socio-political and not strictly geographical point of view. Therefore, taking into account significant socio-political difference of Europe and Asia these are considered to be two separate continents

[22] Argentina, Australia, Austria, Belgium, Brazil, Czech Republic, Estonia, Greece, Spain, Italy, Israel, Japan, USA, United Kingdom, Canada, China, Croatia, Latvia, Poland, Lithuania, South Korea, Portugal, France, Russia, Singapore, Slovenia, Finland, Sweden, Switzerland, Taiwan, Germany.

important. While the main aim of the institutional partnership projects was mainly knowledge and experience exchange between the Lithuanian and Swiss scientists, therefore their results were most relevant to the scientific communities of the partnership countries. Besides, the maximum duration of this type of projects was significantly shorter than the duration of the joint research projects (12 months and 42 months, respectively), therefore the possibilities to make a significant drive in the specific field of science during them were relatively limited.

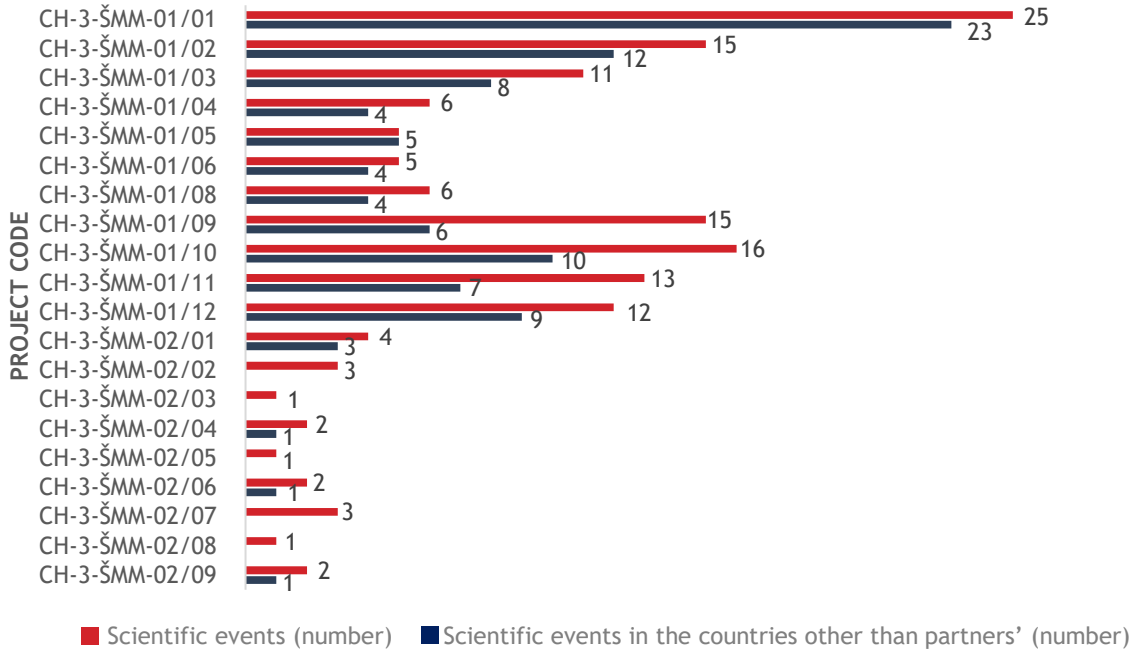

FIGURE 7. THE NUMBER OF SCIENTIFIC EVENTS, AT WHICH THE RESULTS OF THE PROGRAMME PROJECTS WERE PRESENTED

Source: based on the reports of the implementation of the Programme projects conducted by BGI Consulting

The alternative way to raise the profile of the Lithuanian scientists' attainments in the world is **indirect popularisation of the Lithuanian scientific achievements through the Swiss partners.** For example, during the implementation of the project 'Investigating Optomechanical Properties of Hybrid Polymer-Glass Devices Made Using Femtosecond Laser Processing' (CH-3-ŠMM-02/05), the technologies developed by in Lithuania were implemented in the laboratory of the project partners from Switzerland, while during the implementation of the project 'Scientific Research and Development of Innovative Evidence Based Non-invasive Brain Diagnostic and Monitoring Solutions for Neurological and TBI Patients' (CH-3-ŠMM-01/06), the medicinal diagnostic equipment invented and patented by the Lithuanian scientists is planned to be purchased by the project partners from Switzerland. Switzerland is rated as one of the most advanced country in the world in R&D field, therefore when the inventions developed in Lithuania are used by the colleagues from Switzerland, the Lithuanian scientific achievements will be indirectly popularised in the world. The bilateral (Lithuanian and Swiss) patent application submitted on the basis of the results of the project 'Directed Evolution of Computer Designed Enzymes Using Droplet-Based Microfluidics' (CH-3-ŠMM-01/03) will definitely contribute to raising the profile of the Lithuanian scientists' attainments in the world.

2.2.3 SUMMARY OF THE CONTRIBUTION OF THE PROGRAMME TO INTEGRATION OF THE LITHUANIAN R&D SECTOR INTO THE INTERNATIONAL RESEARCH AREA

When summarising the results achieved during the Programme implementation, it can be stated that the **contribution of the Programme to integration of the Lithuanian R&D sector into the international research area is significant.** Though, if comparing the total national and EU funds assigned for R&D tender financing, the financial contribution of the Programme is not particularly significant (for example, in 2013 the Programme financing accounted for about 9 per cent of the total R&D tender financing[23]), but among the other similar bilateral R&D funding programmes the Programme stands out as having one of the largest financial contributions and allocating one of the largest shares of these funds to the support of research activities. The achieved results of the Programme cannot be fully evaluated yet (for example the publications based on the results of the research conducted within the Programme may be released even later on after the termination of the Programme), but by now the **Programme enabled to achieve significant results – 106 articles have already been published** on the basis of the implemented projects, **as many as 88 per cent of which were published in the journals with the impact factor in the JCR.** The quality of the publications is proved also by the fact that many articles were published in the scientific journals leading in the categories by their CR (44.1 per cent in the journals of the first rating quarter in their categories, 16.1 per cent in the second), which undoubtedly raises the profile of the Lithuanian scientists and conducted research at the international scale and thus facilitates integration into the international R&D space. The fact that more than half articles within the framework of the Programme were written together with foreign partners also plays an important role for the integration of Lithuanian R&D sector into the international research area. Out of all the articles written within the framework of the Programme, 42 (40 per cent) of them were written by the Lithuanian scientists in cooperation with their foreign partners. While, according to the data of the Research and Higher Education Monitoring and Analysis Centre (*hereinafter – the MOSTA*), in 2010-2014, the share of the articles written in cooperation with foreign scientists accounted for only 13 per cent[24] on average of all the articles written by the Lithuanian scientists. The results achieved during the Programme implementation were publicised on the international arena not only through publications but also through their presentations at the international scientific events (conferences, seminars, work groups, etc.) The results of the Programme projects were presented at **146 unique scientific events** held in **31 countries**, in **five continents.** These activities contributed to raising the profile of the Lithuanian researchers' scientific achievement in the world.

Another important aspect for the integration of the Lithuanian R&D sector into the international research area is the opportunity provided by the **Programme, which by its pursued aim is bilateral and mainly aimed at strengthening the cooperation between the Lithuanian and Swiss scientists, for Lithuanian scientists to prepare joint publications with the scientists from other countries.** The researchers participating in the Programme projects prepared joint publications not only with the researchers of the countries with which, according to MOSTA data[25], the Lithuanian scientists cooperate mostly (UK, Germany, Russia, France, Italy, USA), but also with the researchers of other countries, including Switzerland, Austria, Spain, Cyprus, Estonia, Latvia. This way the Programme helped to increase international nature of the Lithuanian R&D system by establishing new scientific partnerships.

It must be noted that the Programme contributed to the integration of the Lithuanian R&D sector into the international research area not only by specific results achieved but also by improving the professional competences of the scientists implementing the projects. The communication and organisational capacities

[23] Dainius H. Pauža, „Mokslo tarptautiškumas Lietuvos mokslo kokybei gerinti", Vilnius, 2014
[24] Mokslo ir studijų stebėsenos ir analizės centras, „Lietuvos mokslo būklės apžvalga", 2015, 70
[25] Idem, 67.

acquired by the Lithuanian researchers, and the experience of application preparation, project management and administration gained during the implementation of the projects will **make a significant impact on participation in the future international research projects or even management of their implementation.** The fact that the Programme enabled enhancement of scientific capacities (acquisition of new research tools or new capacitates to operate them, improvement of the application of research methods, etc.) is also important for participation in the future international research projects.

Finally, the analysis of the dynamics of the publishing rates of specific scientists participating in the Programme before and during the Programme implementation shows that the great majority of the scientists implementing the Programme are highly qualified, strong research teams participated in the Programme, while the **Programme helped to sustain the high-level scientists' research activities.**

2.3 QUALITY OF COOPERATION WITHIN THE FRAMEWORK OF THE PROGRAMME

With the completion of the Programme projects, the future of further cooperation between the Programme project beneficiaries and project partners from Lithuania, from one side, and project partners from Switzerland, from the other side, strongly depends on the quality of the cooperation carried out within the framework of the Programme. The quality is reflected by the satisfaction of the both sides with the level of their cooperation. It is important to determine whether the **partnership developed during the project implementation met the expectations of the Lithuanian and Swiss scientists,** how the **partnership is evaluated in the broader context** (when comparing with scientific cooperation with the representatives of other countries), as well as to identify the **success factors of the cooperation** and **challenges encountered during it.** The main information sources include the findings of the questionnaire surveys of the Programme project beneficiaries, project partners from Lithuania and project partners from Switzerland, project implementation reports and interview with the representative of the RCL responsible for the Programme implementation.

2.3.1 EVALUATION OF THE QUALITY OF COOPERATION

According to the summarised evaluation of the all surveyed representatives of the beneficiaries, cooperation with the project partners from Switzerland met their expectations at **large or very large scale (4.72 scoring out of 5).** This opinion was shared by all surveyed representatives of the joint research project beneficiaries (by scoring 4.8 out of 5 for satisfaction of their expectations), and all, except one, surveyed representatives of the institutional partnership project beneficiaries (scoring 4.63 out of 5). The representatives of the project partners from Lithuania agreed with the evaluation on this matter by the beneficiaries' representatives, stating that the cooperation with the project partners from Switzerland met their expectations at large or very large scale (total scoring 4.67 out of 5, the representatives of the joint research project partners scored 5 out of 5, the representatives of the institutional partnership projects scored 4 out of 5). When requested to evaluate the quality of the cooperation developed within the Programme with the project partners from Switzerland in broader context, half (50 per cent) of the surveyed representatives of the beneficiaries stated that the partnership with Swiss scientists was of **higher quality** than with the researchers from other countries (33 per cent evaluated the cooperation quality as better, and 17 per cent significantly better). The same opinion was shared by half of the surveyed representatives of the joint research project beneficiaries and half of the representatives of the institutional partnership project beneficiaries. Slightly less than half (44 per cent) of the respondents (50 per cent in the joint research projects and 38 per cent in the institutional partnership projects) **did not see any difference** in quality between the partnership with the Swiss project partners and the

cooperation in R&D with the representatives of other countries. Surveyed representatives of the project partners from Lithuania shared similar position as the beneficiaries, who stated that the quality of the partnership with the Swiss researchers **was not different** (67 per cent respondents) or **was better** (33 per cent respondents) than the quality of the cooperation in the R&D with the scientists from other countries.

By the summarised evaluation of all surveyed project partners from Switzerland, cooperation with the Programme project beneficiaries from Lithuania met their expectations at **large scare** (scoring 4.29 out of 5). Representatives of the Swiss project partners of the institutional partnership projects gave relatively better evaluation (scoring 4.6 out of 5), while the representatives of foreign partners of joint research projects gave relatively worse evaluation (scoring 4 out of 5). According to 40 per cent of the representatives of Swiss project partners, the cooperation with the Lithuanian researchers was of **better quality** than with the representatives of other countries. This opinion was shared by relatively more representatives of the joint research project partners than of institutional partnership projects (50 per cent and 33 per cent, respectively). One third (33 per cent) of the representatives of the Swiss project partners (both of all and different types of projects) **did not see any difference** between the partnership with the Lithuanian and other foreign researchers. Differently from the surveyed Lithuanian researchers, individual researchers from Switzerland (in different types of projects) evaluated the quality of the cooperation with the beneficiaries from Lithuania as **worse** if compared with the quality of partnership with the representatives of other countries in the R&D field.

2.3.1 FACTORS OF THE QUALITY OF COOPERATION

4.1.6. To identify and evaluate any difficulties encountered by the project beneficiaries during the Programme implementation and applied measures to deal with them, to suggest alternative more effective solutions, if possible.

Programme project beneficiaries from Lithuania and project partners from Switzerland named various factors that determined their high satisfaction with the partnership developed within the Programme. They are related with both the contents of the jointly implemented projects (the outcome of joint activity) and their form (nature of partnership). On one hand, the researchers of both countries were satisfied with the **cooperation productivity** (achieved or even exceeded planned outcomes of the projects) and its **value added** (scientific significance of the joint research activity output, knowledge, capacities and experience acquired or enhanced during the projects). On the other hand, the surveyed Programme project beneficiaries and their foreign partners favourably evaluated the **smoothness of cooperation** (effective communication, pleasant communication, equal contribution into the development of project results) and **its perspective**s (established new or strengthened contacts, expanded cooperation networks).

Despite the prevailing satisfaction of the both sides of the partnership with the cooperation developed within the Programme, project participants faced various challenges, including **administrative difficulties, project content related challenges** and **international partnership related challenges** (Figure 8).

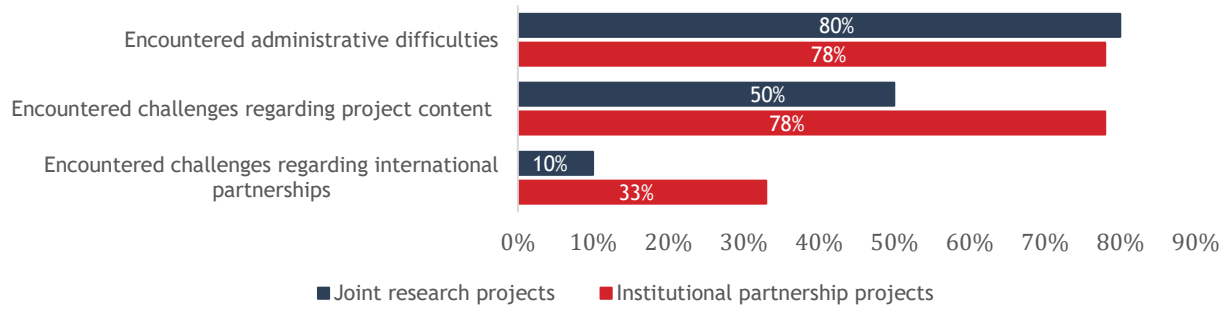

FIGURE 8. SHARE OF THE PROGRAMME PROJECT BENEFICIARIES WHO FACED CHALLENGES DURING THEIR PARTICIPATION IN THE PROJECTS

Source: based on the questionnaire survey of the Programme project beneficiaries conducted by BGI Consulting

Great majority of the surveyed representatives of the Programme project beneficiaries encountered administrative difficulties in both joint research projects and institutional partnership projects (80 per cent and 78 per cent, respectively). The great majority of the surveyed representatives of the beneficiaries of institutional partnership projects and half (50 per cent) of the representatives of the joint research project beneficiaries encountered the challenges related with the project contents (e.g. limitation of the possibilities by objective circumstances to realise the initial project idea to its full extent). Relatively smallest part of the beneficiaries – one third (33 per cent) in the institutional partnership projects and one tenth (10 per cent) in the joint research projects – encountered the challenges related with international partnership. In individual projects, the recorded challenges associated with international partnership, include differences in mentality or administrative culture between Lithuanian and Switzerland[26], inadequate interest from one side of the partnership in cooperation, mistrust in foreign partner in the beginning of the project implementation, or insufficient language command. However, no common trends characteristic to all projects can be distinguished.

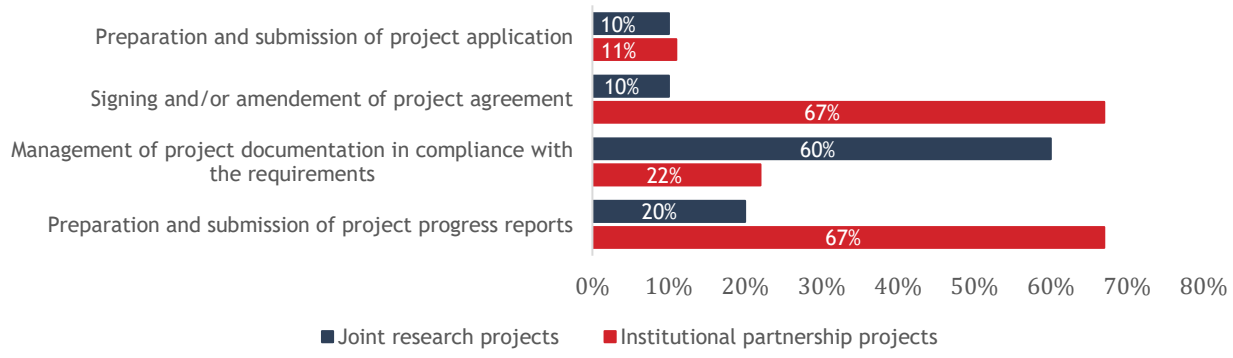

FIGURE 9. SHARE OF BENEFICIARIES WHO ENCOUNTERED ADMINISTRATIVE DIFFICULTIES BY THE STAGES OF PROJECT IMPLEMENTATION

Source: based on the questionnaire survey of the Programme project beneficiaries conducted by BGI Consulting

Programme project beneficiaries named **huge administrative burden** encountered by them during the implementation of the Programme projects, which is mainly associated with excessively strict requirements for project documentation or individual aspects of project implementation. For example, the mentioned sources of

[26] For example, in pursuit of equal administrative burden on both beneficiaries in Lithuania and partners in Switzerland, both sides were requested to have the projects audited. Such practice was incomprehensible to the Swiss researchers, they strongly objected to it, but nevertheless, this requirement stayed in place.

administrative burden include excessively scrupulous financial accounting, complicated and time-consuming reporting procedures. Besides, the **beneficiaries of joint research projects** highlighted public procurement, as an element of project implementation that caused many administrative difficulties, since instruments and equipment needed for research could be procured during the implementation of the above-mentioned projects. Programme administering CPMA carried out very strict supervision of public procurements – any deviations from procurement plans had to be reasoned, explained. Considering the implementation period of the above-mentioned projects (up to 42 months) and the type of projects (research and development activities, success of which is hard to forecast precisely), accurate planning of procurement of aids needed for the project[27] was hard to achieve, while prolonged procedures of public procurements in some projects resulted in the readjustment of the project implementation terms.

The claim that the **Programme administration architecture** is over complex is supported also by the representatives of the institutions responsible for Programme administration. The Ministry of Finance of the RoL (as the national coordination institution of the whole Lithuanian–Swiss cooperation programme), Ministry of Education and Science of the RoL (as an intermediary body), CPMA and Research Council of Lithuania (as project promoter) participate in the Programme administration. According to the representative of the institution of project promoter, in some cases the functions of CPMA and RCL were not properly separated, overlapped, while internal communication (information provision and reporting) between the Programme administering bodies and Programme project beneficiaries was confusing. The involvement of CPMA in the Programme administration system was partly excessive as most of the administrative functions could be implemented by the project promoter institution (RCL) alone as it has sufficient administrative capacities to administer this kind of programmes[28]. Decision to involve CPMA in the Programme administration system was made taking into account that RCL did not have enough competences to carry out the monitoring of public procurement procedures. In the future, however, in case of lack of competences by one institution it would be more efficient to ensure that these competences are provided to the project promoting institution rather than involve another institution into the administering system in order to perform one function only.

The project administration procedure, if compared with other international programmes financing R&D projects, was strict as well. In other international R&D programmes, administration of projects is usually much more flexible (projects with the budgets under a certain limit do not need to be audited, flat rates are applied, etc.).

Programme project beneficiaries faced administrative difficulties in all main stages of project implementation (Figure 9). Preparation and submission of an application for the project can be considered relatively the smoothest stage of project implementation – only one tenth of beneficiaries of different types of projects each encountered problems in this stage. **Beneficiaries of joint research and institutional partnership projects faced challenges in different stages of project implementation.** More than half (60 per cent) joint research project beneficiaries encountered major problems when keeping project documentation according to the requirements, while two thirds (67 per cent) of institutional partnership project beneficiaries named preparation and submission of project progress reports and signing/amendment of project agreements as major issues. For comparison, joint research project beneficiaries faced relatively few challenges in the latter stages.

Institutional partnership project beneficiaries encountered more difficulties when signing/amending agreements and reporting on project implementation due to a **lack of experience in applying administration simplification measures.** The above-mentioned projects are relatively simpler by their financed activities and duration, therefore they were subject to simplification – flat rates were applied to all expenses incurred during their implementation. However, this planned simplification turned into a burden for the beneficiaries, since they (in particular, administrative staff of the project – administrators, financiers) used to usually stricter

[27] Based on the interview with the representative of the Research Council of Lithuania in charge of the Programme implementation of 23 February 2017
[28] Based on the interview with the representative of the Research Council of Lithuania in charge of the Programme implementation of 23 February 2017

administrative culture which limits the possibilities to increase flexibility of administration have not encountered such administration practices before, did not have common understanding of their application[29].

Programme administration difficulties faced by the beneficiaries were caused to a certain extent also by the fact that **some beneficiaries failed to benefit from the granted opportunity to spend up to 10 per cent of the project budget on administration, including administrative staff recruitment** (such opportunity is stipulated in the Programme following the usual practice of other international R&D programmes). Nevertheless, in order to maximise project budget for research staff, in some cases researchers themselves performed administrative tasks, therefore they encountered the challenges, when time assigned for research work had to be sacrificed to administration[30].

Administrative problems encountered by the Programme project beneficiaries were handled through active consultation of the beneficiaries by the representatives of the RCL and CPMA, who applied to both institutions asking for elucidation of various administrative requirements. Furthermore, the RCL advised the beneficiaries to draw more generalised, not too specific project plans to avoid frequent amendments of the agreement and validation of amendments. Proposals of the JSC helped to simplify some administrative processes. For example, at the initiative of the Swiss and Lithuanian experts of the JSC on-site inspections were replaced by optional intermediary review of Programme implementation, during which the progress in project implementation was reviewed. However, in the opinion of the beneficiaries and their foreign partners, **administrative requirements and processes need to be further simplified in the future**, by providing researchers with a possibility to devote their time and potential to research activities rather than to administrative tasks.

2.4 FURTHER COOPERATION AT THE CLOSURE OF THE PROGRAMME

4.1.3. to evaluate and summarise the prerequisites and prospects of potential further cooperation between the Programme project partners once the Programme is closed.

4.3.3. to suggest potential priority fields of scientific cooperation within the programme, and the forms of implementation of the cooperation in pursuit of the goals laid down in Paragraph 3 of the Terms of reference and taking the interests of Lithuanian scientists into consideration.

2.4.1 PREFERENCES OF FURTHER COOPERATION

Surveyed representatives of the beneficiaries evaluate the prospects for further cooperation with the project partners from Switzerland as **big** (scoring 4.39 out of 5). All surveyed representatives of the joint research project beneficiaries and all, except one, surveyed representatives of the institutional partnership project beneficiaries shared the opinion that the prospects for continuing cooperation with the Swiss researchers are **big or very big** (beneficiaries in the joint research projects scored them 4.6 out of 5, institutional partnership projects – 4.13 out of 5). Similar opinion is shared also by the representatives of the project partners from

[29] Idem
[30] Idem

Lithuania, evaluating the prospects for further partnership with their foreign partners as **big** (scoring 4 out of 5).

The surveyed representatives of the project partners from Switzerland were relatively less optimistic about the prospects for further cooperation with the Lithuanian beneficiaries – evaluating them **slightly above the medium** (scoring 3.86 out of 5). Representatives of the institutional partnership projects partners are more favourable about the possibilities to continue partnership with the Lithuanian researchers (scoring 4.3 out of 5), who consider the prospects as **big or very big**. Whilst, the representatives of various joint research project partners from Switzerland had different opinions on this matter. Great majority of them evaluate the prospects for their further cooperation with the beneficiaries from Lithuania as **medium or big** (scoring 3.5 out of 5), but individual respondents perceived the prospects for continuing the partnership developed within the Programme as **very big** and **very small**.

Surveyed representatives of the beneficiaries and project partners from Lithuania expressed their interest in continuing the scientific cooperation launched within the Programme with the researchers from Switzerland. **Joint research** was named as the preferred form of further cooperation by the participants of both joint research projects and institutional partnership projects. Researchers from Lithuania would be interested also in cooperation during **research internships of researchers (in particular, young ones) and doctoral students** in Swiss RHEI. Several respondents named Swiss **researchers' visits** (including to deliver lectures) to the Lithuanian RHEI, as well as **organisation of joint scientific events** (conferences, etc.) as potential form of cooperation with foreign partners. Surveyed representatives of project partners from Switzerland mentioned all the above-named with the exception of organisation of joint scientific events) as preferred forms of further scientific cooperation with Lithuanian researchers, in particular emphasising the importance of research internships of researchers (in particular of young ones) and doctoral students.

When requested to distinguish the most important target of further scientific cooperation with Swiss researchers, the surveyed representatives of the beneficiaries and project partners from Lithuania gave the priority to the **skills to operate specific research instruments** (equipment, software, methodology, etc.)[31] **acquired** during the international cooperation. Other benefits for Lithuanian researchers from the scientific cooperation between Lithuania and Switzerland include the **possibility to use the scientific infrastructure of Swiss RHEI** and **acquired knowledge in the specific field of science**[32]**.** Evidently, the representatives of the beneficiaries and project partners from Lithuania prioritise the possibilities to gain useful experience from the researchers of a more advanced country in science during the international scientific cooperation Individual respondents expressed their interest in taking over the knowledge and experience from their Swiss colleagues not only in specific fields of science but also in the field of RHEI policy, more specifically, **by carrying out science development and raising its international profile.** For example, some respondents expressed their impression that Switzerland has closer cooperation between science and business and stronger institutionalised system for raising international profile of science, therefore Switzerland in the field of R&D policy should be considered as an inspiration. However, some surveyed Lithuanian researchers emphasised that when cooperating with Swiss researchers in the future not only taking over their experience but also developing a **joint contribution into the development of various fields of science** are important goals. Preferred outputs of such scientific cooperation include **common databases, methods, jointly developed new fundamental knowledge, jointly developed or improved technologies,** and finally – **common intellectual property**. Surveyed beneficiaries and project partners from Lithuania and project partners from Switzerland named not

[31] For example, the respondents expressed their wish to learn working with high-resolution gene identification equipment, atmospheric testing equipment, genetic analyser, 'new generation' sequencing machines, life cycle assessment programs

[32] For example, the respondents indicated their goal to acquire new knowledge in various fields of science, including: atmospheric sciences, phytopathology and microorganism population genetics, monogenic diabetes testing, molecular research methodologies, industrial symbiosis, circular economy, effective use of resources, wastewater treatment, etc.

only preferred forms of future cooperation but also specific themes of scientific cooperation. Themes named by the respondents in various fields and directions of science[33] are given in **Klaida! Nerastas nuorodos šaltinis.**.

TABLE 3. THEMES OF FUTURE SCIENTIFIC COOPERATION BETWEEN LITHUANIA AND SWITZERLAND NAMED BY THE SURVEY RESPONDENTS IN VARIOUS FIELDS AND DIRECTIONS OF SCIENCE

FIELD OF SCIENCE	DIRECTION OF SCIENCE	THEME
Biomedical sciences (B 000)	Botany (04B)	Phytopathology of forest trees (in particular, in desiccation of alder, ash trees): plant pathology and immunity testing; microorganism (in particular, fungal disease pathogen) population genetics.
	Ecology and environmental science (03B)	Application of dendrological methods in environmental research; indoor aerosol testing and application of aerosol technologies; research of climatic change and its impact on natural and social-economic environment; wetland evolution research.
	Medicine (06B)	Functional magnetic resonance imaging of the brain; modern diagnostics of brain tumours; radiogenomics; validation and research of non-invasive medical technologies; testing pancreatic beta cell function in patients suffering from non-autoimmune diabetes and functional analysis of new mutations; genomics and transcriptomics; research of individual cells; intellectual disability genomics and new-generation instruments of sequencing data analysis.
Physical sciences (P 000)	Mathematics (01P)	Mathematical modelling of blood flow
Humanities (H 000)	Philology (04H)	Linguistics; sociolinguistics.
Social sciences (S 000)	Psychology (06S)	Psycho-oncology (in particular, improvement of communication skills of specialists working with oncological patients).
Technological sciences (T 000)	Environmental engineering (04T)	Development of wastewater treatment technologies; development of sludge treatment technologies; optimisation of water supply and sewerage operation.
	Electrical and electronic engineering (01T)	Memristor research: development and research of solid particles electric batteries; search and research of new solid electrolytes.
	Materials engineering (08T)	New-generation laser mircoprocessing of materials; laser nano-polimerisation; micro sensors; research of light and materials interaction; functional antibacterial textile for medicine; functional nanofiber coatings.

Source: based on the questionnaire survey of the Programme project beneficiaries conducted by BGI Consulting

[33] Distinguished by the Order No. V-1457 of the Minister of Education and Science of 16 October 2012 'On approval of the directions of science'.

2.4.2 PREREQUISITES FOR FURTHER COOPERATION

After the activities of the Programme projects ended (including joint presentation of project results at scientific events and publication of joint research articles), cooperation between the Lithuanian and Swiss researchers continue to a certain degree of intensity as long as project results are actively used (for research publications by one or the other side of the partnership, final thesis of doctoral students, etc.). In exceptional cases, the sustainable results developed during the projects will serve as a basis for long-term cooperation between the Lithuanian and Swiss researchers outside the Programme, including **patented new inventions** to be used by both partnership sides in the future. In other cases, in order to ensure further scientific cooperation between both countries, specific actions need to be taken.

GOOD PRACTICE IN DEVELOPING SUSTAINABLE RESULTS OF SCIENTIFIC COOPERATION. Sustainable results of scientific cooperation developed during the implementation of the Programme projects will lay foundation for long-term cooperation between the Lithuanian and Swiss researchers. Such results include, for example, within the Programme, continuing former research activities of the research group, preliminary patent application was submitted on the basis of the developed micro liquid technology and non-invasive human brain diagnostic technology, the first of its kind in the world, developed and patented by Lithuanian researchers, which was recognised as eligible, on the basis of which production of special devices was launched in Lithuania and their expansion to the Swiss market is planned.

Specific actions securing further international partnership (between individual researchers, research groups or at RHEI level) were initiated in absolute majority of cases of the Programme projects. Scientific cooperation, which commenced within the framework of the Programme implementation, is continued by the Lithuanian and Swiss researchers mainly through **participation in international research projects, implementation of bilateral research, and partners' consultations.** Some Programme project beneficiaries and project partners from Switzerland are preparing or have already submitted joint applications for financing for joint research projects or are already implementing such projects (frequently financed by the international R&D programmes, such as Horizon 2020 or COST)[34]. Other project partners are trying jointly to realise new scientific ideas that arouse during the cooperation within the Programme, by conducting joint research in a specific field. In some cases, further cooperation between the Lithuanian and Swiss researchers will be ensured by the necessity to consult foreign partners on application of certain scientific tools[35]. In some cases Lithuanian researchers, in others – Swiss colleagues have exclusive expert knowledge, which they plan to share with foreign partners. Partners of one project secured their further cooperation by signing a **cooperation agreement between the represented Lithuanian and Swiss RHEI[36].** Further bilateral cooperation manifests itself also in the forms, such as **research internships** of young researchers (having attained a doctoral degree) and doctoral students at **partners' RHEI[37]**.

[34] For example, Lithuanian beneficiary Centre for Physical Sciences and Technology and partner from Switzerland Paul Sherrer Institute have been together participating in the 4-year duration project of the Horizon 2020 programme since 2015, and they have also submitted an application for joint participation in the project financed by the COST programme. Researchers of Vilnius University submitted applications for participation in the project financed by the Horizon 2020 programme, which involves staff exchanges with the partner from Switzerland – University of Zurich.
[35] For example, in case of the Programme project implemented by Kaunas University of Technology, Lithuanian University of Health Sciences and Kantonsspital Aarau Neurochirurgische Klinik.
[36] The cooperation agreement was signed between the National Cancer Institute and University of Bern.
[37] For example, such exchanges are taking place between Vilnius University and University of Lausanne.

Even in the cases, when further cooperation between the Lithuanian and Swiss researchers is not ensured yet by specific actions, such actions are planned for the future. Most representatives of the beneficiaries indicated that together with the Swiss partners are planning to prepare **applications for financing for international research projects**[38] together and are considering the possibilities to implement joint research projects and are searching for financing sources needed for that. Partners of one project are planning to sign a **cooperation agreement between the represented Lithuanian and Swiss RHEI.**

2.5 CONTRIBUTION OF THE PROGRAMME INTO THE ACHIEVEMENT OF HORIZONTAL PRIORITIES

4.1.5. To evaluate the contribution of the Programme to the achievement of the horizontal priorities: environmental protection, gender equality, social-economic value created.

2.5.1 IMPLEMENTATION OF THE ENVIRONMENTAL PROTECTION PRINCIPLE

Some joint research projects directly (proactively) contributed to the implementation of the environmental protection principle, which were implemented in the field of natural sciences, environmental protection sciences and technology, as well as institutional partnership projects implemented in the field of technology.

The **results** obtained in the projects: 'Climate Change in Peatlands: Holocene Record, Recent Trends and Related Impacts on Biodiversity and Sequestered Carbon' (CH-3-ŠMM-01/05) and 'Aerosol in Lithuania: Investigation of Primary–Secondary and Regional–Local Contributions to Particulate Matter in the South-Eastern Baltic Region' (CH-3-ŠMM-01/08) **were already applied and can be further used at the political and other levels when planning actions aimed at dealing with environmental problems and carrying out public information activities.** Upon implementation of the project 'Aerosol in Lithuania: Investigation of Primary–Secondary and Regional–Local Contributions to Particulate Matter in the South-Eastern Baltic Region' , guidelines at the EU level were already prepared on the basis of the project result to deal with urgent environmental problems (such as, climate change, ineffective use of energy and resources, etc.), while communication of the research results contributed to raising environmental awareness of society, by informing about possible contributions to environmental pollution reduction and efficient use of resources by choosing more environmentally-friendly fuel. The best application of the results of the project 'Climate Change in Peatlands: Holocene Record, Recent Trends and Related Impacts on Biodiversity and Sequestered Carbon', when implementing environmental protection principles, can be achieved when planning environment-oriented actions, in particular when developing or updating the strategies for adaptation to climate changes and peatland use and restoration projects, informing society about the impact of climate change, activities in the protected areas.

The **results** achieved upon implementation of two other projects: 'Development of Peat Fibre Based Textiles with Enhanced Flame Retardancy' (CH-3-ŠMM-02/01) and 'Circular Economy - Closing Material and Energy

[38] For example, researchers of Kaunas University of Technology together with their partners from Swiss Federal Laboratories for Materials Science and Technology, University, University of Applied Sciences and Arts North-western Switzerland are planning to prepare such applications.

Flows in Industry Efficiently' (CH-3-ŠMM-02/04), contributing to the implementation of the environmental protection principle, **can be used when promoting industrial companies to move to renewable resources and effective use of resources.** During the first project (CH-3-ŠMM-02/01), the possibilities to treat peat fibre textiles with smouldering and burning inhibitors, without impairing positive functional properties of the peat fibre products were researched. On the basis of the output of the project, non-flammable peat fibre textile with its properties retained was developed, which being organic and obtained from renewable source could replace synthetic yarn that is currently used in textile industry. The aim of the second project (CH-3-ŠMM-02/04) was to determine and assess systematically the possibilities for increasing efficiency of the use of resources in the industries important for Lithuania. Therefore, once the results of this project will be applied and solutions of more effective use of resources in Lithuanian industrial companies will be introduced, it would make a significant contribution to sustainability of resources in industry.

The **results** of another project 'Incidence of Microviruses in Epidemic and Post-Epidemic Populations of the Ash Dieback Pathogen Chalara Fraxinea and Evaluation of Their Potential for Biological Control of the Disease' (CH-3-ŠMM-01/12) **could be used in the implementation of a specific environmental protection principle – preservation of ash trees**, by developing measures on the basis of the research conducted during the project to fight against the disease of these trees which is relevant at the Lithuanian and European scale. Besides, continuing the research launched during the implementation of the project 'Signalling Control of Pathogen Induced Plant Immunity' (CH-3-ŠMM-01/10), the research results could be applied to prevent various plant diseases.

Other projects of the Lithuanian–Swiss cooperation programme 'Research and Development' did not breach the environmental protection principle, but they were not proactively implementing it either, because in the context in the above-mentioned projects, the environmental protection principle was not relevant.

2.5.2 IMPLEMENTATION OF THE GENDER EQUALITY PRINCIPLE

According to the beneficiaries, **equal opportunities for men and women were ensured for the project participants** during the implementation of the projects. Taking into consideration the scientific type of projects, the scientific competence played the central role when building teams, therefore ensuring the equality of representation of male and female researchers was not the crucial criterion. The implemented projects neither made a proactive contribution to the gender equality promotion. Considering the balance among all male and female researchers, that participated in the implementation of the Programme projects, as well as the composition of single researchers' groups, however, it can be stated that **passive observation of the gender equality principle was ensured during the project implementation.**

TABLE 4. DISTRIBUTION OF THE RESEARCHERS THAT PARTICIPATED IN THE IMPLEMENTATION OF PROGRAMME PROJECTS ACCORDING TO GENDER

	Female research team members, number and per cent of all participants	Male research team members, number and per cent of all participants	Female research team leaders, number and per cent of all team leaders	Male research team leaders, number and per cent of all team leaders	Projects, which teams are dominated by female researchers, number and per cent of all projects	Projects, which teams are dominated by male researchers, number and per cent of all projects	Projects, which teams are composed of equal number of male and female researchers, number and per cent of all projects
All projects	104 /42 %	142 / 58 %	7 / 35 %	13 / 65 %	6 / 30 %	11 / 55 %	3 / 15 %
Joint research projects	63 / 44 %	80 / 56 %	2 /18 %	9 / 82 %	3 / 27 %	7 / 64 %	1 / 9 %
Institutional partnership projects	41 / 40 %	62 / 60 %	5 / 56 %	4 / 44 %	3 / 33 %	4 / 44 %	2 / 22 %

Source: based on the Programme monitoring data of December 2016 provided by the Ministry of Education of the RoL conducted by BGI Consulting

Usually the balance of genders that varies between 40 and 60 per cent is considered to reflect the natural distribution of genders in society and no additional measures to ensure the gender equality are required. The data provided in Table 4 shows that the abovementioned proportions of gender distribution among the researchers that participated in the implementation of Programme projects were sustained – 42 per cent of all researchers that participated in the implementation of the Programme projects were female while 58 per cent of them were male. Similar proportions of male and female researchers are found when analysing the gender composition of researchers in joint research and institutional partnership projects separately. Out of all researchers that participated in the implementation of joint research projects 44 per cent were female and 56 per cent were male. Among the scientists involved in institutional partnership projects the ratio of female and male researchers was respectively 40 and 60 per cent.

The analysis of the data provided in Table 4 reveals also that the gender distribution in separate researcher teams implementing Programme projects was balanced as well. In 6 out of 20 research teams which implemented Programme projects the larger share of researchers were female, in 11 out of 20 research teams the larger share of researchers were male while in 3 research teams the number of male and female researchers was equal. The larger share of researcher teams that were dominated by male researchers was among the joint research projects. In 7 out of 11 research teams that implemented joint research projects male researchers dominated. Among the research teams that implemented institutional partnership projects the number of male researchers was higher in 4 out of 9 research teams.

Even though the composition of separate project implementation teams shows that in a larger share of teams male researchers dominated, taking into account that almost half (9 out of 20) project teams were dominated by female researchers or the number of male and female researchers composing the team was equal, also that the overall number of male and female researchers involved in the implementation of Programme projects reflects the natural distribution of genders in the society, it can be stated that **opportunities for professional improvement and self-realisation were granted by the Programme to the researchers of both genders equally.**

It is confirmed also by the fact that leaders of more than one third (35 per cent or 7) of the project teams were women. Female team leaders in the joint research projects accounted for 18 per cent (2 out of 11), while in the

institutional partnership projects – 56 per cent (5 out of 9). In some projects (e.g. 'Signalling Control of Pathogen Induced Plant Immunity' (CH-3-ŠMM-01/10), the realisation of the gender equality principle was additionally ensured through leadership of the Lithuanian and Swiss research teams by opposite genders.

2.5.3 SOCIO-ECONOMIC BENEFITS OF THE PROGRAMME

Socio–economic benefits of the Programme are understood as the social and economic benefits that can be created by the results of the Programme projects.

SOCIAL BENEFITS OF THE PROGRAMME

Targeted public values created at the result of the implementation of the public investment project activities, not provided through the market system, manifesting themselves in improving social environment conditions for society members, moral (spiritual) satisfaction, reduction of the risk of adverse impact on social environment are considered to be the social benefits brought by the public investment projects[39]. Social benefits of the Programme projects are mainly related with the creation of conditions for **public health improvement** and **human resources development in science**.

Social benefits of almost half Programme projects demonstrate themselves through favourable impact on public health improvement in medium or long term.

Benefits for public health brought by the institutional partnership projects implemented in the fields of biomedicine and social sciences can be noticed relatively earliest. **Specific capacities of researchers applicable in health diagnostics were enhanced during the projects implemented in the field of biomedical sciences.** During the implementation of the project 'Development of Neuroimaging Research and Clinical Skills in Lithuania' (CH-3-ŠMM-02/02), Lithuanian researchers' skills in the fields of neuropsychology science which researches links between human brain and his daily functioning, behaviour and cognitive functions were developed. The latter skills will be applied when diagnosing brain injuries and planning patient's rehabilitation. Whilst, during the implementation of the project 'State-dependent Information Processing: Implementation of Electrical Neuroimaging Approach in Lithuania' (CH-3-ŠMM-02/03), skills of the scientists working in the Lithuanian research and medical institutions to apply non-invasive brain examination method – electroencephalography were developed. These skills will help to ensure optimum use of the advantages of the electroencephalographic laboratories and equipment available in the Lithuanian research and medical institutions and to obtain more precise brain examination research. The project 'Efficiency Research of Internet-Based Psychological Treatment for Cancer Patients' (CH-3-ŠMM-02/09) implemented in the field of social sciences created prerequisites for mental health improvement in patients. Internet-based psychological treatment software was developed during the project implementation, which is available to a big number of cancer patients (including patients in remote areas and with mobility problems). The latter will enable specialists to provide timely professional psychological help to cancer patients and thus to improve their psychological emotional well-being and quality of life.

The results of the joint research projects implemented in the field of health (life) sciences also make direct contribution to public health improvement by upgrading disease diagnostics. During the research conducted within the project 'Unique Genome Variants in Congenital Neurodevelopmental Disorders: Origin, Genomic Mechanisms, Functional and Clinical Consequences' (CH-3-ŠMM-01/04), new causes of intellectual

[39] Jurgita Baranauskienė „Viešųjų investicijų projektų kuriamos socialinės naudos kompleksinis vertinimas“ ('Complex evaluation of social benefits created by the public investment projects). Doctor's dissertation, Aleksandras Stulginskis University, 2015, 25.

disability were discovered, while during the implementation of the project 'Genetic Diabetes in Lithuania' (CH-3-ŠMM-01/09), gene mutations that can be potentially related with diabetes were determined. The results of both research studies broadened the diagnostic possibilities for the above-mentioned illnesses and created the prerequisites for the development of more convenient and effective strategies of their treatment, e.g. created possibilities for replacing insulin injections with oral medicines for the patients with monogenic diabetes diagnosed. The first in the world non-invasive human brain diagnostic technology developed during the project 'Scientific Research and Development of Innovative Evidence Based Non-invasive Brain Diagnostic and Monitoring Solutions for Neurological and TBI Patients' (CH-3-ŠMM-01/06) was recognised as eligible, on the basis of which production of special equipment was launched in Lithuania. The latter equipment enables more precise and early diagnosis of brain damages and pathologies (e.g. a stroke), more effective treatment of neurological and ophthalmologic patients.

Some joint research projects implemented in the field of natural sciences can bring indirect benefits to public health improvement, once their results are adapted in medicine. The results of theoretical research in the fields of elliptic and parabolic equations conducted during the project 'Asymptotic Problems and Applications' (CH-3-ŠMM-01/01) can be adapted in medicine, e.g. to describe blood flow in the vascular systems. Based on them, mathematical blood circulation models can be suggested in the future, which would enable better understanding of the causes and consequences of various blood circulation issues. The materials - ferroelectrics – researched during the implementation of the project 'Swiss-Lithuanian Ferroelectrics: from Controlled Internal Fields to Energy Harvesting/Medical Diagnostics/Microelectronic Applications' (CH-3-ŠMM-01/02) in the future could be applied in the medical diagnostic technologies, while the microliquid technology for protein improvement researched during the implementation of the project 'Directed Evolution of Computer Designed Enzymes Using Droplet-Based Microfluidics' (CH-3-ŠMM-01/03) could be adapted to pharmaceuticals production in the future.

Projects in the field of natural sciences, concerning air pollution reduction, could have positive impact on public health in long term. The results of the project 'Climate Change in Peatlands: Holocene Record, Recent Trends and Related Impacts on Biodiversity and Sequestered Carbon' (CH-3-ŠMM-01/05) could be used when preparing recommendations on greenhouse emission reduction, while the results of the project 'Aerosol in Lithuania: Investigation of Primary–Secondary and Regional–Local Contributions to Particulate Matter in the South-Eastern Baltic Region' (CH-3-ŠMM-01/08) could be used when identifying air pollution sources, their impact on public health and planning pollution reduction measures.

Social benefits of the great majority of the Programme projects manifest themselves by positive impact on human resources development in science, in particular, on young researchers' training. Different types of projects – both joint research and institutional partnership projects – gave an opportunity for young researchers, mainly, doctoral students and postdoctoral interns, to participate in research activities of the projects. The latter participated in the joint research studies conducted during the projects, by contributing to the development of their results, during visits and internships visited the institutions of the partners from Switzerland where they learned about the research studies and scientific infrastructure. The Programme provided the young researchers with a possibility both to cooperate with older researchers from Lithuania and Switzerland and to establish contacts and exchange experience with the young researchers from Switzerland. Some young researchers continued the research activities launched within the framework of the projects, by using the research materials and results in their research works. Training of young researchers is aspired even after the closure of the Programme. Some RHEI which implemented the projects initiate new postgraduate projects, invite other young researchers to join the research activities on the basis of the research or scientific cooperation carried out during the projects. All this will not only enhance young researchers' competences, but will also facilitate their integration into scientific community in Lithuania and foreign countries[40].

[40] Based on the descriptions of the Programme projects, materials of the progress reports and beneficiaries' surveys.

GOOD PRACTICE IN ENHANCING LITHUANIAN R&D HUMAN RESOURCES. The Programme enabled capacity building of young researchers both during the implementation of the projects and after their closure. Young researchers took active participation in the research studies carried out during the Programme projects, and after their closure, they could continue their research activities by writing independent scientific articles or by joining research studies initiated by their RHEI.

Social benefits of the institutional partnership projects in the field of humanities: 'Baltic Morphosyntax in Space and Time' (CH-3-ŠMM-02/07) and 'Exegetical Traditions in Ancient Philosophy, Judaism and Christianity. Their Origins and Cultural Background' (CH-3-ŠMM-02/08) can manifest themselves through **strengthening of social identity (Baltic, Christian).**

ECONOMIC BENEFITS OF THE PROGRAMME

Majority of the Programme projects cover the initial stages of the research and development, such as acquisition of fundamental knowledge, formulation of knowledge application concept and proof/validation of concept feasibility, therefore economic benefits of their results cannot be evaluated yet. The **economic benefits created by the latter can be seen in long term and only under a condition, that all stages of research and development will be implemented, while developed investments will be successful** (effective, marketable). For example, the results obtained during the research carried out within the project 'Signalling Control of Pathogen Induced Plant Immunity'(CH-3-ŠMM-01/10) may have impact on the development of resistant plans in the future, thus contributing to the agricultural industry development. Protein improvement technology developed and patented during the implementation of the project 'Directed Evolution of Computer Designed Enzymes Using Droplet-Based Microfluidics' (CH-3-ŠMM-01/03) can be applied in pharmaceuticals industry, while the production technology of flame-retardant organic textile product developed during the project 'Development of Peat Fibre Based Textiles with Enhanced Flame Retardancy' (CH-3-ŠMM-02/01) can be applied in textile industry. Technologies researched within the project 'Broadband Impedance Study of Memristor Oxide Films' (CH-3-ŠMM-02/06) have the potential to change the computer memory that is currently in use, therefore if developed they could bring immense economic benefits. The results of the research carried out during the implementation of the project 'Incidence of Mycoviruses in Epidemic and Post-Epidemic Populations of the Ash Dieback Pathogen Chalara Fraxinea and Evaluation of Their Potential for Biological Control of the Disease' (CH-3-ŠMM-01/12) in the future can be applied to preserve economically important trees – ash trees. Potential economic benefits of the project 'Efficiency Research of Internet-Based Psychological Treatment for Cancer Patients' (CH-3-ŠMM-02/09) could be observed relatively sooner, since the developed program of internet-based psychological treatment for cancer patients can promote patients to seek psychologist's or psychiatrist's help less frequently, shorten the hospitalisation duration, thus taking off some economic burden from the national health system.

2.5.4 CONTRIBUTION OF THE PROGRAMME TO POPULARISATION OF SWITZERLAND IN LITHUANIA

Another aspect of the social–economic benefits of the Programme is popularisation of Switzerland in Lithuania. This popularisation, as the above-stated analysis revealed, was carried out by the Lithuanian researchers establishing new partnership relations with Swiss researchers and the previously developed partnerships with the Swiss researchers acquiring new dimensions. The name of Switzerland in the Lithuanian scientific community was popularised also by publishing joint Lithuanian and Swiss researchers' articles and presenting the research results at scientific events in Lithuania, thus demonstrating the capacities of Switzerland, as a potential partner, also to the researchers who were not involved in the Programme projects. The name of Switzerland was introduced to general public during such public-oriented science popularisation events as

'Spacecraft Earth', during which the results of the Programme projects were presented[41], results of some relevant projects were presented also to the Lithuanian state institutions, thus introducing the Swiss researchers' experience to them[42]. Information about some implemented projects was published also in the Lithuanian mass media [43] by publishing publicist articles and demonstrating video clips on television, thus providing the Lithuanian society with additional opportunities to get to know Switzerland, as the country with high level in R&D achieved.

[41] For example, in case of the projects CH-3-ŠMM-01/03, CH-3-ŠMM-01/09, CH-3-ŠMM-01/10, CH-3-ŠMM-01/11 (and others).
[42] For example, presentation of the project CH-3-ŠMM-01/05 was organised for Šiauliai City Municipality.
[43] For example, in case of the projects CH-3-ŠMM-01/08, CH-3-ŠMM-01/03, CH-3-ŠMM-01/06, CH-3-ŠMM-01/11, CH-3-ŠMM-01/12 (and others).

3. LITHUANIAN RHEI COOPERATION WITH SWISS RHEI

During the evaluation, not only the Lithuanian-Swiss cooperation programme 'Research and development' was analysed but also other forms of the Lithuanian RHEI (only public Lithuanian RHEI were analysed) cooperation with the Swiss RHEI. Upon completion of the evaluation study, it was established that during the analysed period 2010-2016, in addition to the joint projects carried out within the framework of the Lithuanian-Switzerland cooperation programme 'Research and Development', the Lithuanian RHEI together with Swiss RHEI cooperated also in the implementation of the projects of international R&D programmes EUROSTAR, EUREKA, 7FP, Horizon 2020, COST, as well as under other bilateral/multilateral agreements, they had an opportunity to establish contacts through international networks/associations/societies. The Lithuanian and Swiss RHEI cooperation, that took place in 2010-2016, in every of the above-listed forms, is described in more details in the further subchapters of this Chapter.

3.1 LITHUANIAN AND SWISS RHEI COOPERATION DURING THE IMPLEMENTATION OF THE PROGRAMMES EUROSTARS, EUREKA, 7FP, HORIZON 2020, COST

4.2. To evaluate (outside the Programme) the Lithuanian RHEI cooperation in the fields of R&D and innovation with the Swiss RHEI for the period from 2010 until 2016 and to identify the scope of the Lithuanian researchers' cooperation with the Swiss researchers, fields of interests and popular/attractive forms of cooperation, problems, challenges, by evaluating the following:

4.2.2. RHEI participation in the EU programmes (EU 7FP, Horizon 2020, COST, EUREKA, EUROSTARS), additionally evaluating the contribution of the projects into the establishment of new partnerships.

One of available platforms for the cooperation of the Lithuanian RHEI with foreign partners, including Swiss RHEI, in R&D field is cooperation through implementation of joint R&D programme projects. Implementation of the above-mentioned programme joint projects was the most popular form of Lithuanian and Swiss RHEI cooperation in 2010-2016.

This evaluation report analyses and presents the Lithuanian-Swiss RHEI cooperation that took place within the framework of five R&D programmes that received the largest number of participants from Lithuania, namely: EUROSTARS, EUREKA, 7FP, Horizon 2020 and COST. Below, information about each programme is briefly provided and the possibilities of the Lithuanian RHEI to participate in the implementation of the projects of these programmes are reviewed.

EUROSTARS is a European innovation programme supporting small and medium enterprises (SME), engaged in research and making investments into innovations and development of innovative products, services and processes in order to gain competitive advantages. The programme finances innovative international projects, the results of which are placed on the market as soon as possible. Though SME conducting research studies and

meeting other criteria specific to the programme must coordinate the projects of this programme, however **RHEI** can participate in the projects of this programme as **project partners**[44]**.**

EUREKA is a European research, technology development and cooperation programme aimed at: supporting development of market-oriented research and technology in all fields of modern technologies; enhancing competitiveness of the European Member States; improving the quality of products, processes and services; strengthening multilateral cooperation by including companies and research institutions. Financing is available for institutions implementing the EUREKA programme projects, approved at the meeting of high-ranking officials. Within the framework of this programme, **RHEI** can be **applicants for financing**[45].

7FP is a EU framework programme for research, technological development and demonstrational activity implemented in 2007-2013. The aim of this programme is to create single research area of Europe by referring to the experience gained during the implementation of former framework programmes. 7FP programme is implemented through specific programmes adapted to different R&D fields. **RHEI** can participate in this programme as **applicants or project partners**[46].

Horizon 2020 is a programme continuing the activities of 7FP and previous framework programmes. Horizon 2020 is the largest EU research and innovation programme that ever existed, lasting seven years (2014-2020). The Horizon 2020 programme unites research and innovations and focuses on three main fields: quality science, leadership of industrial entities and objectives of public nature. **RHEI** can participate in this programme as **applicants or project partners**[47].

COST is a European cooperation programme for research and development implemented since 1971. The main goal of the programme is to coordinate nationally-financed research and thus to support European researchers' cooperation in generating and realising new ideas and initiatives in all fields of research. **RHEI** can participate in this programme as **applicants or project partners**[48].

When conducting the evaluation, the databases of all discussed programmes were analysed. The statistics of the Lithuanian RHEI cooperation with the Swiss RHEI in the implementation of the joint projects of the international R&D programmes EUROSTARS, EUREKA, 7FP, Horizon 2020, COST, collected and summarised during the analysis is provided in Table 5.

TABLE 5. LITHUANIAN AND SWISS RHEI COOPERATION DURING THE IMPLEMENTATION OF THE JOINT PROJECTS OF THE PROGRAMMES EUROSTARS, EUREKA, 7FP, HORIZON 2020, COST, IN 2010-2016

PROGRAMME	NUMBER OF THE PROJECTS, IN WHICH LITHUANIAN REPRESENTATIVES PARTICIPATED*	NUMBER OF THE PROJECTS, IN WHICH LITHUANIAN AND SWISS REPRESENTATIVES PARTICIPATED	NUMBER OF THE PROJECTS, IN WHICH LITHUANIAN RHEI AND SWISS NON RHEI PARTICIPATED	NUMBER OF THE PROJECTS, IN WHICH REPRESENTATIVES OF LITHUANIAN AND SWISS RHEI PARTICIPATED
EUROSTARS	31	4	1	0
EUREKA	40	3	2	1
7FP	144	57	17	31
HORIZON 2020	170	41	3	13
COST	310	299	0	299

[44] According to the programme description available on the website of the Agency for Science, Innovation and Technology
[45] According to the programme description available on the website of the Agency for Science, Innovation and Technology
[46] According to the programme description available on the website of the Agency for Science, Innovation and Technology
[47] Based on the programme description available on the website of Horizon 2020 programme
[48] Based on the programme description available on the website of Research Council of Lithuania

PROGRAMME	NUMBER OF THE PROJECTS, IN WHICH LITHUANIAN REPRESENTATIVES PARTICIPATED*	NUMBER OF THE PROJECTS, IN WHICH LITHUANIAN AND SWISS REPRESENTATIVES PARTICIPATED	NUMBER OF THE PROJECTS, IN WHICH LITHUANIAN RHEI AND SWISS NON RHEI PARTICIPATED	NUMBER OF THE PROJECTS, IN WHICH REPRESENTATIVES OF LITHUANIAN AND SWISS RHEI PARTICIPATED
Total:	**695**	**404**	**23**	**344**

Source: based on the analysis of the programme databases conducted by BGI Consulting[49]

When summarising the data of all programmes, it shows that **Lithuanian representatives** (both public and private organisations, including RHEI) were included into **695 projects** implemented in the period of 2010-2016 (it must be noted that some analysed projects were still under implementation during the preparation of this evaluation study). In slightly over half, approximately 58 per cent or 404 of these projects, Swiss representatives participated together with the Lithuanians. However, the number of projects, in which the **Lithuanian and Swiss RHEI** in particular, rather than other types of entities (e.g. private organisations or public institutions other than RHEI) participated was slightly smaller – approx. **49 per cent or 344** projects. In 23 other projects, Lithuanian RHEI participated, but Switzerland in these projects was represented by the types entities other than RHEI. Having evaluated all the data presented, it can be stated that the **scope of the Lithuanian RHEI cooperation with the Swiss RHEI** in the implementation of the projects within EUROSTARS, EUREKA, 7FP, Horizon 2020 and COST programmes **was significant**.

Most projects, in which the Lithuanian RHEI participated together with the Swiss RHEI, were implemented within the framework of the **COST** programme. In total, 310 projects which fall into the period of 2010–2016 and in which Lithuanian representatives participated as project partners or coordinators were implemented under this programme. Majority of these projects – 299 – included also Swiss representatives. Furthermore, it must be noted that representatives in all **299 projects,** in which **both Lithuanian and Swiss entities** participated, were **RHEI**.

Rather smaller, but nevertheless significant number of projects, in which Lithuanian and Swiss RHEI participated together, were implemented under the programmes **7FP** and **Horizon 2020**. Under 7FP programme, 144 projects were implemented, which included Lithuanian representatives, while the number of such projects implemented under the Horizon 2020 programme was 170. Greater part of the projects within 7FP programme (about 40 per cent or 57 projects) involved not only Lithuanian but also Swiss partners. The number of such projects implemented within the framework of the Horizon 2020 programme is smaller – about 24 per cent or 41. Accordingly, the bigger number of projects in which **Lithuanian and Swiss RHEI** were involved were implemented under 7FP. The number of such projects implemented under **7FP** programme was **31 or 22 per cent**. Under the **Horizon 2020** programme, **13 projects** with the **Lithuanian and Swiss RHEI** involved (**about 8 per cent** from all the projects, in which Lithuanian representatives participated) were implemented.

Projects under the **EUROSTARS** and **EUREKA** programmes, with the Lithuanian and Swiss RHEI involved, were hardly implemented. Despite the number of projects implemented under these programmes, in which Lithuanian representatives participated or are still participating, being big (the number of such projects found on the database of the EUROSTARS programme is 31 and of the EUREKA – 40), however only 4 projects under the EUROSTARS programme and only 3 projects under the EUREKA programme were implemented together with the Swiss partners. The number of such projects with the Lithuanian RHEI participating is even smaller – 1 project implemented under the EUROSTARS programme and 2 under the EUREKA programme. Majority of projects partners from Lithuania are SME or university hospitals rather than RHEI. **No project was**

[49] Project implemented in the period 2010-2016 (including the projects that were launched before 2010 and finished after 2016) are counted.

implemented under the **EUROSTARS** programme, in which **Lithuanian and Swiss RHEI** participated as partners, while under the **EUREKA** programme, only **1 such project** was implemented.

Level of activity of the participation of the single **Lithuanian RHEI together with the Swiss RHEI** in the above-mentioned programmes **varied** rather significantly (Table 6).

TABLE 6. FREQUENCY OF PARTICIPATION OF THE LITHUANIAN RHEI IN THE PROJECTS OF THE EUROSTARS, EUREKA, 7FP, HORIZON 2020, COST PROGRAMMES TOGETHER WITH THE SWISS RHEI (IN TIMES)

INSTITUTION	PARTICIPATION IN THE PROGRAMME PROJECTS (IN TIMES)					
	EUROSTARS	EUREKA	7FP	HORIZON 2020	COST	TOTAL
Vilnius University	0	0	8	4	90	**102**
Kaunas University of Technology	0	1	4	3	79	**87**
Lithuanian University of Health Sciences	0	0	3	0	27	**30**
Vilnius Gediminas Technical University	0	0	1	0	26	**27**
Mykols Romeris University	0	0	0	0	23	**23**
Nature Research Centre	0	0	2	0	20	**22**
Centre for Physical Sciences and Technology	0	0	4	0	18	**22**
Lithuanian Energy Institute	0	0	7	2	12	**21**
Lithuanian Research Centre for Agriculture and Forestry	0	0	0	0	20	**20**
Aleksandras Stulginskis University	0	0	0	3	16	**19**
Vytautas Magnus University	0	0	2	0	13	**15**
Klaipėda University	0	0	0	1	11	**12**
Šiauliai University	0	0	1	0	5	**6**
Lithuanian University of Educational Sciences	0	0	1	0	5	**6**
Centre for Innovative Medicine	0	0	0	0	5	**5**
Lithuanian Social Research Centre	0	0	0	0	3	**3**
Lithuanian Institute of History	0	0	0	0	2	**2**
National Cancer Institute	0	0	0	0	1	**1**
Lithuanian Culture Research Institute	0	0	0	0	1	**1**
Lithuanian Sports University	0	0	0	0	0	**0**

INSTITUTION	PARTICIPATION IN THE PROGRAMME PROJECTS (IN TIMES)					
	EUROSTARS	EUREKA	7FP	HORIZON 2020	COST	TOTAL
Lithuanian Institute of Agrarian Economics	0	0	0	0	0	**0**

Source: based on the analysis of the programme databases conducted by BGI Consulting

The **most active participants i**n the projects of the analysed programmes, in which cooperation with the Swiss RHEI was carried out, were **Vilnius University** and **Kaunas University of Technology,** in 2010-2016 representatives of which together with the Swiss RHEI participated in the implementation of **102** and **87**, **respectively**, projects financed under the above-mentioned programmes. Representatives of **Vilnius University** participated in the **biggest** number of projects, with the Swiss RHEI participating as partners, and **by each programme, individually. Other most active** Lithuanian RHEI involved in the implementation of the projects with the Swiss RHEI participating **implemented significantly fewer** projects under the EUROSTARS, EUREKA, 7FP, Horizon 2020, COST programmes. Lithuanian University of Health Sciences, Vilnius Gediminas Technical University, Mykolas Riomeris University, Aleksandras Stulginskis University, Vytautas Magnus and Klaipėda Universities, Nature Research Centre, Centre for Physical Sciences and Technology, Lithuanian Research Centre for Agriculture and Forestry, and Lithuanian Energy Institute within the above-mentioned programmes together with their partners from Swiss RHEI implemented **from 12 to 30 projects.** Participation of **other Lithuanian RHEI** in the projects financed by the analysed programmes and with Swiss RHEI involved was not active and **did not exceed six projects**. Lithuanian Sports University and Lithuanian Institute of Agrarian Economics did not participate in the projects of the analysed programmes, which were implemented in cooperation with the Swiss RHEI at all.

Majority – slightly **over one third** – of the projects, in which the Lithuanian and Swiss RHEI jointly participated, were implemented in the **field of physical sciences and technologies.** Most projects in this field were implemented in the subfields of materials, physics and nanoscience, transport and urban development, information and communication technologies (ICT), chemistry, molecular sciences and technologies. **Almost one third** of the joint projects of the Lithuanian and Swiss RHEI were **interdisciplinary projects** and projects not attributed to any specific field. **Approximately 20 per cent** of all projects implemented by the Lithuanian and Swiss RHEI were the projects in the **field of agricultural sciences.** Projects implemented in this field were carried out in the subfields of food and agriculture, forestry, its products and services. Slightly less – **approximately 10 per cent each** – projects, in which Lithuanian and Swiss RHEI jointly participated, were implemented in the **fields of social sciences** and **biomedical sciences**. **The remaining projects** were **devoted to scientific development promotion** – improvement of research infrastructure, popularisation of science in society.

3.2 PARTICIPATION OF LITHUANIAN RHEI AND SWISS INSTITUTIONS IN THE INTERNATIONAL NETWORKS/SOCIETIES/ASSOCIATIONS

4.2. To evaluate (outside the Programme) the Lithuanian RHEI cooperation in the fields of R&D and innovation with the Swiss RHEI for the period from 2010 until 2016 and to identify the scope of the Lithuanian researchers' cooperation with the Swiss researchers, fields of interests and popular/attractive forms of cooperation, problems, challenges, by evaluating the following:

4.2.3. Participation of RHEI in international scientific networks/organisations/associations/societies.

In 2010-2016, Lithuanian RHEI had an opportunity together with Swiss RHEI to cooperate not only in the projects financed under various R&D programmes, but also through **international networks/societies/associations.** This survey report further analyses **involvement of the universities** in the activities of international networks/societies/associations based on the information provided on the official websites of the universities about participation in these networks and collected through online surveys of universities and faculties/units of universities. **No information was received about participation of other Lithuanian RHEI** (other than universities) in international networks/societies/associations from the analysis of the information published on official websites and online surveys of Lithuanian RHEI (other than universities). From other Lithuanian RHEI (other than universities), only the National Cancer Institute can be mentioned, representatives of which indicated their cooperation with Swiss RHEI through international networks and joint participation in conferences, but no information was received about the number or type of such networks and conferences during the survey.

Table 7 shows the scale of involvement of each Lithuanian state university in international networks (total number of international networks/societies/ associations, of which the university is a member) and the number of international networks/societies/associations, in which Lithuanian universities participate together with Swiss institutions.

TABLE 7. PARTICIPATION OF LITHUANIAN STATE UNIVERSITIES IN INTERNATIONAL NETWORKS/SOCIETIES/ASSOCIATIONS TOGETHER WITH SWISS INSTITUTIONS

INSTITUTION	NUMBER OF INTERNATIONAL NETWORKS/ SOCIETIES / ASSOCIATIONS, A MEMBER OF WHICH THE INSTITUTION IS	NUMBER OF INTERNATIONAL NETWORKS/ SOCIETIES / ASSOCIATIONS, A MEMBER OF WHICH THE INSTITUTION IS TOGETHER WITH SWISS INSTITUTION
Vilnius Gediminas Technical University	23	13
Mykols Romeris University	15	11
Šiauliai University	19	10
Vilnius University	11	9
Lithuanian Sports University	14	6
Kaunas University of Technology	9	5
Lithuanian University of Educational Sciences	6	3
Vytautas Magnus University	6	4
Klaipėda University	3	1
Aleksandras Stulginskis University	2	0
Lithuanian University of Health Sciences	2	0

Source: conducted by BGI Consulting on the basis of the information provided on the official websites of universities

It must be noted that the information provided in the Table 7 about the participation of Lithuanian state universities in international networks/societies/associations **includes various types of networks and associations**, which support and promote not only research activities but also exchanges, internships of students and university staff, joint conferences, cooperation between the university administrations, development of joint position of universities on various educational matters.

But **belonging of Lithuanian and Swiss institutions to the same network should be understood not as direct expression of cooperation but as a basis for cooperation to arise,** thus not only networks supporting research only but also other activities can be considered as serving this basis. Thus, the fact that international networks/societies/associations frequently serve as a platform for establishing contacts, which later are used in joint implementation of projects, is supported also by the information provided in Chapter 'Contribution of the Programme to Scientific Cooperation Development' of this report, according to which many promoters of the Lithuanian-Swiss cooperation programme 'Research and Development' started cooperating with their partners from Switzerland in particular through the international networks/societies/associations.

The provided data shows that researchers of Lithuanian state universities have the potential to establish contacts with Swiss representatives through international networks/societies/associations, which could be further development through joint projects. The number of international networks/societies/associations, to which together with Swiss institutions **Kaunas University of Technology, Lithuanian Sports University, Vilnius University, Šiauliai University, Mykolas Riomeris University and Vilnius Gediminas Technical University** belong to, varies from 5 to 13. Lithuanian University of Educational Sciences, Vytautas Magnus University and Klaipėda University are less involved – from 1 to 4 international networks, to which Swiss institutions also belong. Aleksandras Stulginskis University and Lithuanian University of Health Sciences are not members of any network, to which Swiss institutions would also belong.

It must be further noted that this report analyses only those international networks/societies/associations, to which universities belong to as institutions. Bearing in mind that majority of international networks/societies/associations accept not only institutional but also natural entities to become their members, having considered each researcher's membership in international networks/societies/associations, the number of platforms providing potential opportunity to establish cooperation relations with Swiss partners is likely to be bigger. But during the survey, no information about each individual researcher's membership in international networks/societies/associations was available, therefore it is not analysed in the report.

3.3 COOPERATION BETWEEN LITHUANIAN AND SWISS RHEI UNDER BILATERAL/MULTILATERAL AGREEMENTS

4.2. To evaluate (outside the Programme) the Lithuanian RHEI cooperation in the fields of R&D and innovation with the Swiss RHEI for the period from 2010 until 2016 and to identify the scope of the Lithuanian researchers' cooperation with the Swiss researchers, fields of interests and popular/attractive forms of cooperation, problems, challenges, by evaluating the following:

4.2.1. bilateral/multilateral agreements on international cooperation in science of Lithuanian RHEI – additionally evaluating the type, goals, fields, expediency of the agreements.

The most active cooperation between Lithuanian RHEI and Swiss RHEI in 2010-2016 took place in already discussed forms – through implementation of joint projects under EUROSTARS, EUREKA, 7FP, Horizon 2020 and COST programmes and participation in joint activities of international networks/societies/associations. But there were cases of cooperation in different forms as well during the analysed period.

For example, representatives of **Vilnius University** and **Centre for Physical Sciences and Technology** in the survey stated that participation in the exchange programme of new EU Member States and Swiss researchers (Sciex-NMS^{ch}) in 2009-2016 also contributed to establishing closer partnership relations with Switzerland and laying a further foundation for the activities under the Lithuanian-Swiss cooperation programme 'Research and Development' Young researchers' scientific internships were financed under the latter programme. Post-graduate students were offered internship under the above-mentioned programme in Swiss institutions for 6-24 months, doctors of science for 6-18 months. Young researchers not only from Vilnius University and Centre for Physical Sciences and Technology, but also from Kaunas University of Technology, Lithuanian University of Health Sciences, Mykolas Riomeris University, Vilnius Gediminas Technical University, Vytautas Magnus University, Centre for Innovative Medicine, Lithuanian Research Centre for Agriculture and Forestry, Nature Research Centre received financing for internships under the programme.

Some RHEI, for example **Vilnius University** and **Lithuanian University of Educational Sciences**, indicated long-term cooperation agreements with Swiss RHEI in the survey, under which 2nd and 3rd cycle students of Lithuanian RHEI can go to Swiss RHEI for both study and research purposes. Vilnius University has such agreements with 8 Swiss RHEI – Universities of Bern, Lausanne, Lucerne, Basel, Zurich, and Zurich Technical University, Higher Specialised School of Western Switzerland. Lithuanian University of Educational Sciences signed a cooperation agreement with University of Fribourg.

Individual cooperation initiatives with Swiss RHEI were implemented also by individual faculties of universities. For example, **Faculty of Philology of Vilnius University** indicated ongoing cooperation with young researchers from University of Bern in the format of invitations to scientific conferences, as well as when planning potential joint future projects. **Faculty of Philosophy of Vilnius University** indicated participation together with the partners from Switzerland in the implementation of The Children's Rights Erasmus Academic Network project. **Faculty of Physics of Vilnius University** participates together with Swiss partners in the Laserlab–Europe project, which unites EU and partner countries' institutions engaged in interdisciplinary laser research. Close cooperation between **various faculties of Vilnius University** and partners from Switzerland is promoted also in the process of participation in Lithuania's preparation to join the European Organization for Nuclear Research. **Faculty of Informatics of Vytautas Magnus University** together with the **Computer Linguistics Centre of Vytautas Magnus University** cooperated with Swiss researchers from University of Zurich in organising a summer school for language technology students, contributed to organising NormSoMe conference. **Various faculties of Kaunas University of Technology** with Swiss research and higher education institutions have an opportunity to cooperate through the platform developed by GLORAD – global R&D and innovation centre.

3.4 EXPECTATIONS FOR FUTURE COOPERATION BETWEEN LITHUANIAN AND SWISS RHEI

4.3.2. to determine the fields of interests of research and other activities of Lithuanian RHEI for future cooperation with Switzerland.

All Lithuanian RHEI, irrespective if they already implemented joint projects with Swiss RHEI or not, in online survey indicated their **interest in future cooperation with Swiss institutions.** But big number surveyed RHEI further emphasised that **cooperation with Switzerland in R&D field** would be of **the same importance as with other countries advanced in R&D**. Lithuanian RHEI representatives also noted that the country represented by cooperation partners in R&D field usually is not an important criterion for implementation of joint projects. The main criteria for cooperation include researchers' competences and shared research interests.

According to the survey data it can be stated that cooperation between Lithuanian RHEI and Swiss partners would be relevant in all fields and directions of science, but **technology sciences, social sciences and biomedical sciences were named as the most relevant fields of science for such cooperation.** These fields, as the most relevant for cooperation, were named by 72.2 per cent, 44.4 per cent and 38.9 per cent respondents, respectively. Most respondents named the following directions of technology sciences as the most relevant: **environmental engineering and landscaping** (38.9 per cent), **materials engineering** (33.3 per cent), **measurements engineering** (22.2 per cent), and **chemical engineering** (22.2 per cent). When asked to name specific research themes, in the development of which partnership with Swiss RHEI would be useful, Lithuanian RHEI representatives named environmental pollution reduction, waste management technology development, development of alternative energy sources/energy-efficient technologies, as well research and development of sustainable urban development, modelling and optimisation of transport and logistic systems, research of new movement technologies, smart communication, language technologies. Lithuanian RHEI representatives consider **management and administration** (33.3 per cent), **economics** (27.8 per cent), **sociology** (16.7 per cent), and **educational sciences** (16.7 per cent) as the most relevant directions of social sciences for cooperation with Switzerland. When asked to name specific potential joint research themes of Lithuanian and Swiss RHEI in the field of social sciences, the respondents mentioned research of human social development, social welfare, life quality improvement, ethno social research. In the field of biomedical sciences, the respondents named **public health** (27.8 per cent), **ecology and environmental research** (22.2 per cent), **biology** (16.7 per cent) and **medicine** (16.7 per cent) as the most relevant directions of research. Among potential specific themes of joint research with Swiss researchers, the respondents indicated regenerative medicine research, e.g. research of regenerative body possibilities and mechanisms, innovative diagnostics, treatment, health monitoring and illness prevention technology research, neuroscience, functional brain magnetic resonance imaging research, immunodiagnostic research, search for new medicines. Among potential specific themes of future research, the respondents also mentioned genetic research of forest tree phytopathology microorganism populations, feasibility studies of adaptation of dendrological methods in environmental research.

Some respondents also emphasised that **due to dynamic nature of R&D activities, administrative restriction of potential fields of cooperation is not always expedient.** In order to ensure more intense cooperation in the priority fields of cooperation, by clearly defining them, projects in these fields could be subject to additional promotion rather than restriction.

The survey results also show that the cooperation of Lithuanian RHEI with Swiss partners would be **relevant in various stages of R&D**, from fundamental knowledge acquisition to product placement on the market or creation of a work of art. But among the most relevant stages of R&D activity for cooperation, the respondents indicated **formulation of knowledge application concept** (59.6 per cent of all respondents participating in the survey), **fundamental knowledge acquisition** (48.9 per cent), **proof/validation of concept feasibility** (40.4 per cent), **development and testing of a mock-up (model) or art object project** (29.8 per cent), **and mock-up (model) testing by imitating real conditions or presentation of art object to public** (21.3 per cent).

Lithuanian RHEI consider various forms of cooperation with Swiss RHEI as relevant: joint research projects, long-term/short-term internships for researchers and students, cooperation projects for strengthening relations (summer schools, conferences and seminars), support to Swiss researchers' employment in Lithuania, joint study programmes, students' exchanges. But the most relevant forms of cooperation include: **joint research projects** (76.6 per cent of all respondents participating in the survey chose this form of cooperation as relevant), and **long-term/short-term internships for researchers and students** (44.7 per cent of all respondents participating in the survey named this form of cooperation as relevant).

4. CONCLUSIONS

LITHUANIAN AND SWISS COOPERATION WITHIN THE FRAMEWORK OF THE 'RESEARCH AND DEVELOPMENT' PROGRAMME

CONTRIBUTION OF THE PROGRAMME TO THE DEVELOPMENT OF NEW SCIENTIFIC COOPERATION PARTNERSHIPS

4.1.2. to assess and summarise the Programme's contribution into the establishment of new research cooperation partnerships with consideration of the specifics of joint research projects and institutional partnerships.

4.1.4. to assess and summarise the Programme's ties with Switzerland (i.e. established relations, partnerships, popularisation of the name of Switzerland, possibilities created for Switzerland to participate in public procurements, new opportunities created for Swiss products/services, etc.) and other meaningful relations.

Before the Programme implementation, the **Lithuanian and Swiss cooperation in R&D field mainly was carried out at individual (individual researchers or their groups), rather than institutional (RHEI) level.** In the past, around half (50-53 per cent) surveyed beneficiaries from Lithuania and representatives of Swiss project partners carried out scientific cooperation with foreign project partners at the individual level, and about one fourth (22-27 per cent) – at the institutional level. Besides, slightly less than half (44 per cent) surveyed beneficiaries' representatives identified previous partnership of their represented RHEI in the R&D with Swiss RHEI, other than represented by project partners. At the individual level, relatively more beneficiaries of institutional partnership projects cooperated with Swiss researchers in the past. At the institutional level, relatively more beneficiaries carried out scientific partnership with Swiss RHEI represented by the project partners in joint research projects, while with Swiss RHEI other than represented by the project partners – in the institutional partnership projects.

The main platforms for previous scientific Lithuanian and Swiss cooperation at individual and institutional levels were **joint participation in international scientific networks/organisations/associations/societies, joint projects within the framework of international R&D programmes (ES 7FP, COST, Horizon 2020) and bilateral international cooperation agreements between Lithuanian and Swiss RHEI.** Almost in all cases, cooperation in the implementation of both types of Programme projects stemmed from personal initiative of individual researchers from Lithuania or Swiss, based on personal contacts with foreign colleagues previously established during the implementation of joint research projects or international scientific conferences. Considering the fact that partnership developed between Lithuania and Switzerland in the framework of the Programme was **completely new for slightly more than one third of the surveyed projects (39 per cent/7 out of 18)**, as well as the fact that before the Programme implementation, about one half of the surveyed beneficiaries from Lithuania and representatives of Swiss project partners did not cooperate in R&D field at either individual or institutional level, and the Programme helped to extend these partnerships from individual to institutional level and vice versa, **the contribution of the Programme into establishment of scientific cooperation partnerships between these two countries is to be considered significant.**

Cooperation with project partners from Switzerland justified the expectations of surveyed representatives of the beneficiaries from Lithuania to a large or very large extent. Partnership with the beneficiaries from Lithuania also satisfied the expectations of the surveyed representatives of project partners from Switzerland to a large extent. Mutual satisfaction with the cooperation developed within the framework of the Programme was determined by various factors, including favourable prospects for further mutual cooperation – **established new or strengthened existing relations, extended cooperation networks.** Even in the cases, when former cooperation between the Lithuanian or Swiss researchers or RHEI was recorded, the **Programme**

implementation brought about new parameters of partnership in terms of quality, e.g., birth to the scientific cooperation, as a new type of partnership or closer partnership, if compared with the established partnership during the implementation of the projects financed by other R&D programmes (in which, differently than in Programme projects, not partners of two countries but rather a broad consortium of the researches' groups of various countries participates). The Programme provided Lithuanian researchers with possibilities to start cooperating not only with RHEI represented by project partners from Switzerland and their researchers, but also with **other researchers of the project partner from Switzerland, who did not participate in the project, or other Swiss RHEI not represented by the project partner.** Newly-initiated scientific partnerships within the framework of some joint research projects were not limited to Switzerland only and extended to other foreign countries, such as South Korea, Netherlands, Italy, and Poland.

CONTRIBUTION OF THE PROGRAMME TO INTEGRATION OF THE LITHUANIAN R&D SECTOR INTO THE INTERNATIONAL RESEARCH AREA

4.1.1. to evaluate how and to which extent the Programme's results contributed to the achievement of the key aim of the Programme, i.e. to support the Lithuanian research and development sector by integrating it into the international research area, expressed through the indicator of the aim 'Increased effectiveness and competitiveness of the Lithuanian research and development system'.

Contribution of the Programme to integration of the Lithuanian R&D sector into the international research area is significant. The Programme contributed to enhancement of the effectiveness and competitiveness of the Lithuanian R&D system through the contribution into **enhancement of Lithuanian R&D human resources, development of specific fields of science in Lithuania, improvement of Lithuanian scientists' attainments and increase of their dissemination.**

Participation of Lithuanian researchers in training or internships at the Swiss institutions of the project partners **helped to enhance their professional competences at the large scale.** The communication and organisational capacities acquired by the Lithuanian researchers, and the experience of application preparation, project management and administration gained during the implementation of the projects **will make a significant impact on participation in other international research projects or initiative in the future. The contribution of joint research projects to the enhancement of Lithuanian R&D human resources was relatively bigger.**

The Programme, in particular joint research projects, **contributed to the development of science in specific fields in Lithuania at the large or very large scale.** The Programme enabled development of new or underdeveloped fields of science or research in Lithuania, production of significant results in terms of science (making new discoveries, solving scientific problems, etc.), enhancement of scientific capacities (acquisition of new research tools or new capacities to operate them, improvement of application of scientific methods, etc.), gathering of strong Lithuanian researchers' teams and support of their research activities.

On the basis of the Programme project results, **106 scientific articles** were published, the great majority of which (88 per cent) were published in the journals with impact factor in the JCR database. Significant share of these scientific articles was published in the leading scientific journals in their categories by their IF (44.1 per cent – in the journals of the first rating quarter in their categories, 16.1 per cent – in the second). More than an average of all published articles (40 per cent) at the Lithuanian scale were prepared by Lithuanian researchers in cooperation with foreign scientists. Lithuanian researchers participating in the Programme published scientific articles not only with partners from Switzerland, but also with colleagues from France, Italy, Russia, Germany, Austria, USA, Spain, Cyprus, Estonia, Latvia, and United Kingdom. Programme induced more intense involvement of Lithuanian researchers into broader international research groups **contributed to enhancement of their capacities to write articles that are published in higher-rating journals.** On one hand, the Programme **induced more intense and stable cooperation between Lithuanian researchers with their colleagues from abroad,** and on the other hand, **enabled sustenance of the existing growth of individual researchers and their groups in terms of quality.**

The Programme, in particular joint research projects, **strongly contributed to the increase of awareness of Lithuanian scientists' attainments in a specific field abroad.** It was mainly determined by **presentation of the project outputs in scientific publications** (in particular, in those prepared together with foreign scientists and published in the highly-rated international scientific journals) and **reports at the international scientific events** (conferences, seminars, work groups, etc.). The results of the Programme projects were presented at **146 unique scientific events** held in **31 country,** in **five continents.** Achievements of the Lithuanian scientists will also be indirectly popularised by the use of the inventions developed and patented in Lithuania by the Swiss colleagues.

EVALUATION OF THE QUALITY OF COOPERATION

4.1.6. To identify and evaluate any difficulties encountered by the project beneficiaries during the Programme implementation and applied measures to deal with them, to suggest alternative more effective solutions, if possible.

Cooperation with the project partners from Switzerland satisfied the beneficiaries' expectations at large or very large scale. Half of the surveyed beneficiaries believe that the scientific partnership developed with Switzerland within the Programme was of better quality than cooperation with the researchers from other countries, though similar number of the respondents did not see any difference between partnership with Swiss project partners and cooperation with representatives of other countries in R&D field in terms of quality. **Cooperation with the beneficiaries from Lithuania also satisfied the expectations of the surveyed representatives of project partners from Switzerland to a large extent.** Less than half of the foreign partners evaluated the cooperation with Lithuanian researchers as of higher quality than with researchers from other countries, while one third of the respondents did not see any difference between scientific cooperation with Lithuanian researchers and researchers from other countries in terms of quality.

High satisfaction of both sides with the partnership developed within the framework of the Programme was determined by such factors as **productivity of cooperation** (achieved or even exceeded planned results of the projects), **its value added** (scientific significance of the joint research activities, knowledge, capacities and experience acquired or enhanced during the implementation of the projects), **smoothness of cooperation** (effective communication, pleasant communication, mutual understanding, equal contribution to the creation of project results) **and its prospects** (established new or strengthened existing contacts, expanded cooperation networks).

Despite the prevailing satisfaction of the both sides of the partnership with the cooperation developed within the Programme, project participants faced various challenges, including **administrative difficulties, project content related challenges** and **international partnership related challenges**. Challenges associated with international partnership, include differences in mentality or administrative culture between Lithuanian and Switzerland, inadequate interest from one side of the partnership in cooperation, mistrust in foreign partner in the beginning of the project implementation, or insufficient language command. One of the major obstacle in various projects, in particular, in institutional partnership, in the stages of implementation was administrative burden and lack of beneficiaries abilities to control it if compared with other similar R&D programmes (e.g., failure to use the opportunity to employ administrative staff into project administration, lack of abilities to use the proposed measures for administration simplification, such as flat rates (in institutional partnership projects).

FURTHER COOPERATION AT THE CLOSURE OF THE PROGRAMME

4.1.3. to evaluate and summarise the prerequisites and prospects of potential further cooperation between the Programme project partners once the Programme is closed.

4.3.3. to suggest potential priority fields of scientific cooperation within the programme, and the forms of implementation of the cooperation in pursuit of the goals laid down in Paragraph 3 of the Terms of reference and taking the interests of Lithuanian scientists into consideration.

Beneficiaries (in particular, in joint research projects) **consider the prospects of further cooperation with the project partners from Switzerland as huge. Project partners from Switzerland have** relatively lower estimation **of the prospects of further cooperation with the beneficiaries from Lithuania – slightly above average**, though foreign partners of institutional partnership projects are more favourable about the possibilities to continue partnership with Lithuanian researchers.

Beneficiaries and project partners from Lithuania expressed their interest in continuing the scientific cooperation launched within the Programme with the researchers from Switzerland. Participants of both joint research projects and institutional partnership projects consider the following forms of cooperation as the most desired – **joint research and scientific internships of researchers (in particular, young) and doctoral students in Swiss RHEI**, the most desired results of further cooperation include **acquired skills to work with specific research tools (equipment, software, methods, etc.), possibility to use scientific infrastructure of Swiss RHEI and taken over knowledge in the specific field of science.** Beneficiaries and project partners from Lithuania named also specific themes of scientific cooperation in their represented fields and directions of science, mainly in the **field of biomedical sciences** (botany, ecology and environment research, medicine) and in the **field of technological sciences** (environment engineering, electrical and electronic engineering, materials engineering).

In case of absolute majority of Programme projects, specific actions were initiated to ensure continuation of the partnership launched within the Programme in the future. The latter include **joint participation of Lithuanian and Swiss researchers in international research projects, implementation of bilateral research activities and partners' consulting,** in rarer cases – **signing of cooperation agreement between represented Lithuanian and Swiss RHEI and scientific internships of young researchers and doctoral students in partners' RHEI.** In exceptional cases, the **sustainable results developed during the projects** will serve as a basis for long-term cooperation between the Lithuanian and Swiss researchers outside the Programme, including **patented new inventions** to be used by both partnership sides in the future.

CONTRIBUTION OF THE PROGRAMME INTO THE ACHIEVEMENT OF HORIZONTAL PRIORITIES

4.1.5. To evaluate the contribution of the Programme to the achievement of the horizontal priorities: environmental protection, gender equality, social-economic value created.

The programme **proactively contributed** to the adherence of the environmental protection principle. Some joint research projects, implemented in the fields of natural sciences, environmental protection sciences and technology, and institutional partnership projects implemented in the field of technology included conscious actions that were directly oriented to the implementation of the environmental protection principle. Results of such projects can be directly used at political and other levels when planning solution of environmental problems (such as environment pollution, ineffective use of energy and resources, decreasing biological diversity of flora, etc.) and raising environmental awareness of society and business. In the context of other Programme projects, environmental protection principle was irrelevant, but it was not breached.

The programme **passively contributed** to the adherence of the gender equality principle. It means that the gender equality principle was not breached during the implementation of the Programme projects – equal opportunities were ensured for women and men to participate in Programme projects' implementation. Taking into consideration the scientific type of projects, the scientific competence played the central role when building

teams, therefore ensuring the equality of representation of male and female researchers was not the crucial criterion. Even though the composition of separate project implementation teams shows that in a larger share of teams male researchers dominated, taking into account that almost half (9 out of 20) project teams were dominated by female researchers or the number of male and female researchers composing the team was equal, also that the overall number of male and female researchers involved in the implementation of Programme projects reflects the natural distribution of genders in the society, it can be stated that **opportunities for professional improvement and self-realisation were granted by the Programme to the researchers of both genders equally.** It is confirmed also by the fact that leaders of more than one third (35 per cent) of the project teams were women.

The Programme can create **multidimensional socio-economic benefits.** Social benefits of the Programme projects can manifest themselves through the creation of conditions for **public health improvement** and **human resources development in science**. Specific researchers' capacities of disease diagnostics were enhanced during the implementation of the institutional partnership projects in the field of biomedical sciences, while the projects in the field of social sciences created preconditions for strengthening of mental health of specific social group. Results of joint research projects in the field of health (life) sciences will make direct contribution to social health improvement through broadening of possibilities of various diseases diagnostics, while the results of the projects in the field of natural sciences – will make indirect contribution once they are adapted in medicine or environmental pollution reduction. Different types of the Programme projects contributed to education of young researchers, mainly, doctoral students and post-doctoral interns, by giving them an opportunity to participate in research activities of the projects. The benefits of the institutional partnership projects implemented in the field of humanities can manifest themselves through strengthening of the Baltic and Christian social identity. Due to orientation of the majority of projects into the initial levels of R&D, the economic benefits of the Programme could be seen in long term only. Results of various projects could make positive impact in the future on **the development of agriculture, pharmaceuticals and textile industry, reduction of the state budget funds for health care.**

Another aspect of the socio–economic benefits of the Programme is popularisation of Switzerland in Lithuania. This popularisation was carried out by the Lithuanian researchers establishing new partnership relations with Swiss researchers and the previously developed partnerships with the Swiss researchers acquiring new dimensions. The name of Switzerland in the Lithuanian scientific community was popularised also by publishing joint Lithuanian and Swiss researchers' articles and presenting the research results at scientific events in Lithuania, thus demonstrating the capacities of Switzerland, as a potential partner, also to the researchers who were not involved in the Programme projects. The name of Switzerland was introduced to general public during such public-oriented science popularisation events as 'Spacecraft Earth', during which the results of the Programme projects were presented, results of some relevant projects were presented also to the Lithuanian state institutions, thus introducing the Swiss researchers' experience to them. Information about some implemented projects was published also in the Lithuanian mass media (in a form of publicist articles and TV shows), thus providing the Lithuanian society with additional opportunities to get to know Switzerland, as the country with high level in R&D achieved.

LITHUANIAN RHEI COOPERATION WITH SWISS RHEI

LITHUANIAN AND SWISS RHEI COOPERATION DURING THE IMPLEMENTATION OF THE PROGRAMMES EUROSTARS, EUREKA, 7FP, Horizon 2020, COST

4.2. To evaluate (outside the Programme) the Lithuanian RHEI cooperation in the fields of R&D and innovation with the Swiss RHEI for the period from 2010 until 2016 and to identify the scope of the Lithuanian researchers' cooperation with the Swiss researchers, fields of interests and popular/attractive forms of cooperation, problems, challenges, by evaluating the following:

4.2.2. RHEI participation in the EU programmes (EU 7FP, Horizon 2020, COST, EUREKA, EUROSTARS), additionally evaluating the contribution of the projects into the establishment of new partnerships.

In 2010-2016, cooperation in the implementation of the joint EU programme projects was the **most popular form of cooperation between Lithuanian and Swiss RHEI**, while the **scale of this type of cooperation was large**. Lithuanian representatives participated in 695 projects implemented within the framework of the above-mentioned programmes during the period analysed. Lithuanian and Swiss RHEI representatives jointly participated in nearly half of them – 344 projects. Most of joint projects (as many as 299) were implemented by Lithuanian and Swiss RHEI under the **COST Programme.** Within the framework of EU 7FP programme, 31 projects were implemented, within the Horizon 2020 – 13, within EUREKA – 1 project, in which Lithuanian and Swiss RHEI participated. No such projects were implemented under the EUROSTARS Programme. **Vilnius University** and **Kaunas University of Technology** were the most active participants in the projects of the above-mentioned programmes. Lithuanian Sports University and Lithuanian Institute of Agrarian Economy did not participate together with Swiss RHEI in any project of the analysed programmes. Majority – slightly **over one third** – of the projects, in which the Lithuanian and Swiss RHEI jointly participated, were implemented in the **field of physical sciences and technologies. Almost one third** of the joint projects of the Lithuanian and Swiss RHEI were **interdisciplinary projects** and projects not attributed to any specific field.

PARTICIPATION OF LITHUANIAN RHEI AND SWISS INSTITUTIONS IN THE INTERNATIONAL NETWORKS/SOCIETIES/ASSOCIATIONS

4.2. To evaluate (outside the Programme) the Lithuanian RHEI cooperation in the fields of R&D and innovation with the Swiss RHEI for the period from 2010 until 2016 and to identify the scope of the Lithuanian researchers' cooperation with the Swiss researchers, fields of interests and popular/attractive forms of cooperation, problems, challenges, by evaluating the following:

4.2.3. Participation of RHEI in international scientific networks/organisations/associations/societies.

Researchers of Lithuanian state universities have the potential to establish contacts with Swiss representatives through international networks/societies/associations, which could be further development through joint projects. The number of international networks/societies/associations, to which together with Swiss institutions **Kaunas University of Technology, Lithuanian Sports University, Vilnius University, Šiauliai University, Mykolas Riomeris University and Vilnius Gediminas Technical University** belong to, varies from 5 to 13. **Aleksandras Stulginskis University** and **Lithuanian University of Health Sciences** are **not members of any network,** to which Swiss institutions would also belong.

COOPERATION BETWEEN LITHUANIAN AND SWISS RHEI UNDER BILATERAL/MULTILATERAL AGREEMENTS

4.2. To evaluate (outside the Programme) the Lithuanian RHEI cooperation in the fields of R&D and innovation with the Swiss RHEI for the period from 2010 until 2016 and to identify the scope of the Lithuanian researchers' cooperation with the Swiss researchers, fields of interests and popular/attractive forms of cooperation, problems, challenges, by evaluating the following:

4.2.1. bilateral/multilateral agreements on international cooperation in science of Lithuanian RHEI – additionally evaluating the type, goals, fields, expediency of the agreements.

In 2010-2016, cooperation between Lithuanian and Swiss RHEI was most active in the implementation of the **joint projects of EU programmes (EUROSTARS, EUREKA, 7FP, HORIZON 2020, COST) and through international networks/societies/associations.** Cooperation under other bilateral/multilateral agreements was more of an episodic nature. **Vilnius University** and **Lithuanian University of Educational Sciences** have long-term cooperation agreements with Swiss RHEI, under which 2nd and 3rd cycle students of Lithuanian RHEI can go to Swiss RHEI for both study and research purposes. Individual faculties of Vilnius University, Vytautas Magnus University and Kaunas University of Technology also cooperated with Swiss RHEI by **organising joint events, implementing bilateral projects, participating in joint conferences, through the platforms of joint research cooperation.** Lots of Lithuanian RHEI – 10 out of 18 – participated in only the exchange programme between new EU Member States and Swiss researchers Sciex-NMS^{ch} implemented in 2009-2016.

EXPECTATIONS FOR FUTURE COOPERATION BETWEEN LITHUANIAN AND SWISS RHEI

4.3.2. to determine the fields of interest of research and other activities of Lithuanian RHEI for future cooperation with Switzerland.

All surveyed Lithuanian RHEI, irrespective if they already implemented joint projects with Swiss RHEI or not, indicated their **interest in future cooperation with Swiss institutions.** However, it must be noted that cooperation with Switzerland in R&D field would be of the same relevance for Lithuanian RHEI as with other foreign countries advanced in R&D field. Lithuanian RHEI are interested in cooperation with Swiss partners in various fields and directions of science, while the **fields of technology, social and biomedical sciences** were named as the most relevant ones.

However, **due to dynamic nature of R&D activities, administrative restriction of potential fields of cooperation is not always expedient.** In order to intensify scientific cooperation in priority fields, additional promotion could be applied for implementation of projects in the latter fields. Cooperation between Lithuanian RHEI and Swiss partners would be relevant at various levels of R&D, the most relevant of which are **formulation of knowledge application concept, acquisition of fundamental knowledge and proof/validation of concept implementation.** The most suitable forms of future cooperation between Lithuanian and Swiss RHEI would be **joint research projects** and long-term/short-term **internships for researchers and students.**

5. RECOMMENDATIONS

4.3.1. to submit proposals on further cooperation between Lithuania and Switzerland in the field of R&D and innovations in order to initiate/continue future cooperation programme (provided that financial support of Switzerland is further granted to Lithuania and R&D and innovations are selected as expedient field of financing).

4.3.2. to determine the fields of interest of research and other activities of Lithuanian RHEI for future cooperation with Switzerland.

4.3.3. to suggest potential priority fields of scientific cooperation within the programme, and the forms of implementation of the cooperation in pursuit of the goals laid down in Paragraph 3 of the Terms of reference and taking the interests of Lithuanian scientists into consideration.

4.3.4. to evaluate the good practice of the Programme and what should be considered when implementing similar type of programmes in the future.

Recommendations are made on the basis of the evaluation of the Lithuanian and Swiss scientific cooperation within the framework of the 'Research and Development' programme and beyond it regarding future development of Lithuanian and Swiss cooperation in the field of R&D and innovations. Recommendations are divided into **strategic proposals ('know it')** and **specific recommendations ('do it').**

STRATEGIC PROPOSALS ('KNOW IT')

Lithuanian and Swiss cooperation within the framework of the Lithuanian-Swiss cooperation programme 'Research and Development' was successful for the following reasons:

- it made significant contribution to the establishment of new scientific cooperation partnerships or formation of new parameters of previously developed partnerships;
- brought significant scientific results, which are significantly contributing to science development in Lithuania and will create diverse socio–economic benefits for society in the future;
- significantly contributed to the development of Lithuanian R&D human resources, creating an opportunity to enhance Lithuanian researchers' competences and to educate young researchers;
- significantly contributed to raising awareness of Lithuanian scientists' attainments in foreign countries, by providing an opportunity to present project results in scientific articles published in highly-rated scientific journals and at international scientific events all over the world;
- laid foundation for further international scientific cooperation in various formats.

Beneficiaries of the Lithuanian-Swiss cooperation programme 'Research and Development' see huge prospects for further cooperation with project partners from Switzerland. However, significant number of beneficiaries did not see any difference between partnership with project partners from Switzerland and cooperation with other countries in the field of R&D in terms of quality. Lithuanian RHEI representatives also expressed interest in cooperation with Swiss RHEI in the future, but emphasised that scientific cooperation with Switzerland in the future would be of the same importance as partnership with other foreign countries advanced in the field of R&D.

STRATEGIC PROPOSAL. In the future, when making and implementing R&D and innovation policies in Lithuania, it is recommended to prioritise international scientific cooperation, which could be realised in the form similar to Lithuanian-Swiss cooperation programme 'Research and Development'. However, it must be noted that Lithuanian cooperation in R&D could be developed not only with Swiss RHEI but also with RHEI

of other countries advanced in this field and boasting highly-developed scientific infrastructure and highly-qualified researchers.

Joint research projects of the Lithuanian-Swiss cooperation programme 'Research and Development' mainly contributed to the first three stages of R&D – acquisition of fundamental knowledge, formulation of knowledge application concept and proof/validation of concept feasibility, though individual projects contributed also to further stages of R&D. Lithuanian RHEI representatives believe, that future cooperation between Lithuanian and Swiss RHEI would also be most relevant in the above-mentioned stages of R&D, without limiting to fundamental research as usual scientific activity of RHEI.

STRATEGIC PROPOSAL. It is important to create prerequisites in the future for implementation of international scientific cooperation initiatives, without limiting to the usual fundamental research activities of RHEI and contributing to various stages of R&D.

The absolute majority of scientific articles written exclusively by foreign authors on the basis of the results of the Lithuanian-Swiss cooperation programme 'Research and Development' were published in the group of the first-quarter most-cited scientific journals, while the articles written by Lithuanian authors were not published in a single journal of the first quarter. Scientific articles prepared by Lithuanian researchers together with foreign partners were more frequently published in higher-rating scientific journals than the articles written by Lithuanian authors only. It shows that attraction of capable individual and institutional foreign partners is one of the main prerequisites for international development of Lithuanian R&D sector and promotion of its awareness abroad. The evaluation further revealed that for publication of joint rather than individual publications by Lithuanian and Swiss research groups, continuous promotion of such cooperation by the Joint Selection Committee of the Lithuanian-Swiss cooperation programme played a very important role.

STRATEGIC PROPOSAL. When implementing international scientific cooperation initiatives in the form of joint research activities in the future, it is important to promote attraction of foreign institutions and individual partners well-established in science and publishing scientific articles in highly-rated scientific journals and preparation of joint publications with those partners. It could be achieved by both prioritising partnership with more capable foreign entities in the field of science at the stage of selection of actions eligible to funding, and obligating beneficiaries to attain specific monitoring indicators related with presentation of joint research results by publishing scientific articles in the scientific journals of established rating.

When implementing the Lithuanian-Swiss cooperation programme 'Research and Development' a possibility to allocate some funds assigned for project implementation to hiring administrative staff was stipulated. But in case of a part of projects, this possibility was disregarded in order to maximise project funds for research groups or failing to find adequately qualified administrative staff who would agree to work for the allocated funds, and thus performing administrative functions by one member of the research team. But this practice had negative impact on the results of scientific projects, since researchers performing also administrative functions had less time to devote to research activities.

STRATEGIC PROPOSAL. In the future, in the programmes of scientific cooperation with Switzerland or other countries, it is important to create possibilities for researchers participating in the project to devote all their time to research activities ensuring that the latter could hire sufficient staff of adequate qualification to perform administrative tasks, but also ensuring that such possibility would be used by showing the benefits of administrative staff to beneficiaries and setting specific requirements for inclusion of such staff into project implementation.

Institutional partnership project implemented within the Lithuanian-Swiss cooperation programme 'Research and Development' should be distinguished as an example of good practice in terms of knowledge acquisition and expedient application, during which researchers working in Lithuanian research and medical institutions took over the experience from the Swiss partners of operating specific medical diagnostic equipment, which was previously introduced in Lithuania. Thus, the conditions for application of newly-acquired knowledge and capacities in short term were created, thus preventing potential devaluation of knowledge and capacities, which are forgotten if not used into practice.

STRATEGIC PROPOSAL. When implementing international cooperation initiatives similar to the institutional partnership projects of the Lithuanian–Swiss cooperation programme 'Research and Development' in the future, activities of knowledge and experience exchange should be promoted to create possibilities for the application of newly-acquired knowledge and capacities in the shortest term possible. In some cases, systematic takeover of specific knowledge could help, in which different types of Lithuanian RHEI human resources – research and administrative or managerial staff – could participate.

SPECIFIC RECOMMENDATIONS ('DO IT')

Lithuanian researchers who participated in the Lithuanian-Swiss cooperation programme 'Research and Development' named specific themes of potential future scientific cooperation with Switzerland in their represented fields of science, mainly in the fields of biomedicine and technology. Representatives of Lithuanian RHEI also indicated the most relevant fields of potential future scientific cooperation with Switzerland – sciences of technology, social and biomedical sciences. Despite the interest expressed by the respondents in partnerships in specific fields of science, R&D covers dynamic processes, which do not always can be fitted into one field of science. Multidisciplinarity is gaining growing importance in today's scientific development. It is supported also by the fact that one third of all projects implemented jointly by the Lithuanian and Swiss RHEI under the EU R&D programmes (EUROSTARS, EUREKA, 7FP, Horizon 2020 and COST) in 2010-2016 are attributed to interdisciplinary field.

RECOMMENDATION. In the future programmes of scientific cooperation with Switzerland or other countries, it is recommended not to limit the choice of the fields of science for scientific cooperation, by creating prerequisites for scientific partnership to arise from actually existing scientific interests of researchers in various fields of science or at their junction. If strategic need to promote development of specific fields of science in the country is present, it is recommended to prioritise scientific cooperation initiatives in those fields through selection of projects eligible to financial support.

Participants of both types of projects of the Lithuanian-Swiss cooperation programme 'Research and Development' – joint research and institutional partnership projects – and representatives of Lithuanian RHEI named joint research activities and scientific internships of researchers (including young ones) and students of various durations in Swiss RHEI as the most relevant forms of potential future scientific cooperation with Switzerland.

RECOMMENDATION. In the future scientific cooperation programmes with Switzerland or other countries, it is recommended to sustain the forms of cooperation that justified themselves during the implementation of the Lithuanian-Swiss cooperation programme 'Research and Development', i.e. joint research projects and institutional partnerships in the implementation of projects of scientific internships.

Young researchers, mainly doctoral students and post-doctoral interns, actively participated in both types of projects of the Lithuanian-Swiss cooperation programme 'Research and Development' – joint research and institutional partnership projects. The latter were provided with an opportunity not only to contribute to the implemented R&D activities, but also to establish contacts with other researchers from Lithuania and Switzerland. Inclusion of young researchers is important by promoting their integration into national and international scientific community. Besides, scientific internships of young researchers financed under the EU Member States and Swiss researchers' exchange programme Sciex-NMS^{ch} in 2009-2016 in some cases laid foundation for scientific cooperation also within the framework of the scientific cooperation programme 'Research and Development'.

RECOMMENDATION. In the future programmes of scientific cooperation with Switzerland or other countries, it is recommended to create broader prerequisites for young researchers' education, by additionally establishing a scholarship fund to finance scientific internships of young researchers in RHEI of Switzerland or other countries.

Beneficiaries of the Lithuanian-Swiss cooperation programme 'Research and Development' named disproportionately huge administrative burden, if compared with other research and development programmes of similar nature, encountered by them. For example, the mentioned sources of administrative burden include excessively scrupulous financial accounting, complicated and time-consuming reporting procedures. Besides, beneficiaries of the joint research and institutional partnership projects faced different administrative difficulties caused by the different scale, nature and administration rules of these type of projects. Beneficiaries of joint research projects named public procurement procedures as causing major problems, while beneficiaries of institutional partnership projects faced more difficulties when signing/amending agreements, reporting for project implementation and applying administration simplification rules to institutional partnership projects – flat prices.

RECOMMENDATION. In the future programmes of scientific cooperation with Switzerland or other countries, it is recommended to reduce administrative burden for beneficiaries and to provide them with greater flexibility when reporting for project implementation, e.g. without demanding from all beneficiaries to have mandatory audit completed, instead auditing only several randomly selected projects. Furthermore, though simplification of the administration rules (e.g. application of fixed prices for institutional partnership projects) is expedient and welcomed practice, when implementing such administrative novelties it must be ensured that all personnel responsible for administration of each project is well familiar with their application.