Facilitating macro-regional scope and link up to socio-economic actors of Research Infrastructure in the Danube Region (ResInfra@DR)

WP5: Pilot Actions

PILOT ACTIVITY 1:
PEER REVIEW OF INSTITUTE FOR MOLECULAR BIOLOGY, BULGARIA

Reference No.:	DTP1-1-417-1.1	**Document type:**	*Deliverable*
Project start date:	01/01/2017	**Project end date:**	30/06/2019

Interreg Danube Transnational Programme ResInfra@DR

Project co-funded by European Union funds (ERDF, IPA).

Facilitating macro-regional scope and link up to socio-economic actors of Research Infrastructure in the Danube Region (ResInfra@DR)

DOCUMENT CONTROL SHEET

Work package Number	WP5
Work package Title	Pilot Actions
Activity Number	5.2
Activity Title	Peer Learning Process
Deliverable Number	
Deliverable Title	
Dissemination level	
Main authors	Ioana Spanache, PhD Nastasia Belc, PhD Ioana Trif Raluca Ciobotaru
Contributors	
Quality Assurance	n.a.

Project co-funded by European Union funds (ERDF, IPA).

Contents

Abbreviations

ERDF - European Regional Development Fund

ERIC - European Research Infrastructure Consortium

IBA - Romanian National Institute of Research and Development for Food Bioresources

IMB - Institute of Molecular Biology

INTERREG - European Territorial Co-operation

IPA - Instrument for Pre-Accession Assistance

MES - Ministry of Education and Science

NRRI - National Roadmap for Research Infrastructures

RI - Research Infrastructure

SME - Small and medium-sized enterprise

UEFISCDI - Romanian Executive Agency for Higher Education, Research, Development and Innovation Funding

1 Introduction

The peer learning exercise was implemented in accordance with the Methodology guide for the peer learning process (Working Package 5 „Pilot Actions“) within the project “Facilitating macro-regional scope and link up to socio-economic actors of Research Infrastructure in the Danube Region - ResInfra@DR”.

The ResInfra@DR project is funded under the INTERREG Danube Transnational Programme supported by European Union funds (ERDF, IPA) and co-funded by project partners or from national public co-funding and state contributions. For a more detailed information about this project and the results, please consult: http://www.interreg-danube.eu/approved-projects/resinfra-dr.

The aim of this pilot activity was to find and identify good practices, new approaches and critical success factors regarding research infrastructure (RI) processes in the Danube macro-region. In addition, a reflection of this process itself revealed the potential of similar mutual support actions in the Danube macro-region, and how far similar actions should be included in a joint action plan. Moreover, the pilot activity focused on the support given to research

infrastructures as they concerned with management challenges during their regular operations or specific phases of their establishment.

In this context, the participants in this peer learning exercise were the Institute of Molecular Biology (IMB) from the Bugarian Academy of Sciences, represented by Prof. Stoyno Stoynov, PhD, on the one side, and the Romanian National Institute of Research and Development for Food Bioresources (IBA), represented by Nastasia Belc, PhD. And, as this report refers to

IMB is the leading national research institution in the area of molecular and cellular biology and biochemistry in Bulgaria. The Institute also serves as a Bulgarian Node for the Center for Advanced Light Microscopy Euro-BioImaging, the latter being a pan-European Research Infrastructure, included in ESFRI, and on the path of becoming an ERIC. The aim of IMB as a Bulgarian Node for Euro-BioImaging is to provide open access to innovative biological and medical imaging technologies to internal and external users from Bulgaria and abroad. As a single-sited RI, IMB aims to provide experts, services, equipment and training for performing cutting-edge research by using imaging technologies.

The main results of this activity consist of this present report, with recommendations formulated by the peer learning team, and another report focused on learning outcomes and transferable recommendations. The later will also be used at project level, for comprising a final synthesis report, summarizing all findings and experiences resulted in the ResInfra@DR project. These two results represent the deliverables of this pilot activity. This report contains recommendations as a result of the peer learning process and can be taken up where deemed feasible and useful by the Institute of Molecular Biology.

Moreover, the recommendations developed by the peer learning team were also presented at the RESINFRA@DR Know-How Exchange Forum in Bratislava, Slovakia, on May 22-23, 2019. The aim of this was to identify, together with project partners and external experts, what are the transferable recommendations, as same as to share experiences and to create a basis for reflection for other relevant stakeholders.

It is important to mention that the results and recommendations formulated by the peer learning team do not include a peer review or systematic assessment which would be normally necessary to contribute to funding decisions or other internal key decisions, but the team consider that the recommendations might feed the internal discussions within the RI, can give a specific and informed feedback and can provide recommendations for the future development to the RI.

The institutions involved in this peer learning exercise are the following:

❖ *Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI) – ResInfra project partner in Romania*

Facilitating macro-regional scope and link up to socio-economic actors of Research Infrastructure in the Danube Region (ResInfra@DR)

Executive Agency for Higher Education, Research, Development and Innovation Funding

❖ *Romanian National Institute of Research and Development for Food Bioresources– IBA Bucharest – Romanian Node of METROFOOD RI*

❖ *Institute of Molecular Biology, Center for Advanced Light Microscopy Euro-BioImaging, Sofia, Bulgaria*

Bulgarian Academy of Sciences

Institute of Molecular Biology "Roumen Tsanev"

Bulgarian Advanced Light Microscopy Node at the Institute of Molecular Biology "Roumen Tsanev"

❖ *Ministry of Education and Science, Bulgaria*

РЕПУБЛИКА БЪЛГАРИЯ
Министерство на образованието и науката

The peer review report was elaborated by: Ms. Ioana Spanache, Ms. Raluca Ciobotaru and Ms. Ioana Trif from the Romanian Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI) and Ms. Nastasia Belc, General Director of the Romanian National Institute of Research and Development for Food Bioresources (please see the table below).

Project co-funded by European Union funds (ERDF, IPA).

Table: Experts involved in the elaboration of the peer learning report Roles in the process

Team leader (partner)	Team member - Thematic external expert	Optional team member (partner)	Team member (partner)	Optional team member (partner)
Ioana Spanache, PhD (UEFISCDI)	Nastasia Belc, PhD. (IBA)	Raluca Ciobotaru and Ioana Trif (UEFISCDI)	Prof. Kostadin Kostadinov (MES BG)	Kalin Mutavchiev (MES BG)

This report is elaborated based on the responses provided during the interviews with representatives of the Institute of Molecular Biology and relevant stakeholders, as well as on the self-assessment questionnaire. All the interviews, written and online have been processed and analyzed by the peer learning team and were taken into account when formulating the recommendations within this report.

The methodological approach for this exercise is comprehensive and consists of: desk research (documentation about the RI), face to face and written interviews with stakeholders, and on site visit to the Institute of Molecular Biology.

Thus, we thank the representatives of the Institute of Molecular Biology and the involved Bulgarian stakeholders for all the information provided and the documents submitted, which contributed to the results of this peer learning exercise, as well as for the availability to participate in all interviews.

We are grateful to the Bulgarian ResInfra@DR partners, the Ministry of Education and Science and Applied Research and Communications Fund for the support in making the necessary arrangements for the interviews, but also for facilitating communication with the relevant selected stakeholders.

2 Summary of the self-assessment questionnaire

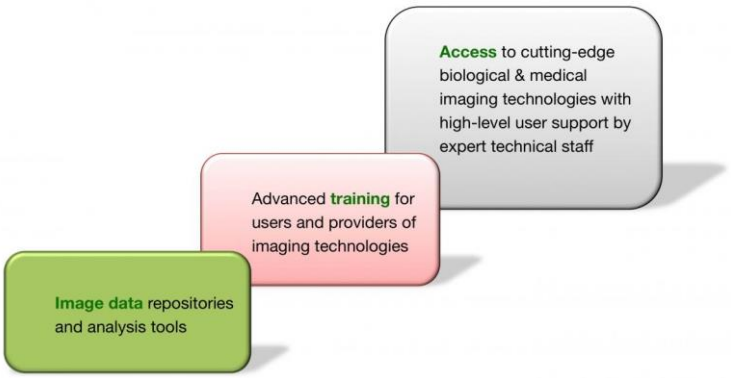
The main elements from the self-assessment questionnaire of the Institute of Molecular Biology are presented below and their focus is on IMB ‘s mission and activities, performance to date, the international dimension of research within the RI, use of infrastructure facilities and equipment, human resources, risk management, challenges encountered and other relevant aspects.

Section 1: Research programmes / activities of RI

Mission and types of activities

The mission of the European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences (Euro-BioImaging, EuBI or EuBI ERIC) is to **establish and operate a distributed research imaging infrastructure across Europe that provides open physical user access to a broad range of state-of-the-art technologies in biological and biomedical imaging for life scientists.** In addition, EuBI will offer image data support and training for infrastructure users and providers.

Type of activities it intends to provide:



a) open physical access to imaging infrastructure;
b) advanced expertise and services for technology users;
c) training for technology users, facility staff and technology experts;
d) data analysis and storage support for user-generated image data;
e) open virtual access to image analysis software and image data repositories of public interest;
f) high-quality standards for image acquisition, training and data management;
g) European-level coordination and integration activities for the scientific imaging communities; and
h) any other activity to fulfil its principal task.

Sofia Center for Advanced Light Microscopy EuroBioImaging (http://dnarepair.bas.bg/eurobioimaging.bg/site/)

The mission of the Sofia Center for Advanced Light Microscopy is to provide open access to innovative biological and medical imaging technologies for internal and external users from Bulgaria and abroad. The Center aims to provide experts, services, equipment and training for performing cutting-edge research by using imaging technologies.

Performance to date

Regarding the performance to date, the objectives and results of the research programmes/ activities of the RI (planned vs. achieved) in 2015-2017 were the following:

Set objectives	Results achieved

- to support between 30 and 40 research projects in being successfully completed	36 research projects successfully completed
- to publish more than 80 scientific papers in peer-reviewed journals	96 research papers published in peer-reviewed journals
- to publish more than 3 papers in top quality journals (papers with impact factor > 10)	4 papers published in top quality journals

The international dimension of research within the RI

IMB-BAS and the RI have gained international recognition and experience through **cooperation with outstanding research organizations** (The Institute of Cancer Research, London UK, Max Planck Institute of Molecular Cell Biology and Genetics, Dresden Germany, Herbert Irving Comprehensive Cancer Center, Columbia University, New York, USA, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, Johns Hopkins University, Baltimore, MD, USA). IMB-BAS participated in several **projects under H2020, FP7, FP6, FP5, and Erasmus Plus**. Cooperation between Bulgarian scientists and international teams benefit from the RI. For this stands proof the papers published in high quality journals.

Moreover, IMB becoming part of the pan-European RI has led to an increased participation of its research groups in international projects and in field-specific scientific networks.

Challenges encountered

1. Low number of international patents;
2. Comparatively low number of international projects;
3. Weak commercialization of results obtained in research projects;
4. Insufficient number of specialized equipment;
5. Not sufficient visibility at national and international level;
6. Not sufficient collaboration with stakeholders from the field;
7. Not sufficient training for students – in order to increase the number of staff.

Future tasks challenges expected (1-2 and 2-5 years)

8. To completely build our scientific infrastructure;
9. To increase the visibility of the available infrastructure among potential national and international scientific and business users;
10. To train potential users of our infrastructure and acquaint them with its functions and potential.

Section 2: Infrastructure equipment

Infrastructure facilities and equipment

IMB consists of 4 departments and 2 laboratories (http://www.bio21.bas.bg/imb/) and currently employs 78 scientists.

All departments and laboratories provide their own experimental facilities that include standard molecular and cellular biology equipment and are also open to users across the Institute. In addition to facilities and instrumentation managed by the units, the Institute provides its scientists with core research facilities.

Equipment and research facilities available: Zeiss Axiovert 200M fluorescent microscope, a newly acquired unique spinning-disk confocal system for live cell studies Andor Revolution XDi, micro-irradiation and FRAP modules, high-performance objectives and the best available cameras, an Orbi-Trap Elite mass-spectrometer, an Illumina MiSeq next generation sequencer, gel-doc systems, infrared imaging system (LICOR Biosciences Odyssey), real-time PCR system (RotorGene 6000, Qiagen), flow cytometer (Becton Dickinson FACSCalibur), ITC DSC nano-calorimeter (Microcal), issue culture laboratories.

The services provided by IMB-BAS include administrative support, technical support, computer and networking support, a library with a seminar room (seating up to 50 people) and access to a conference room (seating up to 200 people).

During the latest evaluation exercise executed by the **European Science Foundation**, the Institute received an **AAA score** (for quality/productivity, socio-economic impact and prospects).

The institute has previously won a grant under the "Development of the Competitiveness of the Bulgarian Economy" Operational Program (EU structural funds), which allowed it to significantly upgrade its research facilities and equipment.

Planned upgrading

IMB plans to renovate several laboratories and to accommodate new scientific equipment for the RI. In the next 4 years, according the National Roadmap for RI, IMB BAS will receive an annual funding between 700 000 and 1 million euros for new microscopy equipment.

Use of equipment and facilities

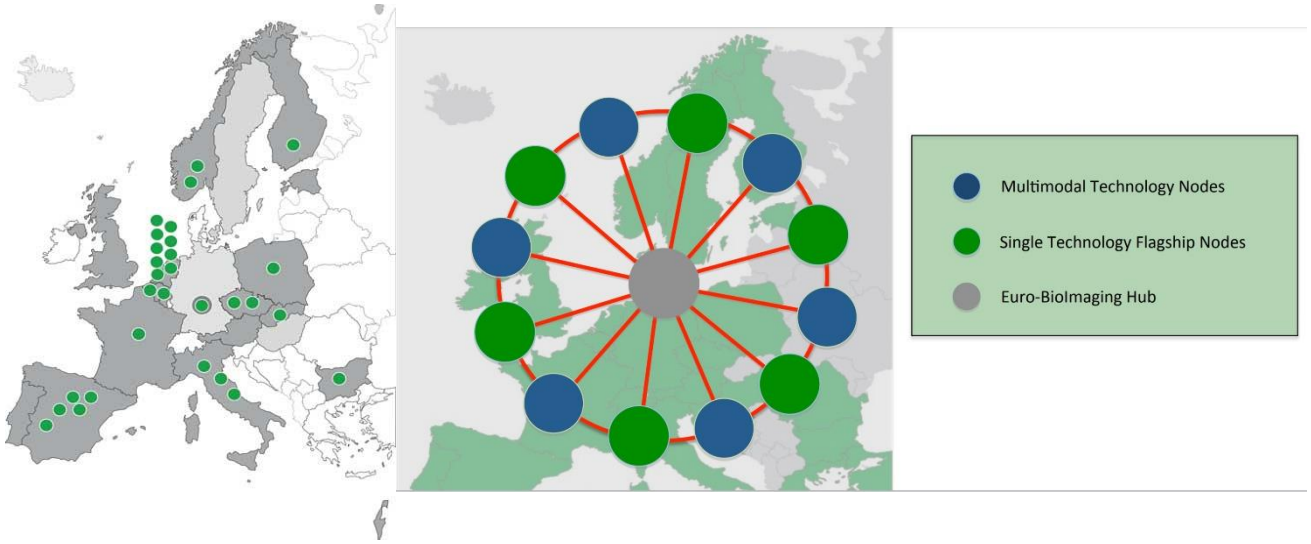
For the RI's own RD;	**45%**
By students or for teaching purposes;	**5%**
Rented out to industry/ other centres for commercial purposes;	0 %

Other types of uses/ users, please specify. **External users**	**50%**

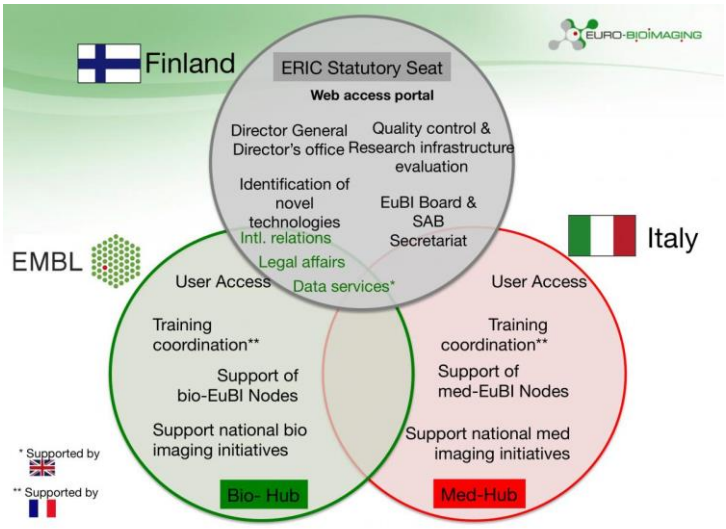
A major challenge in this regard is that the usage and maintenance of the infrastructure is quite expensive, which leads to high prices for external users of the RI. To deal with this, the RI together with EuroBioImaging Consortium applied for a Horizon2020 grant, which will cover the expenses of the external users of the RI.

Section 3: Management of the RI

Euro-BioImaging Consortium



Risk management



Description of risk	Proposed risk-mitigation measures
Inability to identify and attract enough external users, which are	The visibility of the RI and connections with the partners from EuroBioImaging Consortium

necessary for the sustainable development of the RI.	minimizes such a possibility.
Loss of key expertise („brain drain"), which is critical for the proper function of the RI.	The participation in the National Roadmap for Scintific Infrastructure, in Horizon2020 programmes such as PP2 and Global BioImaging and national scientific programmes should ensure sufficient financial support to attract qualified young researchers to work in the RI.
Insufficient financial resources for completely equiping the RI.	The participation in the National Roadmap for Scintific Infrastructure and the availability of European Regional Development Funds minimizes this risk.

Relations with key stakeholders

IMB is cooperating with different stakeholders at European level, being a member in the following associations: European Light Microscopy Initiative ELMI (https://www.embl.org/elmi/); The European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences (Euro-BioImaging (http://www.eurobioimaging.eu/); Network of European BioImage Analysts to advance life science imaging (NEUBIAS) https://www.cost.eu/actions/CA15124 https://www.cost.eu/actions/CA15124.

Section 4: Human resources

Human resources	**Headcount**	**% of work conducted at the RI**
Scientific staff directly engaged in the RI	8	30
Staff engaged with educational purpose in the RI	2	20
Staff in the infrastructure management role	1	30
Technicians of the RI	1	30

Training and professional development

The Bulgarian Node RI has a **dedicated plan for training** its staff. Every user is trained before getting to use the facilities and equipment of the RI.

Moreover, the RI is participating in the **Job shadowing program** Global BioImaging H2020 project, in which an imaging facility hosts a person coming from an international partner imaging facility to share with him/her experience and knowledge on a certain type of work related to the facility itself. To each guest researcher, an accompanying experienced local researcher is assigned, who offers support to him/her while performing the job. This allows facilities to establish or strengthen collaboration and to learn from each other, how to improve their efficiency in various aspects of their work functionality.

Participation in **international courses** is another way through which the RI staffs benefit of training. The Bulgarian Node has an **agreement with EMBL-BioImaging for training of staff** and sharing of experience regarding the management of the imaging infrastructure.

Section 5: Interaction with external users

The RI has a **detailed procedure when it comes to external user access**. For this, a dedicated webpage is utilized, serving as an access portal, and which is integrated with the access portal of the consortium (http://dnarepair.bas.bg/eurobioimaging.bg/site/Apply_for_access.html).

Euro-BioImaging (EuBI) users use this Web Access Portal as a virtual entry point to the Bulgarian Node and all other EuBI Node Candidates, which offer access to imaging technologies and services. In addition, potential users can receive assistance even in cases in which they do not know exactly which types of services and technologies they need.

Note: EuBI encourages users to discuss potential applications with the contact person at the prospective EuBI Node Candidate(s) before submitting an application, to make the application as strong and successful as possible.

Every application goes through **two stages of evaluation**. The first evaluation stage consists of a process of scientific review, conducted by two external reviewers, who are leading experts in the field. If the application passes the first review, it is sent to the RI for a technical feasibility review. The whole procedure, until final notice of acceptance/rejection, takes 3-4 weeks.

Section 6: Financial practices

Budget description

The total annual budget of the RI was 754 000 Euros. Out of which:

- 700 000 Euros were dedicated to buying new equipment;
- 10 000 Euros were dedicated to laboratory reconstruction and renovation;
- 32 000 Euros were for salaries of the RI staff;
- 12 000 Euros were for buying consumables.

3 Summary of interviews

The list of interviews undertaken is the following:

No.	Institution/ Organization	Category
1.	Microna Ltd	business enterprise
2.	Trifonov Inovatix Ltd.	business enterprise
3.	Institute of Plant Physiology and Genetics, Bulgarian Academy of Sciences (BAS)	research organisation
4.	Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences	research organisation
5.	Sofia University "St. Kliment Ohridski", Physics Department	research organisation
6.	Institute of Mechanics	research organisation
7.	Ministry of Education and Science	RI funding organisation
8.	IMB	RI hosting organisation

The main elements from the face-to-face and written interviews are presented below and are focusing on 'IMB relation to local/public authorities and business sector, communication, socio-economic impact and other relevant aspects for the peer learning exercise.

Staffing and resources

The IMB has the youngest research staff among other RIs on the National Roadmap - 50% under the age of 30 years.

Communication and outreach

Outreach

Means of dissemination/promotion: presentations to scientific community and society, presentations regarding research results, lectures, word of mouth, via e-mail, by publishing scientific results obtained through joint research activities.

The Ministry of Education and Science (MES) also supports RIs' outreach through field-specific joint information days. And even encourages the formation of clusters. Moreover, MES is working on developing a national portal for ensuring visibility of RIs and of their national scientific programs.

Communication

Within the Science Directorate from MES, each RI has two experts assigned to it.

Relation to Higher Education

IMB and the Institute of Plant Physiology plan to start new joint research projects which will also include providing training to PhD students and university students in advanced imaging techniques in plant science. Moreover, they wish to attract more young people to imaging techniques.

Relation to local/ public authorities

Relation with the Ministry of Education and Science (funding organization)

- IMB became part of the Bulgarian Roadmap with Research Infrastructures since 2014, as a result of a process of international evaluation (together with other 19 national RIs);
- IMB is part of a group of 12 national RIs part of larger, pan-European RIs;
- in 2015, IMB received funding through a H2020 project, for setting up an ERIC.

Relation to/ cooperation with business

IMB, as part of the National Roadmap with RIs, is allowed by MES to provide a maximum of 20% usage to business partners.

⇨ All significant research complexes, included in the National Roadmap for Research Infrastructure (NRRI), have a commitment to develop a Management Plan, including clearly defined access conditions to research infrastructures, application forms for providing specialized services to citizens and business, where applicable. The free access to modern RI does stimulate career development of scientists.

Forms of interaction with the private environment:

- research co-operation (joint research);
- conducting research by yourself, using RI equipment/ technology;
- RI participation in SME innovation activities;
- expertise, consultation, advisory.

Microna (SME – 5 employees, founded through a program for start-up companies financed by the Ministry of Economy)

- IMB has been co-operating with Microna Ltd. for 10 years, as the latter is working on developing robotic systems for manipulation of biological objects and biological cells. Their collaboration is based on Microna needing IMB's expertise and equipment in

the field of microbiology. Their co-operation is based on projects, and not on economic forms.

Trifonov Inovatix Ltd. (SME)

- relation of co-operation of bilateral nature of 2 years based on IMB offering expertise and research consultancy to the SME regarding imaging and the evaluation of the cell growth and proliferation.

Relation with other research performing organisations

Institute of Plant Physiology and Genetics, Bulgarian Academy of Sciences (160 employees of which 60 are research staff)

- relation of co-operation of 5 years with IMB;
- based on exchanges of expertise and access to IMB's equipment, sharing of research data and results;
- participating in joint research projects;
- physical proximity of the two institutes has also facilitated the collaboration between them;
- their collaboration with IMB has contributed to the consolidation of their projects and activities portfolio, which has led to obtaining funding for new projects.

Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences

- relation of co-operation of 2 years with IMB;
- based on using IMB's equipment; their collaboration would deepen if certain pieces of equipment (in microscopy) would be acquired by IMB.

Institute of Mechanics

- relation of co-operation of bilateral nature of 10 years with IMB, based on undergoing mid-term joint research activities (cell research), and on sharing research data and results (not based on economic contractual agreements).

Sofia University "St. Kliment Ohridski", Physics Department

- relation of co-operation of bilateral nature of 5 years with IMB, based on joint research activities, and not on contractual agreements;
- scope: research for the development of new pieces of equipment.

Monitoring practices and methods

Monitoring and evaluation by MES

The implementation of the Roadmap and the construction of research complexes is a subject to a permanent international monitoring and evaluation, regarding the effectiveness of their

participation in the European Roadmap, their research and technological programs, and their activities. The monitoring of the NRRI implementation envisions is a responsibility of a Standing Committee of NRRI - as a consultative body to the Minister of Education and Science.

The long-term funding and sustainability of the National Roadmap requires that it is included in the medium-term budget forecast of the Ministry of Finances, as part of the planned public expenditure for the development of science in Bulgaria, and in line with the planned funds under the National Research Development Strategy.

Financial sustainability

All the RIs included in the roadmap have business plans elaborated with the financial support of MES. As for the budget planning, MES annually invites RIs managers to submit information with annual working programme for construction, upgrade, operational needs and HR funds to us. The Standing Committee discusses and proposes to the minister prioritization for next year funding of the Roadmap RIs. In this process RIs are responsible to report the services provided to the society and the economy.

Socio-economic impacts

The research conducted by IMB together with the Institute of Plant Physiology and Genetics is focused on integrating efforts for the protection of human health and climate change mitigation, which contribute to the solving of important social problems, related to life quality and provides technology transfer between plant biology and medicine.

From the perspective of MES:

RI is in the construction period. The expected benefits are:

The development of the infrastructure will enable researchers to take advantage of avant-garde microscopy techniques for monitoring fixed and living cells for studying a wide variety of questions in biology, medicine and biotechnology.

Providing of free access to an advanced microscopic technology through the creation of the Centre for modern biomedical microscopy as part of the international Euro-BioImaging infrastructure will increase the opportunities of the Bulgarian scientists to develop both fundamental research and development. The establishment of a system for sharing technologies and equipment between science and business will facilitate the conceptual and technological integration of biomedical researches of Bulgaria in the EU.

In longer term the creation of biomedical products with protected intellectual property as drug products, other biologically active substances, tests with applications in diagnostics and forensics and more will be stimulated. The opportunities for knowledge transfer from the field of science into the field of production for turning technological design into real production product technology with high added value will expand. This research infrastructure will increase the competitiveness of the Bulgarian economy in the field of health and biotechnology and will help build a modern economy based on knowledge and scientific achievements.

4 Summary of the visit (practical details)

The peer learning exercise has taken place at the Institute of Molecular Biology, Academy of Sciences, Sofia, Bulgaria on December 13-14, 2018.

The international expert team agreed with the Institute of Molecular Biology on a 2 day on-site visit to the RI and the related agenda (please see the annex).

The team conducted interviews with the following core stakeholders of the RI: Institute of Plant Physiology and Genetics (December 13, 2018), Microna Ltd (December 13, 2018), Sofia University "St. Kliment Ohridski" - Physics Department (December 13, 2018), Trifonov Inovatix Ltd (December 13, 2018) and Institute of Biophysics and Biomedical Engineering (December 14, 2018).

Furthermore, a skype interview was organized in April 2019 with the representative from the Bulgarian Ministry of Education and Science. The stakeholders within the research infrastructure mentioned above were public and private organizations (RI funding institution, research organization, business enterprise) and were selected in order to have a more comprehensive picture of the RI.

The interviews were held based on the interview guideline within the Methodology guide for the peer learning process. Considering the variety of stakeholders and the specific focus, additional questions were addressed by the team members to fit the objectives of this peer learning exercise.

The interview guideline and the core questions were communicated by the peer team in advance to the stakeholders interviewed.

As foreseen, the team and the final recipients of support (the involved research entities and infrastructures) met during the two day visit to reflect on the current challenges of the RI and to support the Institute of Molecular Biology who is the main beneficiary of this activity.

After the visit, the peer learning team processed the audio recordings of the interviews and the data obtained from the Bulgarian experts and elaborated the transcripts of the interviews

in order to have a better understanding of the RI and the relation between the RI and relevant stakeholders.

Thus, this peer learning exercise has facilitated a dialogue process between the RI and the relevant stakeholders in the Danube macro-region and it helped the RI in improving its operation mode and performance.

5 Information on the peer learning team

Table: Roles in the process of the team who participated on the 2 day on-site visit to the IMB

RI host	Team leader (partner)	Team member - Thematic external expert	Optional team member (partner)	Team member (partner)	Optional team member (partner)
Institute of Molecular Biology (December, 13-14, 2018)	Ioana Spanache, PhD (UEFISCDI)	Nastasia Belc, PhD. (IBA)	Raluca Ciobotaru (UEFISCDI)	Prof. Kostadin Kostadinov (MES BG)	Kalin Mutavchiev (MES BG)

Roles and core functions of team members (brief description):

Team leader (ResInfra@DR partner) – Ioana Spanache, PhD (UEFISCDI)

- Co-ordination of team work;
- Interaction with the RI on organizational issues of the process;
- Contribution to recommendations.

Thematic expert from the pair RI – Nastasia Belc, PhD (General Director of IBA)

- Maintaining thematic focus;
- Core drafting of recommendations.

Team member in the country of the host RI – Prof. Kostadin Kostadinov, PhD and Kalin Mutavchiev (MES Bulgaria)

- Providing access to relevant stakeholders and facilitating the communication with the RI;
- Providing logistic support during the on-site visit;
- Contribution to recommendations.

Optional team members (ResInfra@DR partner) – Raluca Ciobotaru (UEFISCDI)

- Supporting the team coordinator;
- Contribution to recommendations.

6 Outcomes of the on-site visit

One of the aim of this pilot action was to find and identify good practices, new approaches and critical success factors. During the on-site visit the following good practices were observed:

6.1 Good practices

- sharing of expertise and equipment – certain pieces of equipment are expensive to buy and maintain, thus it is not economically feasible for each research institute to try to acquire it. Rather, it is preferable that, each research institute acquires the equipment according to its field, and then it can be shared.
- the RI is open to work with start-up companies, by offering expertise and access to its equipment.
- IMB and Microna Ltd (SME) are complementing each other when implementing activities, which leads to new opportunities for further cooperation on different projects, joint capacity, sharing the administrative burden of a project.
- the constant character and open-mindedness of IMB as a success factor in establishing partnerships.

6.2 Areas for improvement

- Absence of enough funding for interdisciplinary projects implemented by research infrastructures and scientific groups.

7 Recommendations

The results of this first pilot activity consist of a set of practical recommendations addressed to the Institute of Molecular Biology, which may contribute to the future development of the RI and deciding on the steps to undertake in the near future. Based on the findings and the conclusions drawn and on an in-depth methodological approach, a number of recommendations were formulated. The recommendations can be taken up where deemed feasible and useful by the IMB.

The recommendations at case are focusing on the following main elements relevant for the research infrastructure.

7.1 Organisational structure

The Center for Advanced Light Microscopy Euro-BioImaging is part of the European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences (Euro-BioImaging, EuBI or EuBI ERIC).

The Bulgarian Advanced Light Microscopy Euro-BioImaging Node is part of the Institute of Molecular Biology "Roumen Tsanev" (IMB), under the Bugarian Academy of Sciences.

IMB is a single-sited RI in Bulgaria and it provides experts, services, equipment and training for performing cutting-edge research by using imaging technologies.

IMB became part of the Bulgarian Roadmap with Research Infrastructures since 2014, as a result of a process of international evaluation (together with other 19 national RIs). IMB, as part of the National Roadmap with RIs, is allowed to by the Ministry of Education and Science to provide a maximum of 20% user access to business partners. IMB is one of the RIs in a group of 12 national RIs which are part of larger, pan-European RIs. And, in 2015, Euro-BioImaging received funding through a H2020 project, for setting up an ERIC.

Recommendations:

1. The organisational structure could comprise a physical-RI – equipment, labs, etc., and an e-infrastructure, for communication with other nodes and data collection (data management).
2. Considering communication, a Strategy for Communication should be elaborated. Moreover, when it comes to data collection, **Data Management rules should be established.**
3. For the e-Infrastructure, and not only, an access policy needs to be defined, including administrative and legal aspects.
4. All these issues should be based on an overall **Quality Management Plan.**

7.2 Staffing and resources

The infrastructure has the youngest research staff among other RIs in the National Roadmap: 50% of its research staff is under the age of 30 years. The RI has a training plan for its staff and an agreement with EMBL-BioImaging facility for training its staff and sharing experience about the management of the imaging infrastructure.

Recommendations:

1. **A Human Resources Policy** should be defined in order to assure the RI's sustainability - which should comprise: Recruitment (recruitment strategy) and Selection, Involvement, Training, Development, Education, Work Conditions, Competency-Based Performance Appraisal and Compensation and Rewards (CR).

7.3 Communication and outreach

The core components of an RI are networking partnership, multilevel leadership, planning, resources and knowledge output, whereas a Quality Documentation System, Data Management and **Communication Strategy** are supportive components.

Recommendations:

1. The communication over the internet should use HTTPS (SSL) and secured interfaces such as Oauth.
2. Communication practitioners should be committed to promote and disseminate, at different levels and by involving all relevant stakeholders as well as potential users of the RI (e.g. to scientific and technical audience, to official/public bodies and policy makers, to industry, to wide public, on the markets), the identity of the business of the RI, including its mission, its vission and objectives, values, distinctive features, services, positive impact on society and daily life. They should have technical skills on communication media, as well as regarding marketing and advertising, with high communicative and relational capacities.
3. The information available on the RI's webpage should be customized for different types of persons looking for information. It can take into consideration the academic environment/researchers; public and private laboratories; policy makers; industry and producer associations; consumers/citizens and consumer associations.

7.4 Research management

The priorities in terms of research can be identified through Exploratory Workshops or other brainstorming sessions in which all type of stakeholders should participate. Protocols on how research should be conducted need to be established.

Recommendations:

1. Building up a Strategic Research Agenda;
2. Ellaborating a Plan for Institutional Development;
3. Identifying complementary RIs;
4. Identifying relevant national and international stakeholders and their needs in terms of collaboration.

7.5 Relation to local/public authorities

Users should be identified and categorised as part of the business plan and as part of a Stakeholders Analysis. Users can be categorised into four groups, which are industry, policy makers, research/academic, and consumers/citizens. Within each category, further user groups can be identified.RI delivers different services, some of them free of charge, mainly

related to the e-infrastructure, and some other which are paid, addressed to different user categories (Research/Academia, Policy Makers/ Industry/companies, Consumers/ Citizens). It can be estimated that they will access the Infrastructure in different proportions based on the different types and modes of access and depending if the physical or the electronic infrastructure is considered.

In particular, "individuals" are much more related to consumers and the general public, industry, students involved in e-learning, to the e-infrastructure and to virtually accessing the RI, while "teams" are much more related to research/academic (including researchers, doctoral candidates, technical staff and students participating in research in the framework of their studies or in training programmes) and with a major involvement in the physical RI, and "Institutions" are mainly related to the category Government/Policy makers and other official bodies.

Recommendations:

1. The RI should identify what type of services can support policy makers and other public authorities in defining their policies.

7.6 Relation to Higher Education

Higher education organizations can be used as a resource for the infrastructure's staff.

Recommendations:

1. Students could participate in internships within IMB;
2. Continue the practice of involving master and PhD students in research projects;
3. **Students to be trained in using the facilities of the Center for Advanced Light Microscopy Euro-BioImaging.**

7.7 Relation to/ co-operation with the business environment

Recommendations:

1. Collecting information about the existing needs in relation to services (research, analytical, consultancy, acces to RI) at national and international level;
2. Ellaborating an offer of RI services: e.g. acces to infrastructure, research and analytical services, collaboration in projects etc.

7.8 Monitoring practices and methods

Recommendations:

1. **Apointting a Quality Manger.**
   The Quality Manager(QM) role will consist of coordinating the activities required to meet the RI's quality standards, monitoring and advising on the performances of the quality management system, producing data and reporting on performance, and measuring against sets tandards (Key Performance Indicators).

Other monitoring activities:

- monitoring data management across all data providers;
- monitoring and evaluation of the dissemination strategies;
- monitoring the status of performed activities;
- monitoring of acces to the RI;
- monitoring of risks.

7.9 Risk management

Risk management is an ongoing process which takes place during the entire life of the RI, and IMB needs to have effective procedures for coordinating and monitoring risks, with clear roles and responsibilities for each person involved in the process.

The purpose of risk management is to ensure that the levels of risk and uncertainty are identified and then properly managed in a structured manner, so that any potential threat (level of resourcing, time, cost and quality) and the process of achieving of outcomes/benefits is properly managed.

The objectives of the risk management approach in relation to a RI are to identify, assess and mitigate risks where possible, and to continually monitor risks throughout its life time as other risks or threats emerge or a risk's impact or likelihood changes.

Where required, the process of risk identification, assessment and the development of countermeasures will involve consulting with other relevant stakeholders or with the Advisory Board (if there is one, e.g. the Bulgarian Academy of Science).

Risk management is an iterative process in which the effectiveness of control actions is constantly evaluated, new risks are discovered, and existing risks are reassessed. New or revised control actions are implemented as needed. By managing risks, the process helps

minimize cost impact, schedule delays, or the impact of other issue that could impede a progress. The iterative process continues until all the risks are closed or the project/activity is completed.

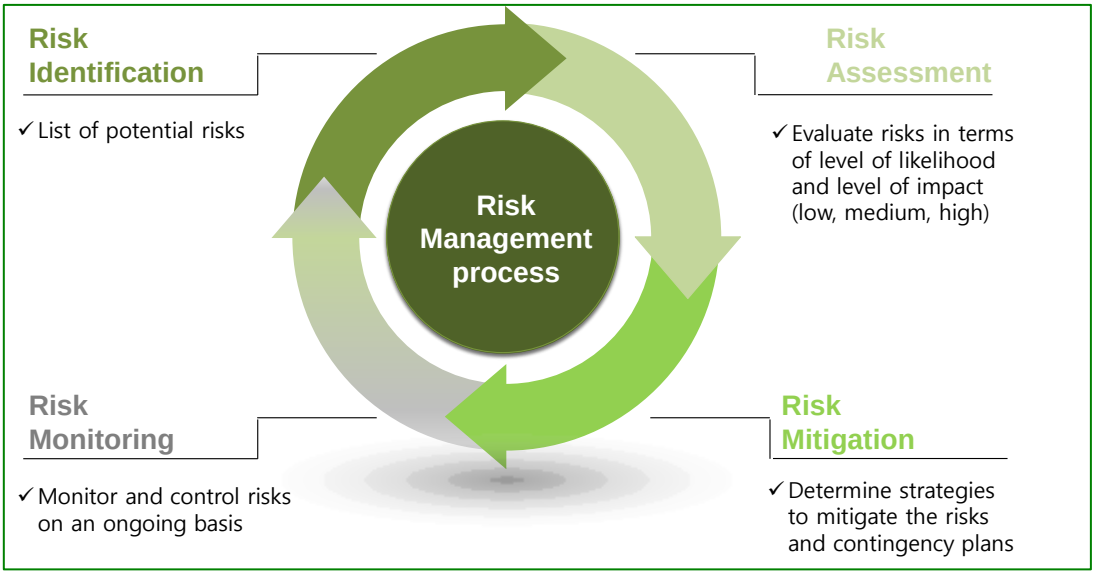
The risk management process is summarized in the following steps:

Risk Identification – Identify risks that may impact the successful completion of the undertaking. Risks associated with scope, cost, impact and schedule are identified by systematically challenging the assumptions;

Risk Assessment – Assess the risks to determine their likelihood and impact on the activities of the RI. This includes a qualitative and quantitative assessment of consequences (impact) of those risks, as well as the risks' probability of occurring;

Risk Mitigation – Determine the risk- handling strategy, whether (in order of preference) it is to avoid (eliminate), transfer (share), reduce or accept the risk;

Risk Monitoring – Risk reporting and tracking is mandatory to ensure a sound risk management process.



Recommendations:

1. Elaborating a Technical Analysis and developing Option Strategies on Risks (risk management process – identification, assessment, mitigation and monitoring).

7.10 Networking

Networking is a process used for increasing collaboration/cooperation. For a RI, networking in relation to its facilities is important in order to create a synergy among partners. Networking partnership is also another term which can be used.

Networking events can also be used to strengthen international networking and scientific cooperation in the research field of RI (biomedical) and for attracting the attention of potential new Partners/Collaborators and Users.

Networking opportunities should be envisaged to improve the seeking of new ways of cooperation and collaboration, of bridges between research institutes, universities and industry both at national and international level.

7.11 Financial sustainability

Recommendations:

1. For supporting the RI, an economic commitment of the Bulgarian Academy of Sciences/ Ministry of Education and Science should be addressed.

7.12 Socio-economic impacts

Social-economic impacts are:

Social impact:

Impacts on Science and Technology (including impact also on education and training of young researchers and European scientists);

Impacts on Data Revolution;Impacts on work and population;Impacts on Quality of Life;Impacts on Environment.Economic impacts:

- Competitiveness, Trade and Investment Flows;
- Labour Market;
- Economic Impacts on Consumers and Households.

Recommendations:

1. Creating a service chart of the physhical-infrastructure and, if possible, of the e-infrastructure;
2. Databases organization;

3. Tracking the RI's socio-economic impact.

8 Final remarks

The peer learning team hopes that the recommendations mentioned above will serve to feed internal discussions within the RI and will give a specific and informed feedback and support which will contribute to the efforts to strengthen its mode of operation.

9 Annexes

9.1 Annex 1 On-site visit agenda at the Institute of Molecular Biology, Sofia, Bulgaria, December 13-14, 2018

Agenda

Day 1 – 13 December 2018 (Thursday)

09:30 – 10:30 Welcome meeting and presentation of the Institute of Molecular Biology

10:30 – 11:00 Coffee break

11:00 – 12:00 Presentation of the Research infrastructure and the team

12:00 – 13:30 Working lunch

13:30 – 15:30 Presentation/guided tour of IMB laboratories

15:30 – 17:00 Meeting and discussions with the RI management and the team

17:00 – 17:30 Reflection session (peer review teams representatives of IMB)

19:00 Working Dinner – project partners, Romanian external expert and IMB BAS BG representatives

Day 2 – 14 December 2018 (Friday)

09:30 – 12:30 Stakeholder meetings (coffee breaks in-between)

13:00 – 14:00 Working lunch