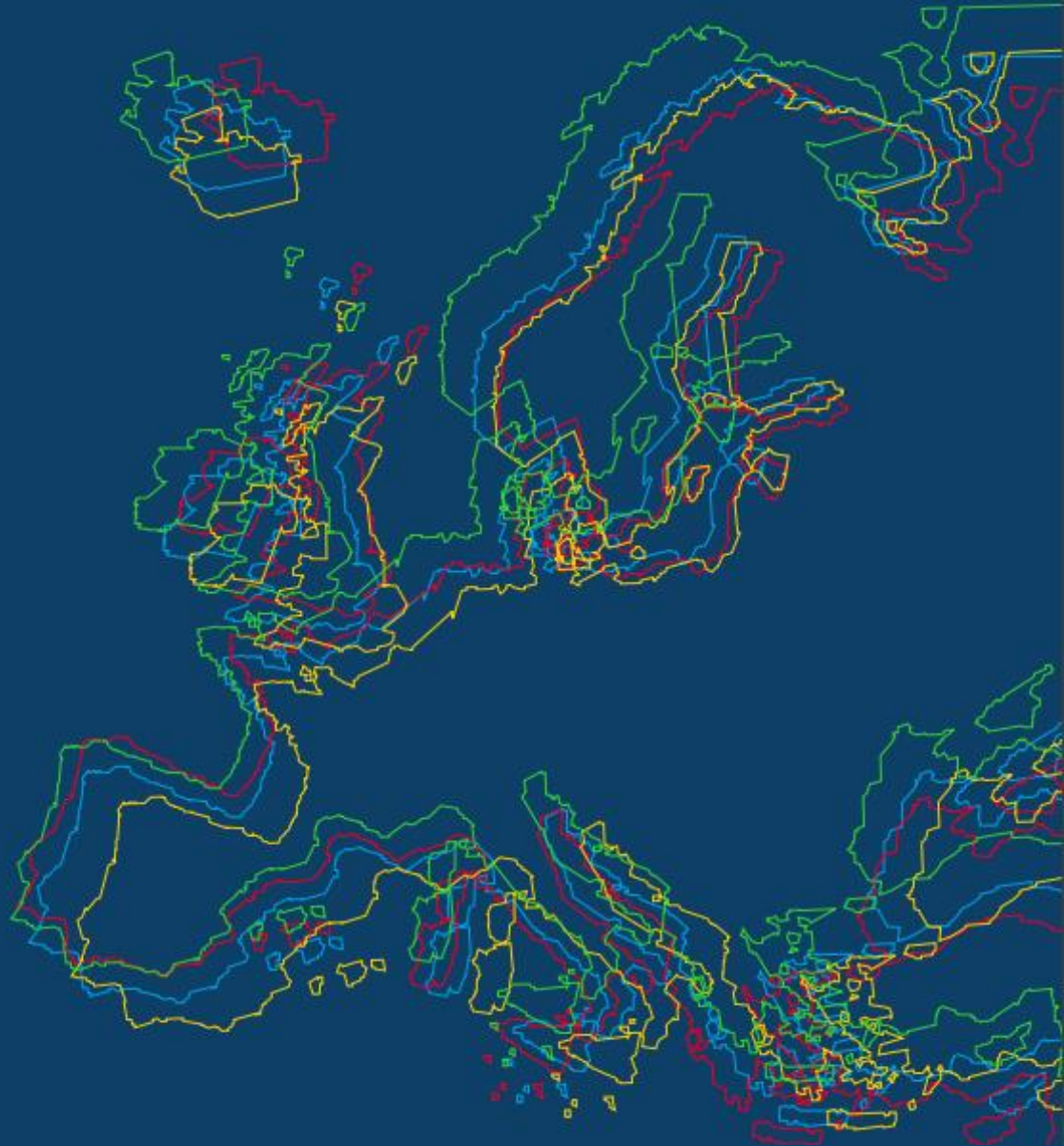




InRoad synchronising research infrastructure
roadmapping in Europe



InRoad deliverables 5.2 – 5.3

BEST PRACTICES AND COMMON STANDARDS FOR RI BUSINESS PLANNING



InRoad has been funded by the
European Union's Horizon 2020
Research and Innovation programme
under grant agreement No 730928.

BEST PRACTICES AND COMMON STANDARDS FOR RI BUSINESS PLANNING (D5.2 – D5.3)



InRoad has been funded by the
European Union's Horizon 2020
Research and Innovation programme
under grant agreement No 730928.

InRoad | 2

Authors: Patricia Vogel (NWO), Kas Maessen (NWO), Carme de Andres Sanchis (HGF), Annika Thies (HGF), Nataliia Voievoda (CNRS), Stéphanie Lecocq (CNRS)

InRoad partners would like to acknowledge the contribution of their collaborators Beata Lubicka (EIT+) and Katrien Uytterhoeven (NWO) to the data collection and analysis.

Brussels, 14. December 2018

Contents

EXECUTIVE SUMMARY.....	5
ABBREVIATIONS	6
INTRODUCTION	7
METHODOLOGY AND DATA COLLECTION	8
CONSULTATION	8
MAIN RESEARCH QUESTIONS.....	8
IN-DEPTH AND INDIVIDUAL CASE STUDIES	8
DEFINING THE CASE	8
SELECTION OF CASES	9
RATIONALE FOR THE SELECTION OF THE EMBRC, BBMRI AND NORWAY IN-DEPTH CASE STUDIES	9
METHODS FOR DATA COLLECTION	10
ANALYSIS AND REPORT DRAFTING	10
TEMPLATE FOR ANALYSIS REPORTS	10
IN-DEPTH AND INDIVIDUAL CASE STUDY REPORTS.....	11
GOOD PRACTICES	11
EVALUATION OF RI BUSINESS PLANS IN THE NATIONAL ROADMAP AND FUNDING PROCEDURES	12
FRANCE	12
GREECE	13
ITALY.....	14
CZECH REPUBLIC	14
THE NETHERLANDS	16
NORWAY	16
OTHER RELEVANT EXAMPLES	17
DEVELOPMENT OF THE BUSINESS PLAN	19
BUSINESS PLAN CONCEPTION, CONTENT, AND TEMPLATES USED FOR DRAFTING	19
INVOLVEMENT OF STAKEHOLDERS (CONSULTATION, FEEDBACK AND APPROVAL)	20
IMPLEMENTATION, REVISION AND UPDATE OF BUSINESS PLANS.....	20
USE OF BUSINESS PLANS AS A MANAGEMENT TOOL FOR INTERNAL RI MONITORING AND OPERATIONAL PERFORMANCE.....	22
LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES AND ITS LINK TO THE BUSINESS PLAN.....	24
MAIN SUCCESS FACTORS, CHALLENGES AND RISKS	24
FINANCIAL PLANNING AND FUNDING STRATEGY	26
FULL COST CALCULATION AND PLANNING FULL LIFECYCLE COSTS.....	28



IN-KIND CONTRIBUTIONS.....	29
USER STRATEGY AND ACCESS POLICY	31
CONSULTATION OUTLOOK.....	31
ACCESS POLICY DOCUMENTS AND ACCESS PROCEDURES.....	31
COST OF ACCESS AND USER FEES.....	32
DATA MANAGEMENT	33
SOCIO-ECONOMIC IMPACT	35
ACCOUNTING PRACTICES.....	36
SUPPORT MEASURES FOR RI BUSINESS PLANNING.....	37
CONSULTATION OUTLOOK.....	37
PERSPECTIVE OF CASE STUDY PARTICIPANTS.....	37
CONCLUSION	39
REFERENCES	40
ANNEX.....	43
QUESTIONS OF THE SECTION 3 IN THE INROAD CONSULTATION.....	43
EXEMPLE OF THE INTERVIEW GUIDE.....	44
ELEMENTS OF RI PROPOSAL AND EVALUATION CRITERIA APPLICABLE IN STUDIED NATIONAL ROADMAP PROCEDURES	47



EXECUTIVE SUMMARY

The aim of the present report is to bring together in a concise but comprehensive way the findings of the consultation and case studies carried out by InRoad on business planning practices in European research infrastructures (RIs) and on business plan assessments in national roadmap processes. The results are based on the case studies of business planning practices in different RIs, as well as a country-specific case study. Trends, good practices and existing bottlenecks are analysed to produce recommendations on business planning for RIs, and evaluation of business plans in view of RI roadmapping and funding. The findings and analyses from this report, as well as final recommendations on RI business planning, are presented in the [InRoad final report](#)¹.

¹InRoad final report, pp. 33–42 and 119–147



ABBREVIATIONS

AC	Associated Countries
ANR	French National Research Agency
BBMRI	Biobanking and BioMolecular Resources Research Infrastructure
CESSDA	Consortium of European Social Sciences Data Archives
CNR	Consiglio Nazionale delle Ricerche
EC	European Commission
ECCSEL	European Carbon Dioxide Capture and Storage Laboratory Infrastructure
EIB	European Investment Bank
EMBRC	European Marine Biological Resources Centre
EMBRIC	European Marine Biological Research Infrastructure Cluster
EPAnEK	Programme Competitiveness, Entrepreneurship and Innovation
ERA	European Research Area
ERDF	European Regional Development Fund
ERIC	European Research Infrastructures Consortium
ESIF	European Structural Investment Funds
ESFRI	European Strategic Forum for Research Infrastructures
EU	European Union
EU FP	EU Framework Programme for Research and Technological Development
European XFEL	European X-Ray Free-Electron Laser
FAIR	Findable, Accessible, Interoperable and Reusable
GDPR	EU General Data Protection Legislation
GSRT	General Secretariat for Research and Technology
ICTS	Unique Scientific and Technical Infrastructures (es. Instalación Científico-Técnica Singular)
IPR	Intellectual property rights
KPI	Key Performance Indicator
LIMS	Laboratory Information Management System
MESRI	French Ministry for Higher Education, Research and Innovation
MEYS	Czech Ministry of Education, Youth and Sports
MS	Member States
PNIR	Programma Nazionale per le Infrastrutture di Ricerca
R&D	Research and Development
RCN	Research Council of Norway
RI	Research Infrastructure
RIS3	Research and Innovation Smart Specialisation Strategies
RTW	Regional Technical Workshop
TNA	Transnational access
UHR	Norwegian Association of Higher Education Institutions



INTRODUCTION

The present report merges two deliverables corresponding to the InRoad tasks 5.2 ('Collection of information on the business plan evaluation in the national RI roadmapping') and 5.3 ('Synthesis of best practices for business plans and discussion with the Reflection Group').

The respective objectives of these tasks were to investigate on one hand the practices of business planning in European RIs, and on the other hand, the national procedures of RI business plans assessments.

The task was performed using diverse data collection methods. In a first step, a common questionnaire was developed by InRoad partners, targeted at national policy making organisations involved in the RI roadmapping and funding procedures. The interaction with this target group was done primarily through an **online consultation**, with some additional insights being obtained via email exchanges. The third part of the questionnaire was dedicated to questions on business plan assessment. The feedback from the [InRoad consultation](#) was then further enriched with information from a desktop study of supplementary documents provided by the consultation respondents.

In the second step of data collection, a set of 'in-depth' and 'individual'² **case studies** were produced based on a series of interviews with RI managers and on an analysis of supporting documents provided by interviewees. One of the case studies also included an interview with a national funding organisation (the Research Council of Norway).

Some insights regarding RI business plans and associated challenges were obtained during [regional technical workshops](#) (RTWs) organized by InRoad. These workshops were dedicated mainly to discussing issues related to the RI funding landscape, to which the question of business planning is closely related.

This comprehensive investigation allowed the gathering of detailed information from various RI stakeholders (RI funders, national ministries, and RI managers) and provided a solid background. In this step, the findings from the individual interviews were combined in comprehensive case study analyses, which allowed the drafting of main **recommendations** regarding best practices for RI business planning and business plan evaluation. The recommendations were discussed with the Reflection Group at the InRoad Validation Workshop, and subsequently refined using feedback from Workshop participants. InRoad's policy recommendations on business planning are presented in the InRoad final report and D5.4.

Finally, InRoad members would like to warmly thank everyone who offered their time to participate in the various stages of data collection, from the InRoad consultation to the case studies and interviews. Their involvement made it possible for InRoad to achieve its objectives, and to present the main findings and conclusions in the final report.

² A detailed description is provided in the 'Methodology and data collection' chapter.



METHODOLOGY AND DATA COLLECTION

CONSULTATION

The consultation was carried out by InRoad between March and July 2017, using an online survey tool. The questionnaire included closed- and open-ended questions as well as multiple-choice questions with rating scales, and offered the opportunity to upload additional documents. The invitation to participate in this survey included a description of the InRoad project, the content and objectives of the consultation, as well as contact addresses for technical issues and questions about the content.

In order to get an overview of the status quo in different countries, the consortium targeted actors responsible for national RI roadmapping in all 46 EU Member States (MS) and Associated Countries to Horizon 2020 (AC). Where the consortium was able to identify relevant people, these were directly addressed. Yet, in cases where this was not possible, the invitation to participate was sent to the respective European Strategy Forum on Research Infrastructures (ESFRI) delegate.

A detailed list of the questions laid out in Section 3 'Business plans for RI' of the consultation can be found in Annex.

27 out of 46 countries answered the survey. The consultation responses were summarised, allowing InRoad to perform a cross-country analysis presented in the [InRoad Consultation Report](#). Information collected during the consultation that is relevant to business planning practices was also used in the present analysis.

MAIN RESEARCH QUESTIONS

In order to deliver recommendations on best practices for business plan drafting and strengthening RI long-term sustainability, InRoad sought to explore the ongoing processes in several pan-European and national RIs and to gather feedback and recommendations from RI managers (mainly), funders and other stakeholders involved.

The main research questions structuring the case study are presented below:

1. How are business plans drafted in different types of RIs (pan-European distributed RIs, large European single-sited facilities, national RIs) and how are they used for management and operational activities?
2. How are business plans used by national nodes to manage activities and respond to funder's requirements in the frame of roadmapping and evaluation processes?
3. Which monitoring practices are implemented at the RI?
4. What is the role of business planning in assuring long-term sustainability of the RI?
5. Which support measures from national and European authorities are in place to improve business plan drafting and long-term sustainability, and how can they be improved (recommendations from RI managers)?

IN-DEPTH AND INDIVIDUAL CASE STUDIES

DEFINING THE CASE

The present study covers business planning as a process in central hubs of pan-European RIs, national nodes and national RI, as well as business plan evaluation in national research infrastructure roadmapping processes (on a country level). Therefore, the focus is not homogeneous in all case studies, since the dialogue was conducted with different actors in the RI ecosystem (though mainly RI managers).



SELECTION OF CASES

The investigation was organised using two approaches. The first approach consisted of a limited number of **'in-depth' case studies**, including two ERICs and one country-oriented investigation. Each 'in-depth' case study was then based on findings gathered from different sources, such as desk research and several interviews.

RI-oriented case studies (EMBRC and BBMRI): interviews with the central hub and several national nodes of distributed RIs were conducted

Country-oriented case study: interviews with a national policy-making and funding organisation (the Research Council of Norway), as well as with the managers of the Norwegian node of BBMRI and of two central hubs of European Research Infrastructure Consortia (ECCSEL and CESSDA) seated in Norway.

The second approach included several **'individual' case studies**, based on one interview and desk research (and/or alternative data collection methods) with participation of national and pan-European RIs.

The only **binding criterion** for the selection of candidates for this investigation was that the chosen RI had to be on the latest update of the national roadmap of its respective country. The other criteria applied to the selection were:

- recommendations from InRoad's consultation respondents;
- evidence of ongoing or completed business planning from desk research (published business plans or dedicated workpackages of the preparatory phase of projects);
- evidence of good practices and infrastructure maturity from desk research and InRoad's consultation results;
- for the node selection, the recommendation from the central hub was taken into account;
- balanced geographical and scientific field distribution;
- coherence and complementarity among selected case studies and interviews;
- coherence with other InRoad case studies (on roadmapping and funding practices).

Both RIs with and without business plans were considered for the selection of case studies. However, InRoad partners looked for evidence of good practices through a preliminary desk study.

Regarding the lifecycle of the selected RIs, RIs in different stages (preparatory, implementation, operational phases) were included with a preference for already established and operating facilities. The assumption is that RIs that are already established have verified practices regarding different aspects of business planning, such as monitoring, risk management, financial planning, access and commercial policies. However, taking into account that business planning and support measures for newly established RIs might evolve with time, a RI that is still in the preparatory phase was also included.

RATIONALE FOR THE SELECTION OF THE EMBRC, BBMRI AND NORWAY IN-DEPTH CASE STUDIES

EMBRC ERIC was identified as an interesting case because of its business planning practices, e.g. existence of an initial version of the business plan drafted during the preparatory phase and of a recent update; both versions are readily accessible on EMBRC's [website](#).

BBMRI ERIC, on the other hand, was included in the selection for the following reasons: it is an example of an ERIC that has been in operation since 2014; it has a business plan, which was drafted during the preparatory phase, and is published on the [website](#); and BBMRI is considered a highly distributed RI due to the high number of member biobanks spread across European countries.



Both BBMRI and EMBRC are infrastructures that belong to the same research field (Health & Food according to the ESFRI Roadmap). However, they operate in different sub-fields, which led to the assumption that the expected operation strategy and socio-economic impact would be different.

The rationale for choosing Norway as a country-case study is mainly based on the consultation results. InRoad's partners aimed at obtaining the perspective from the national funding and policy making organisation and at exploring the link between this funding body and the RIs located in the country. From the consultation findings, Norway was considered by InRoad's partners to be a country with an interesting system for the evaluation of RI business plans.

METHODS FOR DATA COLLECTION

Three main methods were applied:

1. Review of secondary sources, such as relevant documents provided by study participants prior to the interview and analysed by InRoad partners;
2. Semi-structured and structured expert interviews with all relevant actors based on a common interview guide, an example of which is provided in the Annex. A set of questions was prepared in advance, in order to harmonise the interview process and to facilitate the drafting of the report on state-of-the-art business planning.
3. Additional data was collected through the presentation of a case during the RTW in Wroclaw (May, 2018), supplemented by round-table discussions.

ANALYSIS AND REPORT DRAFTING

All interviews were recorded and then transcribed. Interview reports were then drafted for internal use and subsequently analysed. The reports produced were used for two types of analysis.

Within-case analysis:

- RI-case: in-depth analysis of business planning in central hubs combined with an analysis of the situation in national nodes;
- Country-case: in-depth analysis of the business planning in several RIs (including hubs hosting the statutory seat or country nodes).

These analyses were complemented with information on business plan evaluation in roadmap procedures. The aforementioned case studies were also supplemented by the analyses obtained from the individual case study interviews.

Cross-case analysis: The joint analysis of business plan processes in different RIs across Europe is presented in Deliverable 5.2 – 5.3.

TEMPLATE FOR ANALYSIS REPORTS

Each in-depth and individual case analysis was structured as follows:

1. Description of the RI or national node and description of the interview (date, duration, participants, location, etc.);
2. Main topics discussed. These were described in two parts – observations and lessons learnt –, and covered at least:
 - a. Development of business plans and their use as a management tool;
 - b. Internal RI monitoring mechanisms;



- c. Evaluation of the RI business plan by the funder and link to the roadmapping process;
 - d. Main factors of the long-term sustainability of RI;
 - e. Financial planning and risk management;
 - f. Access and commercial policy;
 - g. Socio-economic impact (the topic was included only in selected case studies);
 - h. Existing and desirable support measures;
 - i. Other topics that might come up in the interviews.
3. Brief summary of the lessons learnt;
 4. Recommendations derived from the analysis of the case or directly suggested by the study participants.

IN-DEPTH AND INDIVIDUAL CASE STUDY REPORTS

The in-depth case study reports are based on the analyses of interview findings, supplementary documents, as well as feedback from case study participants. The individual case study reports contain a brief analysis of the interview held with the RI, which was then verified by the interview participants. Those documents can be found in InRoad's website (Supplementary material to Deliverable 5.2 – 5.3).

GOOD PRACTICES

Various good practices are described throughout the InRoad final report and Deliverables 5.2 – 5.3. In addition, D5.2-5.3 display anonymized citations of interviewees, which illustrate good practices identified during data collection and subsequent analyses.

A good practice is a very concrete example of a business plan practice implemented in a European RI. The selection of good practices was based on the cross-case analysis, feedback provided by case study participants, and from InRoad Advisory Board and Reflection Group members.



EVALUATION OF RI BUSINESS PLANS IN THE NATIONAL ROADMAP AND FUNDING PROCEDURES

The analysis presented in this section places a focus on RI business plan evaluation and RI monitoring by national policy makers and funders, and is based on the results of InRoad's consultation in combination with the case studies analyses.

This section covers mostly the countries hosting RI nodes that participated in the in-depth case studies, namely:

Czech Republic (BBMRI CZ);

France (EMBRC FR);

Greece (EMBRC GR);

Italy (EMBRC IT);

the Netherlands (BBMRI NL); and

Norway (BBMRI NO).

Consultation responses from the organisation in charge of the Norwegian RI roadmap, the RCN, were complemented and enriched with the in-depth case study findings.

This approach allowed combining the RI managers' perspective (obtained through the interviews), with factual information (obtained from the consultation and supporting materials) and a funding organization's perspective (RNC). An additional example of a national procedure that was included in the analysis, to highlight good practices in the RI business plan assessment is Spain.

Among the consultation respondents (from 27 countries), 17 national policy making organisations indicated that they assess RI business plans in their roadmapping processes. However, the desk study revealed that RI business plans are not requested as a separate document. Instead, the most important aspects of the RI business plans are, in fact, evaluated in the roadmap and in funding calls for proposals.

Usually, business plan elements are requested using specific templates, some examples of which are provided in the Annex. The format of such templates, as well as the evaluation methodology, depend on the country's procedure, and also, on the funding source.

FRANCE

In the consultation, the French respondent, the Ministry for Higher Education, Research and Innovation (MESRI), indicated that business plans are not requested as part of the national roadmapping process. However, monitoring of RIs is performed by MESRI and is linked to the roadmap update (currently done on a bi-annual basis). The data, which contains the essential elements of the business plan, is collected through a survey (internal document) and an annual total cost calculation exercise. The most important part of the aforementioned survey relates to the user strategy.

In the case of EMBRC France, having an up-to-date central-level (ERIC) business plan was not sufficient to have ready-made answers to the questions of the ministerial survey. National node managers were expected to collect data on performance indicators at the node level by establishing internal monitoring procedures.

Those performance indicators are also used for reporting purposes to the French National Research Agency (ANR), which is the research funding organisation in France. All RIs funded by ANR through the 'Investments for the Future' scheme undergo a periodic evaluation by the RI Steering Committee in their scientific domain (according to the RI's taxonomy on the national roadmap).



Good practice 1: *EMBRC France was funded under the national call for proposals 'Investments for the Future' for a period spanning July 2011 to December 2019. A mid-term evaluation was performed in 2016 by the Health and Life Sciences Steering Committee. EMBRC France received excellent evaluation marks, with only one recommendation for the operational adjustment, which is 'to transform the federation of three marine stations into a true national RI' with a central management office and dedicated personnel. This recommendation was successfully implemented shortly thereafter.*

EMBRC France managers consider drafting a node's business plan in view of the upcoming renewal of the funding application. They also believe that the business plan requirement will become a criterion of RI evaluation, particularly in the upcoming 'Investments for the Future' call in 2020 (but not necessarily for the national roadmap update).

Regarding the current monitoring practices, EMBRC France commented that ANR does not systematically take into account performance indicators such as the success rate in European Commission (EC) grant applications (through INFRADEV and INFRASUPP calls), and responsibilities associated with leading such projects. The international dimension currently considered by the funder is the existence of a European RI counterpart (of the national RI) in order to develop international synergies. On the contrary, at the ministerial level, the success rate in EC calls is becoming an important performance indicator. The acknowledgment of the impact of the EU Framework Programme for Research and Technological Development (EU FP) grants on the funding coverage and other operational improvements of the RI came with an annual full cost calculation exercise, performed for the first time in 2017 (based on 2016 costs) and renewed in 2018 (based on 2017 costs).

GREECE

The General Secretariat for Research and Technology (GSRT) of the Ministry of Education, Research and Religious Affairs is in charge of the roadmap process. The roadmap update was initiated in February 2013, and resulted in the establishment of a priority list of 26 RIs and a secondary list of another seven RIs. In the second-step of the process, the roadmap update was followed by a multiannual investment plan for the whole period 2014-2020, which is closely linked to the management of European Structural Investment Funds (ESIF) funds under the operational programme Competitiveness, Entrepreneurship and Innovation ([EPAnEK](#)). The first call for proposals for RI funding was launched in 2015 and the second one in 2017.

Since business plans are evaluated during the roadmap process, they are not requested again during the funding procedure.

For RIs that have already received funding during the ESIF 2007-2014 programming period, a performance assessment was undertaken prior to the allocation of new funds. This evaluation was done in 2015 as a pilot project, involving a review panel consisting of international experts.

In parallel to the funding procedure managed by EPAnEK, the GSRT issued in June 2016 a new call for expressions of interest for the submission of RI proposals, aimed at completing the mapping of RIs and fulfil ESIF conditionality 1.2 'Research & Innovation Infrastructure'. In particular, this call sought to extend the RI priority list, which was announced in December 2014.

The full list of **evaluation criteria** applicable in this call can be found in the Annex. These cover most of the aspects of a RI's strategy and planned operation. The results of the evalua-



tion, thus, can be considered a good basis for improving an existing RI business case / business plan, or for drafting one.

There is a notable focus placed on the socio-economic impact of RIs and their contribution to Research and Innovation Smart Specialisation Strategies (RIS3) in the Greek procedure, which is related to the main source of RI investments (ESIF) and its specific conditions. Another particularity of the Greek national procedure is that it is important to be related to a larger European network to obtain the funding (mainly, adherence to ESFRI projects).

Good practice 2: *CMBR (which represents a Greek node of EMBRC ERIC) was one of the 20 selected projects and was granted €4M for a period 2018-2020.*
The Ministry of Education, Research and Religious Affairs had set some specific requirements to all funded RIs, one of them is to use allocated funding to make the RI immediately accessible to Greek users, and not to invest all the funding in the infrastructure development exclusively, meaning that the development of service offer is a priority in their national strategy.

The consultation respondent from GSRT indicated that all of the RI **monitoring** procedures pertain to the ESIF monitoring framework and are performed by corresponding bodies. While activity reports related to ESIF audit are submitted on an annual basis, cost statements are declared monthly.

ITALY

The Consiglio Nazionale delle Ricerche (CNR) is involved in the creation of a roadmap, and in a next step, RIs on the roadmap are funded through a dedicated call for proposals. The consultation respondent from CNR indicated that the business plan is part of ex-ante indicators included in the proposals.

The CNR reported on several aspects that were assessed in the frame of the Programma Nazionale per le Infrastrutture di Ricerca ([PNIR](#)) update, performed in February 2017. Those aspects are listed in Annex.

Concerning the **monitoring** practices, it was mentioned that RI performance assessment by CNR is included in the monitoring of their hosting research institutions, and is usually performed on a triannual basis.

CZECH REPUBLIC

The main national component of financial support for large-scale RIs comes from the Ministry of Education, Youth and Sports (MEYS). The MEYS is also responsible for the national research infrastructure roadmapping process. The last roadmap update was published in 2015, for the 2016-2022 period.

While operational costs of large RIs in the Czech Republic are covered with research and development (R&D) state budget expenditures, investment costs for technological development or upgrades are funded predominantly through EU Cohesion Policy instruments.

The national roadmap contains the outcomes of the 2014 comprehensive ex-ante evaluation of RIs in the Czech Republic. It comprises a total of 58 positively assessed RIs with the indicated degree of priority for the public funding (A1, A2, A3 and A4) in direct proportion to the quality-differentiated output of the evaluation. This was a pilot evaluation process that applied newly-developed methodology, prepared within the framework of the Effective System of



Evaluation and Funding of Research, Development and Innovation project, financed by the European Regional Development Fund (ERDF).

All the RIs, regardless of their previous main funding source (e.g. R&D state budget expenditures or ERDF) and their current state of development (e.g. preparatory, implementation, operational or decommissioning) were subject to the assessment. A two-stage evaluation was carried out by an international evaluation committee.

Specific documents were requested at each stage of the process.

- A so-called form A was used in stage I of the evaluation which acted as the basis for a brief RI presentation, covering mainly the research focus of the RI, involvement of the RI in national and international research activities, robustness of the RI strategy, etc;
- In the second stage, a form B was requested, which included comparisons to similarly focused research organisations (benchmarking), a detailed budget and specific information enabling a feasibility assessment of the proposed RI;
- In addition, a form C was required, which mostly contains data on users and their feedback from the RI use (for operating RI).

The consultation respondent from the MEYS indicated that business plans are requested in their roadmap procedure, with the following remark “*During the RIs’ evaluation, we are also assessing the sustainable development strategy of RIs. Each RI which is listed on the National RIs’ Roadmap is requested to develop and fulfil its development strategy, including a feasibility strategy*”. The desk investigation of supporting documents showed that **business plan elements** are included mostly in form B, the content of which is described in Annex.

An international peer-review evaluation of existing RIs was performed subsequently in 2017 and is considered an interim evaluation, followed by MEYS 2018-2022 funding commitment. For new RI projects, an ex-ante evaluation was conducted in 2017, based on the methodology published in 2014. A ‘consensus report’ was produced for each evaluated RI and sent to RI managers (confidential documents).

Good practice 3: *The consensus reports are also accompanied by recommendations from MEYS. One of those recommendations for improvement provided to BBMRI CZ after the 2017 interim evaluation was to augment industrial collaborations. Currently, these collaborations account for 7% of the node’s activities, and the maximum allowed by State Aid rules is 20%. The major bottlenecks for increasing collaborations with industry, as indicated by RI managers, is the lack of major pharma or diagnostic companies located in the region, and the complex regulations for industrial collaborations applied to public institutions.*

The evaluation rounds will be renewed every three to five years. The next one is planned for 2019. One of MEYS’s future objectives, as stated in the latest roadmap update, is to create a **stable pool of experts** for the evaluation of the RIs over a longer period, so that the Scientific Boards are aware of the previous development of RIs and thus able to observe how their previous recommendations were reflected in the operation of the facilities.

This approach could be considered a good practice and recommended for adoption in other national procedures.

Regarding monitoring practices, the annual progress report concerns only those RIs that are funded by MEYS (i.e. all listed in the national RIs roadmap). This annual progress report is rather brief and related mostly to ongoing activities and the financial framework.



THE NETHERLANDS

NWO is responsible for designing the national roadmap, and in a second step selected RIs are funded through a specific [Call for proposals](#) launched biannually. Only the facilities included on the [roadmap](#) are eligible for NWO funding (16 of them are individual facilities and 17 are clusters).

The consultation respondent from NWO answered that the business plan is a requirement in roadmapping processes.

The desk study of supporting documents showed that **business plan elements** are to be included in the 'Technical, business and management case', that RI submit as part of their proposal, and not a full-format business plan.

The RI assessment criteria applied at the subsequent funding stage in the **Dutch** procedure can be found in the Annex.

Furthermore, the consultation respondent indicated that roadmap updates are planned every four-years, and the re-assessment of the strategic importance of the RIs is done at this step. When it comes to **monitoring** practices, NWO reviews the annual outputs requested.

The updated and detailed RI roadmap and funding procedures in **the Netherlands** and the **Czech Republic**, as well as the description of the national embedment and actors involved, can be found in InRoad's Deliverable D.3.3, as those countries' national RI systems were subjects of comprehensive case studies.

NORWAY

The roadmap process is guided by the Research Council of Norway (RCN) through the [INFRASTRUKTUR](#) call, for which all documents can be found on the RCN website. The first Norwegian RI roadmap was initially published in 2010, based on the first call for RI proposals launched in 2009, and subsequently updated every second year, in 2014, 2016 and lastly in [2018](#). The consultation analysis was based on the previous (2016) version of the roadmap update and the corresponding call for proposals documentation.

Only RIs of national importance are funded through the INFRASTRUKTUR call, those that:

- have a broad national interest;
- are found in one or few places in the country (as a rule);
- create a foundation for international leading research;
- are made available to relevant research communities and industries.

Funding commitments last at least five years.

The evaluation procedure involves both an assessment of the **scientific case** and the ranking of project proposals, made by international expert panels, who are classified according to different research areas and also reflect Norwegian research priorities. It is then followed by a second step, which includes an (in-house) administrative evaluation that assesses strategic, national importance and cooperation, as well as the **business case**.

When composing the international expert panels, especially for certain research areas, RCN places a special focus on reviewers' experience in RI implementation. The administrative evaluation panels consist of RCN permanent staff working in different scientific areas.

The main parts of the RI application template requested in the INFRASTRUKTUR call by the Research Council of Norway can be found in the Annex.

Good practice 4: *In the assessment of RI proposals, criteria are not weighted beforehand. Some criteria are more important for proposals in*



certain research areas. An example of this is 'relevance to industry', which has more weight in the fields of energy, nanotechnology, bio-technology, etc. The relative importance of a criterion also depends on whether certain aspects of the RI strategy are highlighted in the proposal by the applicant or not. Lastly, current national priorities have an impact on the weight of the criteria. This is a good example of a flexible approach to the RI project evaluation in a national procedure, which was positively perceived by RI managers during InRoad's RTWs.

The second (administrative) round of RI proposal evaluation results is a ranking list with those candidates that have the highest priority for funding. The last step before the grant allocation is a meeting of RCN-staff with the RI project leader and the leader of the host institution, to explain RCN's decision and negotiate the grant contract.

Multiple aspects of RI business planning are found in the RCN-INFRASTRUKTUR's application form and its annexes, the fulfilment of which requires detailed inputs. Specific guidelines and requirements concerning the number of pages and aspects covered in each part of the application form are provided by RCN. This comprehensive approach prevents the science case being put forward more strongly than the business case.

The use of business plans for RI management in the implementation and operation phases is also actively encouraged by RCN.

RCN also requests an **annual progress report** from all funded RIs, as a part of monitoring. A template is provided, and it mostly contains questions on the use and management of the RI. In addition, RCN monitors also some specific performance indicators that have been agreed with each of the funded RI.

The formal procedure for monitoring funded RIs also includes a direct contact with all running projects, as part of RCN's quality assurance system. RCN's RI department aims at maintaining a **close dialogue** with RI managers because it is also in the Research Council's interest that infrastructure projects are successfully implemented.

OTHER RELEVANT EXAMPLES

In some national processes, other strategic documents than business plans are requested for a roadmap evaluation. A good example of this is an RI Strategic plan evaluated in the **Spanish** roadmap process (c.f. [Map of Unique Scientific & Technical Infrastructures \(ICTS\)](#)) which is requested as a stand-alone document in a specified format and with recommended content.

In addition to the strategic plan of each individual RI (ICTS), the Network of Infrastructures³ are requested to submit a joint Strategic plan. As for distributed RIs, these present a single joint Strategic plan that includes the contributions of all involved partner institutions.

To complete their dossier, RIs are also requested to provide an Excel file (in a specified format) listing performance indicators and other factual data. Performance indicators for the construction / implementation phases are to be included if the RI is not yet operational. The description of the data collected is provided in the guideline for applicants.

Having a **quadrennial Strategic plan** is one of the criteria for RI evaluation in the roadmap update. The full list of criteria can be found in the [guiding document](#), some parameters of which are listed in the Annex.

³ For the definition of a Unique Scientific & Technical Infrastructure and a Network of Infrastructures, please refer to the 'Map of Unique Scientific & Technical Infrastructures'



Even though comprehensive data on RI projects is collected through different documents in the application procedure, the request for a Strategic plan as a single document could be considered as a good practice. Furthermore, this document provides a solid basis for drafting a full-format business plan (please, refer to **recommendation 8**) because it helps to establish RI objectives and strategies, and align them with existing and planned resources.

One of the requirements in the aforementioned examples of the national procedures includes the drafting and submission of documents in English language to allow its evaluation by international experts.

Inviting an international expert panel to perform the evaluation of RI projects is already an established practice in those countries. An idea worth further exploring would be the creation of a permanent body at the EU level that not only benefits from the rich experience and expertise of its reviewers, but also contributes to the improvement of the evaluation methodology and alignment of national procedures.

Such alignment of the evaluation criteria is especially important for distributed European RIs, which are subject to discrepancies in the periodicity and methodology of the nodes' evaluation, creating an additional hurdle for the distributed infrastructures.



DEVELOPMENT OF THE BUSINESS PLAN

BUSINESS PLAN CONCEPTION, CONTENT, AND TEMPLATES USED FOR DRAFTING

Case study findings show that in most cases, especially the ERICs, business plans are drafted during the preparatory phase. However, there are exceptions to this, where memoranda of understanding, statutes and other relevant documents covering aspects like mission, objectives, activities, innovation, standards, access, dissemination and optimization are prepared in accordance with ERIC and national regulations and practices. Furthermore, it has also been reported that when a specific item was not requested for the ERIC application (e.g. value proposition), some RI managers (e.g. CESSDA) would cover this gap using widely available strategic management tools like the business model canvas from Osterwalder (see for example [Osterwalder 2004](#)).

In addition to the example in the previous paragraph, there are others where nodes from a specific pan-European distributed RI are also drafting their own business plan. In one case, the RI managers stated that they were currently drafting their business plan coherently with the central-level one, focusing mainly on aspects like the facility's development and the improvement of user services. In relation to this, one of the interviewees stated that, as activities became increasingly centralised over time and synergies with other relevant scientific initiatives were forged on a national and European level, having a business plan at the node level was seen as helpful to improve coordination of activities among all those involved, avoid the duplication of efforts and build upon existing efforts.

With regard to the content, the business plans examined during the case studies included sections on governance structure and operational framework (i.e. access policy, dissemination and exploitation, funding, data management plan, education and training and the implementation plan). According to one of the interviewees, one of the most challenging parts of the drafting process was agreeing on the governance structure and the right level of detail for the business plan, as some partners wanted to cover every eventuality, while others believed that a shorter and more concise version would be best.

The above example reflects the complexity of the decision-making process.

Another issue that added to the complexity of the process was the fact that during the preparatory phase, several interviewees indicated that not enough templates and guidelines were available to lead the process confidently. In one particular case, a template designed by the European Investment Bank (EIB)⁴ specifically for ERICs was used. Furthermore, another interviewee emphasised that in addition to the success stories, failure can also be of value to newcomers. The problem with failure, according to this manager, is that these cases are not well known, as people share their successes but are reluctant to discuss their failures.

Besides the lack of available templates and guidelines, some interviewees made remarks on the length of the business plan. As a matter of fact, some of the business plans examined in the case studies are quite extensive, with up to 88 pages. Furthermore, on several occasions the interviewees pointed out that a shorter and more concise business plan would be useful to improve its use as a living management tool.

"We are using the model provided by the EC with the business guidelines for the ERIC (the last version) but I also asked for different templates. I have one elaborated by the European Investment Bank. The problem here is the lack of models because not

⁴ This template is not a public document.



many models are available around, even though 17 ERICs have already been established.”

INVOLVEMENT OF STAKEHOLDERS (CONSULTATION, FEEDBACK AND APPROVAL)

Based on the information gathered, two approaches have been identified to draft RI business plans: the first one involves the joint work of the consortium partners in the preparatory phase (e.g. ministries, funding agencies and research performing organisations) and the second one entrusting the drafting of the business plan to external consultants. The experience using this last option has been satisfactory so far, as pointed out by some of the interviewees, since the whole process can be carried out professionally and quickly. In both cases, exchanges among different parties were needed. These exchanges happened through direct dialogue and meetings for the most part, and through consultations with users via survey or alternative means at later stages, to improve services and increase user engagement. In general, exchanges among stakeholders have been productive to gather feedback, direction and commitment. Besides this, some interviewees mentioned that having people on board with previous professional experience in other state-of-the-art facilities and European initiatives facilitated the process, as they shared their knowledge and experience with RI, management and business concepts, which came in handy for the drafting process.

Good practice 5: *The involvement of relevant stakeholder communities has provided in a number of cases a balanced and comprehensive approach to the development of business plans, by transferring their experience and expertise to the project. Some examples include but are not limited to patient organisations, insurance companies and research performing organisations.*

IMPLEMENTATION, REVISION AND UPDATE OF BUSINESS PLANS

Several elements have been reported on business plan updating and implementation. While in some cases business plans have not been updated since the date of publication, others have been reviewed and amended after two years. In the second case, updates were done to specific sections like strategy, investments and key performance indicators (KPIs). These modifications were then presented to the General Assembly for approval. The governance section, on the other hand, was one of the sections that remained untouched, since it was an area that was considered to be clear. According to another interviewee, although the process proved to be beneficial, it turned out to be so complex and labour-intensive (taking almost up to one year), that in his opinion, updates should only be done every five years. Furthermore, as mentioned earlier, the extensive length of the business plan in some cases is seen as a hurdle for further updates. Conversely, in cases where no updates have been made, an annual work programme that acts as a roadmap, setting out the goals, activities and funding was used at the central and node levels, and a vision paper with an outline of the prospects and challenges for the next five years was sometimes used.

“Even though it is not formally updated, we are using the different parts of the business plan for the daily work of operations and purposes of the day to day management and for future development purposes.”

Besides issues related to the length of the document, some remarks on the evaluation of the business plan were also made by interviewees. For instance, in one specific case, the RI manager pointed out that there were some discrepancies between the ESFRI Evaluation Committee and the consortium involved in the drafting of the business plan, on the role and objectives of the RI. While one party considered that the business plan model should be targeted at



short-term economic benefits, the other placed the focus on making the most of research facilities in Europe, maximising the benefits of partnership, and on increasing operational efficiency.

The implementation of business plans is reported to be diverse among and within RIs. Even within the same distributed RI, nodes will use business plans in various ways and for different purposes. For example, whereas some nodes consider these to be useful for the implementation and operational strategy, others either do not have one in place at the node level, or do not use them to run the facility. At the central level, on the other hand, the business plan is seen as an excellent tool to communicate with stakeholders, as stated by one Director General. In fact, while the statutes and the rules of procedure are more rigorous and static documents, the business plan serves as a tool to present the internal strategy to RI managers and to the stakeholder community.



USE OF BUSINESS PLANS AS A MANAGEMENT TOOL FOR INTERNAL RI MONITORING AND OPERATIONAL PERFORMANCE

Based on the feedback obtained from the case studies, the use of business plans and other strategic documents for internal monitoring and operational performance varies between RIs. For instance, in one case, an interviewee reported that the strategy of the node was reviewed every three years and then reflected in the strategic plan. In other cases, an action plan had been set up annually outlining the specific tasks, timeline and resources to reach the goals.

When it comes to **KPIs**, a number of things have been observed. First, KPI monitoring appears to be a recent thing for the majority of the RIs interviewed. Second, KPIs are used at different levels (node and central) and for various purposes. In some cases, they are used to measure short-term objectives (such as number of visits and number of projects) and in other cases they are being developed to measure long-term performance.

Good practice 6: *Monitoring practices depend strongly on the type of RI and their operational specificities. For example, Biobank Norway (BBMRI national node) reports to RCN on behalf of the national partnership on contractually agreed KPIs. Furthermore, Biobank Norway collects information for the yearly report from different work packages and institutions, representing the participating biobanks, and in addition, reports on the common services of the national hub level.*

The biobanks in Norway are embedded in universities, health organisations and hospitals, and report on their activities through the host institutions as well.

Examples of the KPIs collected by Biobank Norway for reporting to the Research Council are:

- *total number of users;*
- *total number of samples;*
- *number of researchers making use of the samples;*
- *number of researchers from industry;*
- *number of projects with international funding (e.g. EU projects);*
- *number of projects with external national funding, with co-financing from health institutions;*
- *number of projects financed by industry.*

Also included are KPIs on outputs (publications from the biobank-based research), meetings and conferences hosted and attended, etc. This report also highlights the RI input to the quality standards improvement, e.g. on the data management and LIMS (Laboratory Information Management System).

There are also cases in which different nodes from the same pan-European distributed RIs follow diverging approaches. For instance, while one node might not be tracking KPIs, another one will be collecting information on relevant parameters to the country where it is located, such as contribution to education and training. Yet, regardless of this, most interviewees appear to agree that KPI monitoring and benchmarking are important in view of providing quality services. To this end, some preliminary actions have already been taken within the H2020 project EMBRIC⁵, e.g. gathering feedback during meetings targeted at users. Moreover, quality of services is said to have improved significantly as a result of these exercises.

⁵ European Marine Biological Research Infrastructure Cluster, H2020 project funded under the call for proposals INFRADEV-1-2014 www.embric.eu/



However, most interviewees agree that there are certain challenges associated to the use of KPIs. From an operational point of view, collecting the feedback provided by the nodes on a regular basis to assess the volume of activity is not always straightforward. Another interviewee added that time and not having enough people to track KPIs are barriers to maintaining the quality system. Regardless of this, several central hub representatives highlighted their desire to engage with consortium partners on a more day-to-day basis.

Another point raised during some of the interviews concerns the adaptation of the central hub's KPIs to the node's needs. But things get even more complex, as one of the interviewed nodes mentioned that they were also gathering data for the national funding agency, which had its limitations as some of the indicators used were quite general.

There are other cases, however, where progress in earlier stages was monitored by one of the internal committees on a rolling basis without the use of KPIs. In one specific case, milestones were used instead to keep track of events, activities and resources. Furthermore, several governance bodies were set up to monitor and assess performance through meetings, in some cases up to 10 times per year.

Other internal management tools used include reports sent from the central hub to all nodes (with a general update on the key accomplishments, the obstacles encountered and the next steps to follow), teleconferences between the director general of the ERIC and the node directors, to enquire on progress made and the challenges faced, management committees, composed of national node directors, that meet around three times per year to discuss strategy and progress.

"KPIs were introduced about 1.5 year ago as a useful tool to report on the central activities, and it was thought logical to report on the same KPIs as we do on the national level. Trying to harmonize this was a difficult and extensive discussion at the ERIC level, also based on what people were able to provide."



LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES AND ITS LINK TO THE BUSINESS PLAN

Achieving long-term sustainability of the RI is one of the main reasons for drafting a business plan. In the business planning exercise, RIs relate their mission to value creation, develop a strategy and plan their activities, estimate the cost and income for the short-term as well as the long-term, for the different phases of the lifecycle of RIs, for investments, operations and, finally, for closing down. It is crucial for the success of this exercise that RI managers identify and address in their business plan the main risks, and reflect on the success factors and challenges that affect the long-term sustainability of the RI in its specific environment.

Besides the importance of adequate and stable long-term funding, the 'question of RIs long-term sustainability goes well beyond the funding only, and is touching upon several dimensions such as scientific excellence, socio-economic impact or innovation' as is underlined in the EC's 'Sustainable European Research Infrastructures – A call for action' [report](#) and supported by InRoad's findings.

The following topics, related to business planning and RI long-term sustainability, served as the basis for InRoad's interviews:

- key factors influencing the long-term sustainability and the RI's ability to respond to important challenges and manage risks;
- full lifecycle costs of RIs, financial planning;
- requirements for RIs to ensure their long-term sustainability (i.e. next phases of their lifecycle, including operations, maintenance, upgrades, termination).

In the cases studied, several critical factors for the success of RI long-term sustainability were highlighted by RIs managers. The success and risk factors are important topics to be considered in RI business planning, either in the business plan itself or when drafting other operational documents, e.g. the financial plan, stakeholder engagement strategy and communication, user strategy, access policy and data management plan.

MAIN SUCCESS FACTORS, CHALLENGES AND RISKS

Important success factors that impact the long-term sustainability of the RIs that were highlighted by RI managers in the case studies, are related to:

- **financial planning and funding framework** (e.g. adequate, stable funding perspective, that allows adjusting for growth, future investments for upgrades – also at the node-level –, calculation of the full lifecycle costs, continuation of regional funding, development of a sustainable business model combining different sources of income);
- **societal and economic impact** (e.g. the energy challenge, blue economy, health);
- **stakeholder engagement** (e.g. widening the partnership, industrial relations);
- **user strategy and access policy** (e.g. accessibility of the facilities, user satisfaction);
- **data management** (e.g. quality assurance, trust, costs, unifying data in certain types of facilities);
- **communication and outreach** (e.g. visibility of the RI, communication strategy);
- **implementation and monitoring** (e.g. alignment of strategies between central hub and nodes, professionalisation of management, using external business planning expertise).

In the view of the interviewees, **user engagement and user satisfaction** are important pillars of RIs sustainability. A strong brand of the RI may bring short-term political support



and initial funding, but it won't automatically bring in the users. It is therefore not surprising that **making the use of RI attractive and visible** is a main factor of success reported by all RIs. A major challenge from the operational point of view is to have all the facilities fully used and receive feedback on the usage, to enable the RI to show existing and future members or partners the benefit of their commitment to the RI. Hence, an important work in the business planning has to be done about user strategy and stakeholder engagement, and translated into more operational plans, like on access, monitoring and communication.

The **commitment of stakeholders** is a general pillar of RIs sustainability. At the national level of distributed RIs, **regional investment** is also important for the financial stability. For some RIs, an important area is to find the best way to interact with local industry, since engaging with industry will then benefit to the RI in the form of regional investment or contribute in another way to reaching the RIs societal or innovation goals. Policymakers – both at EU and national level – could support improving the visibility and accessibility of RIs on European and international scales by implementing measures that would favour the use of RIs. This could mean, for example, providing more financial incentives to researchers to actually use RIs, but also highlighting RIs in the national research agendas, and performing educational work by explaining why RI's use may be more beneficial than buying specialised equipment and performing the research in-house only.

For some RIs, developing a **commercial strategy** is important not only as a way to obtain financial resources, but also for delivering the mission of the RI, especially with regards to societal and economic impact, including the growth of innovation ecosystems. In some national RI funding procedures, making RIs accessible not only to researchers but also to industries is a requirement to be met. Niches in terms of services provision to the industry can be identified through a market analysis in the business plan and used to develop RI services in that direction. In the case of distributed RIs, this service development has to be tailored to the territories and their resources.

Good practice 7: *In one of EMBRC's national nodes, EMBRC France, RI managers are using a flexible approach when providing the assistance to industrial users who are not familiar with the facilities (marine stations). In terms of the service offer development for industry, this issue is tackled specifically within the EMBRIC⁶ project through the creation of a service pipeline between the involved research infrastructures (EMBRC, ELIXIR⁷, EU-OPENSSCREEN⁸ and MIRRI⁹) and two Integrating Activity projects (AQUAEXCEL¹⁰ and RISIS¹¹) in order to foster innovation in marine biotechnologies.*

As part of the engagement strategy on innovation in the business plan, RIs have different ways to establish closer relations with industry. Some RIs have an industry advisory group or a committee in their governance structure and can also be involved in advising on RI's business planning. In some cases, the RIs engage with industrial stakeholders through a partnership or an associate membership. In other examples, some RIs engage with industry via the

⁶ European Marine Biological Research Infrastructure Cluster, H2020 project funded under the call for proposals INFRADEV-1-2014 www.embric.eu/

⁷ A distributed infrastructure for life-science information <https://www.elixir-europe.org/>

⁸ European high-capacity screening network <https://www.eu-openscreen.eu/>

⁹ Microbial Resource Research Infrastructure <http://www.mirri.org/>

¹⁰ A Horizon 2020 research infrastructure project, which aims to support the sustainable growth of the aquaculture sector in Europe <https://aquaexcel2020.eu/>

¹¹ Research Infrastructure for Science and Innovation Studies <https://risis.eu/>



establishment of an industry platform or develop specific tools to facilitate industrial collaboration.

Good practice 8: *As part of its strategy to engage with industry, the Norwegian node of BBMRI has established a working group with representatives from pharmaceutical industries, biobanks and universities. One concrete idea that this group is working on is the development of tools to make biobanks ready for industrial collaboration. This involves the establishment of an industry compliant standard enabling biobanks to act more swiftly when approached by industry.*

For some RIs, ties with industry will remain minimum, like in the case of the European XFEL, since they are mostly designed to perform fundamental research. Therefore, these elements need to be related back to the mission of the RI.

Related to the aforementioned topics and examples, it is clear that an important success factor for the long-term sustainability of RIs is the **visibility of the RI**, to show how they fulfil their role. RIs' communication strategies and outreach plans target specific stakeholders and how to approach them. Using only traditional media has its limitations, as was stated by one of the interviewed RI managers; although impact is not always guaranteed, a communication strategy combining both traditional and modern media is more likely to increase the facility's visibility.

Good practice 9: *In the case of the Norwegian node of BBMRI, the name BBMRI.NO was seen as meaningless for the general public in Norway. Therefore the national node has also been operated under the alias 'Biobank Norway' or 'Biobank Norge' since 2010.*

Support of an external professional (e.g. a commercial communication company) can help the RI to develop a communication strategy. In the case of CESSDA, the RI's main office hired external services to develop a communication strategy targeted to the RI's stakeholders (members, service providers, users of data, producers of data) and for advising the RI how to restructure the website and how to reach out to new members.

Finally, a **weak link between the headquarters and the nodes' strategy** can also be a risk for the long-term sustainability of any distributed RI. The alignment of strategies can be improved through joint business planning. If each node has its own strategy for development separate from the ERIC strategy, they may still function successfully as individual facilities. However, there is a great risk that the nodes' activities will drift apart. A solution, as proposed by a RI manager, is to put in place a 'quality system' for the strategy, such as labelling the node as 'compliant with ERIC strategy' or not. It can be called alternatively **the power of a brand**, when the nodes' governance would trust the RI's central brand and respect their recommendations.

FINANCIAL PLANNING AND FUNDING STRATEGY

In their financial plan, RIs describe present and foreseen funding sources, including members financial and in-kind contributions, cohesion funds (if applicable), project funding, income from user fees and from other parties (private or public). This plan is used for the provision of funds, for initial and planned investments, for the calculation and coverage of operational costs of the RI within a given timeframe. The development and regular updates of the financial plan and funding model, with adjustments according to changes encountered, are important



elements of the business plan and a key factor of success for RIs' long-term sustainability, as is a suitable funding. This was supported by the findings from the case studies.

RIs in our case studies experience several financial risks or challenges related, for instance, to a lack of funds/failure to secure financial contributions, to not having a contingency budget to cover potential financial risks, to the imbalance in members' contributions, and also to the difficulty of calculating the cost of the use of the facilities.

Another challenge reported is when the RI's funding model doesn't bring additional budget for the central hub's activities when new members join in; the fixed total budget will in such cases lower the other members' mandatory contributions but won't bring new monetary contributions to the RI.

RIs financial strategies are bound by their mission, value proposition and the rules and regulations that they need to comply with to guarantee their funding. RIs that apply for roadmap funding are required to provide their financial plan and funding model with defined or estimated costs and income for a certain period ahead. A practice from the Norway case study shows the requirement for roadmap applicants to make separate financial plans for the implementation phase and the operational phase. The RCN's call for proposals requires RIs to plan their (estimated) costs and income for a period of 10 years of operations and to fill in a mandatory 'Spreadsheet for Costs and Income' with a quite detailed estimation of the contributions, to show the (expected) midterm commitments of stakeholders.

Basic costs for operation of RIs are normally not covered by the funding for RIs in Norway, as is outlined in the national [strategy](#) regarding RIs by the RCN (2018a, p. 11):

"Since the National Financing Initiative for Research Infrastructures primarily targets the *renewal* of Norwegian research infrastructure, the Research Council has a restrictive policy concerning funding of *operating costs* of research infrastructures. Instead, the operating costs of research infrastructure are as far as possible to be covered by the projects that use it. Thus, the Research Council requires applicants seeking funding to establish research infrastructure to include plans for how to achieve sustainable operation of the infrastructure. User fees from the R&D projects using the infrastructure should ideally be an integral part of financing its operation. Expenses related to the use of research infrastructure are therefore approved costs in all applications for research funding from the various Research Council programmes and funding schemes."

Distributed pan-European RIs are dependent on members' contributions to the central services, and their national nodes – mainly on national funding decisions (e.g. investment grants, basic funding from hosting institutions). Practices from the case study show that working with different procedures and timelines for the various income streams is a challenge for the financial planning by the RI Central hub.

Good practice 10: *The financial plan of EMBRC ERIC is described in the 2017 business plan with all the revenue streams and cost categories. The planning is made for 6 years and in two phases: start-up phase (2017-2019) and full regime operation (2020-2022). The financial commitment for the development of the EMBRC nodes, included in the case study, ranges from three years for the Greek node (2018-2020) to ten years for the French one (2011-2020), which depends mostly on the national funding scheme. In view of such long funding cycles, EMBRC France performs detailed investment planning every three years.*



In many cases, contributions to the central hub's costs and services are minor compared to the funding (including in-kind contributions) of the national node facilities. An example of **combining funds from different sources**, mainly from national grants and funding by host institutions, but also through engaging with the regions and private sector, is provided below.

***Good practice 11:** The basic funding of the French node of EMBRC consists of a grant obtained in 2011 from the national research agency in the frame of a programme called 'Investments for the Future' (PIA-I). Supportive funding allocated to solving specific challenges was obtained through H2020 projects targeted at RI development. EMBRC France is also working in close collaboration with the regions, which allows them to be eligible for the regional structural funds for the continuous development of the infrastructure. Furthermore, EMBRC France continues to improve its visibility and attractiveness to the private sector by working on joint projects, developing services for them, and developing sector-specific training courses to meet the needs of the regional industries. This will improve the annual revenue of the RI and help to cover the operational costs.*

When updating the RI's strategy, planning for a sustainable financial situation could lead a revision of **the existing business model**¹² and to the development of new sources for future additional income. This could lead the RI to engage with new stakeholders, widening the group of users or looking for a pricing mechanism in addition to the agreed and fixed income by members' contributions or basic funding by the host institution.

FULL COST CALCULATION AND PLANNING FULL LIFECYCLE COSTS

Case study findings show that calculating annual full costs is a challenge for RIs and not a common practice. And this is also the case for the planning of the full lifecycle costs. For some of the distributed RIs, the calculation of the node's full lifecycle costs falls under the responsibility of its respective national host institutions.

***Good practice 12:** EMBRC ERIC considers that the estimation for the termination cost should be done locally, at the institutional level. Headquarters can only encourage performing these estimations, but cannot go beyond simple recommendations.*

For single-sited facilities, European and national, it seems a more common practice to plan the costs for the full lifecycle of the RI, and to include a provision for the costs of termination.

Guidelines for RIs on the cost calculation for use of the facilities (e.g. to have some principles agreed in Europe on how to categorize a few different types of access, and on how to calculate the costs for each type) could be beneficial, whether they are issued by the EC, RIs central hubs or the national governments, however they should be coherent.

Regarding the annual full cost calculations, some distributed RIs headquarters are trying to gather the data from the nodes or facilities by sending them templates to fill in. Still, a big challenge is to have comparable inputs because RIs (as legal entities) or their host institutions have their own accounting practices. Another big challenge is to draw a financial and account-

¹² A business model is an abstract representation of an organisation, which includes all core interrelated architectural, co-operational and financial arrangements designed and developed by an organisation (presently and in the future), as well as core products or services the organisation offers or will offer to achieve its strategic goals. ([OECD 2017](#))

ing border between the RI activities as a national node and the other institutional research activities.

In France, the RI annual full cost calculation by RIs was fostered by the MESRI and concerned every RI on the national roadmap.

Good practice 13: *Support measures aimed at implementing RI annual full cost calculations were initiated in 2011 by the MESRI through a pilot project involving several large RIs, which was carried out in collaboration with a consulting agency. The methodology for cost calculation was optimised subsequently, and since 2016 this annual full cost calculation is part of the roadmap update. Consequently, all RIs included in the national roadmap are expected to submit such calculations. An interviewed RI (EMBRC France) confirmed that this exercise was very beneficial for their financial planning.*

In Norway, a [methodology](#) for the calculation of full costs associated with RIs for the academic institutions was developed by the Norwegian Association of Higher Education Institutions (UHR) in 2014. This is a methodology for declaring the costs and pricing for the use of RIs in externally funded projects. Though this cost calculation model is developed mainly for non-economic activity (research practice in universities and colleges), it provides also a guideline for price calculation for economic activity.

IN-KIND CONTRIBUTIONS

European RIs rely to a large extent on in-kind contributions, which are accounted for at different levels.

Regarding the contribution of members to pan-European distributed RIs, monetary contributions are necessary to assure the central office's financial sustainability in the mid-term. In case in-kind contributions are offered as a substitution to monetary, this requires an approval by the governance of the RI.

However, there are still quite substantial differences between RI funding models concerning in-kind contributions. There are distributed RIs that accept in-kind only as a voluntary addition to the compulsory monetary contributions. In others, in-kind contributions are accepted and valued, for example in the form of staff secondment or by involving node's staff in the development of common services and activities. Some distributed European RIs rely mostly on the in-kind contributions from members, and for them, having a reliable in-kind contribution valuation methodology is crucial.

In case of single-sited European RIs, in-kind contributions in the form of instrumentation can be a very important component of their funding model in the construction phase. Some members have a possibility to use ESIF funds to construct state-of-the-art instruments in their country and to deliver it to the single-sited RI as a part of their contribution.

RI managers confirmed that costs calculations, which include the in-kind valuation, are a quite complex exercise.

At the level of national facilities constituting the nodes of European distributed RIs, in-kind contributions from the host organisations are in many cases implicit to their functioning. Biobanks infrastructures, for instance, are constituted of multiple highly distributed facilities. The majority of those facilities are embedded in hospitals and research institutes. The state-of-the-art equipment and qualified personnel provided by the host organisation is therefore crucial for an efficient functioning of the biobanks.



Apart from the challenges for sustainable in-kind provision, for some RIs the issue arises when comparable data on the in-kind contributions need to be collected across all national operators. One of the interviewed pan-European RIs confirmed that they are currently in the process of collecting detailed information from all national nodes on the volume of work and the staff commitment associated with the service provision at the national and ERIC levels, as well as the contribution of the nodes' staff to the development of common activities and centralised platforms.

Taking into account the abovementioned findings, InRoad recommends that in-kind contributions be better accounted for when drafting RI business plans at the level of central hubs of distributed RIs, as well as at the level of national nodes.



USER STRATEGY AND ACCESS POLICY

CONSULTATION OUTLOOK

Open excellence-driven access is regarded as important, and is one of the main criteria for eligibility for the roadmap.

In many national processes, open access also means receiving a substantial part of users that are not affiliated with the host institutions. Oftentimes, a description of the access policy for industrial users is requested in addition to the access policy for academic researchers. In the Czech roadmap process, for example, RIs are also required to develop an access strategy for other users, who are utilising the RI's capacities for collaborative and/or contractual R&D projects beyond the open access mode.

70% of the consultation respondents stated that they request additional information related to **services and support for users**, and 67% on the **RI user capacity**, in particular the capacity for welcoming external users.

Good practice 14: *In the Czech ex-ante evaluation methodology (form B) a complete user analysis is required: "Describe the current user community of RI, its development over the last 5 years or since the establishment of RI (relevant for the RIs established later) and future outlook. Indicate number of users and their affiliation to research institutions, including the country of origin".*
In the French process, multiple parameters for measuring RI capacity and efficiency of usage are requested in the MESRI evaluation survey, and include among others the total rates of usage, percentage of usage by internal/external projects, national/international teams, industry/academia; full list of equipments and associated services, including data storage and transmission services; specific services targeted at industrial users, etc.
In the Slovenian procedure, the capacity for training at the RI facilities is included as a criterion.

The above examples show that user analysis and user segmentation are important criteria in the roadmap evaluation procedures.

Only half of the consultation respondents confirmed that they include data management plan and intellectual property rights (IPR) management as assessment criteria in their roadmap procedures. Examination of the supporting documents shows that **data management and IPR** are usually both addressed under the access policy. One interesting example of data collection is the roadmap survey in the French national process, where those two aspects are elaborated as separate paragraphs, and the part of the survey related to data is well developed. Similarly, in the Norwegian RI application form, data management is a separate category.

One important term that was not initially included in the InRoad consultation, but stood out during the consultation analysis is the **critical mass** of users. In particular, the term was employed in Romanian, Greek and Israeli processes.

ACCESS POLICY DOCUMENTS AND ACCESS PROCEDURES

User strategy, which also includes access policy, is one of the main parts of a business plan, and is tightly linked to the RI mission and value proposition.

The access policy is often defined during the preparatory phase, along with the business plan drafting, and refined in the implementation phase. In addition to the description of access



procedures for users, the access policy document also contains guidelines and requirements addressed to the participating facilities, for instance, the recommendations on how to report on provided services (types of access, number of access units, costs and fees, projections for the following years, etc).

RIs involved in the present study are using the [European Charter for Access to Research Infrastructures](#) (2016) as a guiding document for establishing their access policy. In case of distributed RIs, individual facilities' operators refer to the guidelines provided by their central management offices. Regarding the detailed access procedures and pricing, the individual operators/national nodes are responsible for establishing the latter at the local level.

Good practice 15: *The managers of the Italian node of EMBRC indicated that the access policies developed at the ERIC central hub level have to be validated by the Board of directors of the partner institutions prior to being translated into the node's policies.*

In the meantime, the procedures and rules for access must be transparent and visible for users across the whole distributed RI. In pan-European RIs, the access is oftentimes provided either through the central access point (e.g. ERIC) or through the national RI; the latter also includes the use of facilities by researchers of the host institution.

One of the study participants stated that *"the added value [of an ERIC] is to provide the unifying force to overcome differences in cultural, technical, geographical/political and methodological settings and to bring the principles into every day practice"*.

Good practice 16: *EMBRC ERIC strives to make the 'user experience' similar across all involved service providers. The respect of common access procedures and the implementation of a central user access point – consisting of a services catalogue with a human-assisted interface – are the main contributors to it.*

One of the central principles of the access to European RIs is an *open access*, which is widely supported by the national and European policymakers.

Good practice 17: *An interesting example of support for the principle of open access comes from the Greek national RI evaluation procedure. The funder of RIs in Greece, the Ministry of Research and Education, imposed the rule that a minimum of 20% of the RI's access capacity should be devoted to external users (researchers who are not affiliated to host institutions).*

However, the infrastructures that produce and store sensitive data have more rigid ethical and legal frameworks for access. In RIs dealing with human biological samples, the access policy must be compliant with the current national and European legislations on the patient data protection under the EU General Data Protection Legislation (GDPR). *"New GDPR regulation could play a role in harmonising access requirements in the future, as it might help get informed consent in a more generalised way"*, as was stated by one of the study participant.

COST OF ACCESS AND USER FEES

User fees can form a substantial part of the RI revenue. It is illustrated by a study involving a RI that has just entered its operational phase: the revenue from service delivery is expected to gradually increase to 25% of the running costs coverage when fully operational, while the transnational access funding will account for an additional 15%.



Access cost calculation, however, may differ considerably depending on a RI organisation. When RI investments are covered at 100% by public funds, access fees are usually used to cover as much as possible the facilities running costs. When a distributed RI includes privately funded facilities, investment costs are included in the access fee.

In any case, establishing the prices for products and the fees for services is not a trivial task, since the value proposition of RIs relies on providing unique services at the local and European levels.

Good practice 18: *An important pilot project was initiated by the French node of BBMRI and supported by other partner biobanks regarding the calculation of the access costs. The work was published in the journal Science Translational Medicine (Clément et al. 2014), and displays an estimation grid developed by an international expert group. This grid was tested across biobanks in six countries in order to validate a tool for setting specimen-access prices that are transparently related to biobank costs.*

Independently of the source used to cover access fees, it is desirable that RI users be aware of the actual costs associated with requested services.

Good practice 19: *One of the RI involved in a case study issues to all non-paying users (for instance, when the access fees are covered by a transnational access scheme) a pro-forma invoice. It allows users to get familiar with the pricing details, and this information can be used in future grant applications, where the access shall be covered by different funding sources.*

On the contrary to physical access, in data-driven RIs, charging fees to access the data is not expected to be a sustainable funding model because the costs for data storage in the archive are mostly fixed costs and the cost of providing access to data is marginal. Business opportunities arise rather through the provision of tools and expertise, which are the added value of data RIs.

DATA MANAGEMENT

According to one of the RI directors, the most challenging issue about access policy is not to define its procedure, but to establish the rules for the use of knowledge and protection of the intellectual property generated by this access.

Making data more accessible to and reusable by wider research and industrial communities substantially improve the impact of RIs. In 2016, the '[FAIR Guiding Principles for scientific data management and stewardship](#)' (Wilkinson et al.) were published. Shortly after, the [guidelines](#) on FAIR (Findable, Accessible, Interoperable and Reusable) data management for the H2020 programme were published by the EC (2016). This aspect of data management is tackled also by RIs, especially the ones that provide data-driven services. ELIXIR has published its [position paper](#) on FAIR data management in life sciences in 2017; and CESSDA prepared [guidelines](#) and published a 'Data Management Expert Guide' on its website, to accompany social science researchers in making their research data FAIR.

Good practice 20: *One of the interview participants (ERIC director) confirmed that the implementation of the FAIR principles is an important issue included in their current activity plan, and that an upcoming project under H2020 INFRAEOSC-04-2018 call aims at refining those issues and at helping RIs to adapt their data management plans.*



The GDPR regulation that came into force on 25 May 2018 also represents a challenge for RIs, especially those that produce sensitive data (such as patient data). One of the national node directors commented that GDPR implementation might bear risks which are difficult to forecast. At the same time, European RIs prepare their users and stakeholders by organising [webinars](#) and publishing other training materials.

InRoad recommends that all the relevant development in the national, European and international legislation be properly addressed in RI business plans, in order to be better prepared to that transition and operational adjustments.



SOCIO-ECONOMIC IMPACT

Socio-economic impact is an important but complex area. According to one of the RI managers interviewed, the quantification of impact is a problem for all RIs, but at the same time, they are aware that measuring impact successfully would allow the RI to have much better leveraging power with policymakers. Socio-economic data can demonstrate the relationship and impact that RI services have on the region, the European Research Area (ERA), etc. In a specific case, an interviewee stated that a special budget had been allocated during the preparatory phase to hire the services of a professional firm in order to track this data.

As stated by one ERIC director, it is not possible to attribute a monetary value to every output of the RI activities, and the RI impact assessment model should not be developed exclusively in that direction.

Moreover, RI activities contribute significantly to defining the regional Research and Innovation Smart Specialisations Strategies. Therefore, finding an appropriate way to demonstrate it will considerably shape the decision-making process. The example below shows how RIs can actively engage with RIS3 policy level.

Good practice 21: *Trying to contribute to embody the regional agenda on Blue Biotechnologies and attracting the regions towards the long-term sustainability of the RI, EMBRC have joined forces with the Conference of Peripheral Maritime Regions (CPMR), through a joint participation in an EMBRC preparatory phase project, in which the Smart Specialisation Strategies of 110 European coastal regions were analysed, mapping the relevance of 'marine biotechnologies' therein. Through this exercise, 17 regions have been identified, which consider Marine Biotechnologies as a priority area of specialisation. This number increased to 24 when the regions that recognise marine biotechnology as an enabling technology for other economic sectors were accounted for (e.g. aquaculture and fisheries).¹³*

Interviewees have also highlighted that it is important to take into account all current developments and available methodologies when performing the RI impact assessment. Important work on establishing the impact assessment indicators and defining relevant methodologies is being currently performed by an OECD Global Science Forum Expert Group on Research Infrastructures. Main indicators for establishing a reference framework for assessing the socio-economic impact of RIs are presented in the InRoad D3.3 'Good practices and common trends of national research infrastructure roadmapping procedures and evaluation mechanisms'. The ongoing RI-PATHS¹⁴ project also aims at defining the best practices of RI impact assessment.

¹³ Source : EMBRC website www.embrc.eu/about/collaborations

¹⁴ Charting Impact Pathways of Investment in Research Infrastructures, Horizon 2020 CSA project ri-paths.eu/

ACCOUNTING PRACTICES

When asked about accounting practices, the representative from one ERIC explained that one of the challenges they face is drawing a line between the RI activities conducted as the RI node from those of the institution. Yet, the biggest challenge concerns the comparability of inputs especially when nodes are bound to their host institutions accounting practices. Having guidelines on cost calculations would be extremely beneficial, whether these are issued by the EC, ERIC, RI's central hub or by the national government agencies. However, these should be coherent.

Another interesting point raised concerns auditing practices. According to one interviewee, while cost calculation methods at the institutional level follow the usual cost categories applied at the institutional level (e.g. personnel, equipment, travel, consumables and overheads), accounting rules for structural funds' audits comply with specific rules from the common procurement vocabulary.

Accounting standards at the central hub are often applied in compliance with the national law of the country where the statutory seat is located, having consequences for filing, auditing and publication of accounts. In other RIs, International Public-Sector Accounting Standards are used. In the latter case, the RI representative highlighted that even though it takes time for the partners to get used to this international system, it was their auditors who advised them to do so. Furthermore, according to the interviewee, accounting standards are linked to national laws, which might mean nothing to another country. For this reason, the consortium decided that it would be better to have international accounting standards, so that regardless of who joined, even from outside of Europe, it would be easier for them to interpret the information.

"We, for example, have international accounting standards because we believe that independently of who reads the balance they should be able to interpret them. If we use national accounting standards it would be very challenging for all countries. This is a decision we made, which has been questioned by some countries because they are not used to using international accounting standards but this is the easiest thing for everyone. It is like speaking English, it is a decision that we made at a certain point."



SUPPORT MEASURES FOR RI BUSINESS PLANNING

CONSULTATION OUTLOOK

Only 7 national policy making organisations out of 27 (26%) confirmed that they provide support measures to improve RI business planning. In some cases, despite the negative answer from the consultation respondent, relevant support measures were identified by investigating supportive documents (e.g. national roadmaps or guidelines for applicants in RI calls).

Support measures pointed out by survey respondents include: allocation of advisors to help with the drafting of RI business plans or identifying relevant business models; offering guidance to applicants per email, phone, direct discussion, or by publishing clear and detailed guidelines; specific topical meetings at national levels organised by the responsible Ministry and major research performing organisations.

Several consulted countries place a particular focus on the *support* of the RI operational viability, which is done using various methods, such as the development of detailed cost calculation guidelines.

PERSPECTIVE OF CASE STUDY PARTICIPANTS

When asked about support measures to improve business planning and long-term sustainability, RI managers confirmed that it would be very beneficial to have more exchanges with other infrastructures, especially for RIs that are in the preparatory phase, e.g. on the experience of setting up an ERIC. Having a formal way to exchange templates of the main standard documents would be also very helpful to avoid the situation that every emerging RI is required to set up its own procedures. The meetings targeted at the exchange of experience of RI managerial staff, such as [RItrain](#) or the [ERIC forum](#), are very useful at all stages of the RI lifecycle and should be further encouraged.

Other interviewees highlighted that one way to help address the RI long-term sustainability issue could be through improvement of internal expertise in business planning.

Furthermore, propositions such as putting more focus on the RI value creation for the research and society in the national strategic agendas were made. Interviewees mentioned the **visibility** of RIs as one of the main issues, emphasising that more support is needed to facilitate an efficient exploitation of the RI service capacity, e.g. financial or other incentives from the funders to foster the RI use by the national research projects.

"This incentivisation should come specifically from the policymakers. RIs should not be left alone to advertise their services."

Transnational access (TNA) schemes, in particular, have been named as a great promoter of a more efficient use of facilities.

InRoad's case studies also show that EU FP projects, dedicated to the support for RI development, have substantial impact on the elaboration of common access standards across RI communities.

Good practice 22: *An example of joint efforts aimed at improving the access standards is an ASSEMBLE+ project, funded under a H2020 INFRAIA call, which activities focus on the Transnational Access (TNA) and Virtual Access (VA) to marine biological stations. The managers of one of the national nodes involved indicated that their participation in such project helped them to establish a benchmark for service provision and considerably improve the skills of RI personnel, which was mainly done through staff exchange schemes and workshops.*



Other support measures relating to the improvement of business plan drafting expertise have been offered by ministries in certain countries, and include the provision of external professional services targeted at RIs, for instance in areas that affect the business sector. Furthermore, a continuous dialogue with the ministry/funding agency and the EC is regarded as important for feedback and guidance in areas like Horizon 2020, funding and links with industry. The [Blue Economy](#) meeting organised in March 2018 at the European Union Parliament provides a good example of such dialogue. These actions should be encouraged and facilitated, as stated by one of the interviewees.



CONCLUSION

This report has presented current business plan practices in European RIs. The case studies, desk research and InRoad consultation aimed to assess three main issues with regards to business planning: the extent to which managers in the selected facilities use business plans for their daily operations; the degree to which these are required in national RI roadmap and funding procedures across Europe; and the identification of those components that are advised to be an integral part of a RI's business plan.

The findings gathered throughout these past 24 months show that although business planning is seen as challenging by case study participants, national funding organisations and RI managers consider them instrumental for different purposes. From the RI manager's perspective, business planning can make RIs more transparent, efficient, effective and accountable, and from the funding organisation's perspective they can improve decision-making in national competitive roadmapping and funding processes. Considering the complexity associated to the design and implementation of business plans throughout the entire RI lifecycle, it can be concluded that additional support measures targeted at providing guidance on business plan drafting and implementation (both, at national and European level) to current and future RI managers is vital to ensure the long-term sustainability of European RIs.

Considering the above, InRoad proposes the following recommendations to help accomplish the RI's objectives successfully along the different stages of their lifecycle.

1. InRoad recommends all RIs to develop a business plan in order to align their strategy, resources and goals and to connect their mission with national and international strategic agendas.
 - The inclusion of a set of minimal components in a RI's business plan;
 - Short- and long-term financial forecasting for robust RI growth;
 - The alignment of central-level and node business plans to reflect coherent strategies in distributed pan-European RIs;
 - The professionalization of business plan drafting and implementation.
2. InRoad recommends the use of the business plan as a management tool, in the form of a living document aimed at ensuring the long-term sustainability of the RI.
 - Using the business plan as a reference for the development of other more operational documents;
 - Using and periodically updating the business plan throughout the entire RI lifecycle.
3. InRoad recommends early and continuous stakeholder involvement for the development, implementation and updating of a sound business plan.
 - Using business plans as a requirement in national RI roadmap and funding applications and as an evaluation criterion;
 - The development of training schemes, exchange of practices and mutual learning exercises.

In today's competitive world, RIs not only depend on stable and predictable funding frameworks to excel, but also on effective management systems to execute their strategy and maximise their growth and impact. Professional business planning, therefore, provides a reliable framework to accomplish these objectives successfully.



REFERENCES

- ANR (2017) 'Investissements d'Avenir – Projets financés – EMBRC' [online] <http://www.agence-nationale-recherche.fr/ProjetIA-10-INBS-0002> [Last access 11/2018]
- BBMRI-ERIC (2017) 'Policy for Access to and Sharing of Biological Samples and Data'. Retrieved from http://www.bbmri-eric.eu/wp-content/uploads/AoM_10_8_Access-Policy_FINAL.pdf [Last access 03/2018]
- BBMRI-ERIC (2017) 'Work programme 2018'. Retrieved from <http://www.bbmri-eric.eu/wp-content/uploads/Work-Programme-2018-online.pdf> [Last access 03/2018]
- Bolliger, I. (2017) 'InRoad Consultation Report. Prioritisation, Evaluation and Funding of Research Infrastructures in Europe'. Bern: Swiss National Science Foundation. Retrieved from http://inroad.eu/wp-content/uploads/2017/11/InRoad_Consultation_Report_201711.pdf [Last access 12/2018]
- CESSDA Training (2018) 'Fair data' [online] <https://www.cessda.eu/Training/Training-Resources/Library/Data-Management-Expert-Guide/1.-Plan/FAIR-data> [Last access 12/2018]
- Clément, B. et al. (2014) 'Public Biobanks: Calculation and Recovery of Costs'. *Science Translational Medicine* 6(261): 261fs45, DOI: 10.1126/scitranslmed.3010444
- EC (2015) 'European Structural and Investment Funds 2014-2020: Official Texts and Commentaries'. Retrieved from http://ec.europa.eu/regional_policy/sources/docgener/guides/blue_book/blueguide_en.pdf [Last access 28/03/2017]
- EC (2016b) 'European Charter for Access to Research Infrastructures Principles and Guidelines for Access and Related Services'. Luxembourg: Publications Office of the EU. Retrieved from https://ec.europa.eu/research/infrastructures/pdf/2016_charterforaccessto-ris.pdf [Last access 12/2018]
- EC (2016c) 'Guidelines on FAIR Data Management in Horizon 2020'. Retrieved from http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf [Last access 12/2018]
- EC (2017c) 'Sustainable European Research Infrastructures – A call for action'. *Commission staff working document*. Retrieved from <https://publications.europa.eu/en/publication-detail/-/publication/16ab984e-b543-11e7-837e-01aa75ed71a1/language-en> [Last access 12/2018]
- EC (2018) 'What is Smart Specialisation?'. *European Commission Smart Specialisation Platform* [online] <http://s3platform.jrc.ec.europa.eu/what-is-smart-specialisation-> [Last access: 12/2018]
- ECCSEL (2015) 'D1.2. ECCSEL Business Plan – Final'. Retrieved from <http://old.eccsel.org/SciPublicationsData.aspx?IdPublication=316&IdType=327> [Last access 11/2018]
- ELIXIR 'Position paper on FAIR Data Management in the life sciences'. Retrieved from https://www.elixir-europe.org/system/files/elixir_statement_on_fair_data_management.pdf [Last access 12/2018]



- Euromarine Network (2018) 'Releasing the economic potential of marine biotechnology: meeting programme'. Retrieved from <http://www.euromarinenetwork.eu/system/files/2018/Blue%20bioeconomy%20Releasing%20the%20economic%20potential%20of%20marine%20biotechnology%20Agenda.pdf> [Last access 11/2018]
- GSRT (2014) 'National Roadmap for Research Infrastructures'. Retrieved from https://ec.europa.eu/research/infrastructures/pdf/roadmaps/greece_national_roadmap.pdf#view=fit&pagemode=none [Last access 11/2018]
- GSRT (2016) 'Ex-ante Conditionality (EAC/1-2) Research and Innovation Infrastructures: The existence of a multi-annual plan for budgeting and prioritization of investments'. Retrieved from http://www.gsrt.gr/Financing/Files/ProPeFiles88/ex-ante-1-2_Nov%202016%20V.11.pdf [Last access 11/2018]
- InRoad (2018b) 'Report from Regional Technical Workshops'. Bern: Swiss National Science Foundation. Retrieved from http://inroad.eu/wp-content/uploads/2018/07/D4.4_cdas_final_annexes.pdf [Last access 12/2018]
- ISBE Project (2014). 'Business Case'. *Reference* [online] http://project.isbe.eu/wpisbe/wp-content/shared-data/2014/11/ISBE_Business_Case_FINAL_Nov14_screen.pdf [Last access 12/2018]
- MESRI (2012) 'Programme Investissements d'Avenir, l'action Santé et biotechnologies' [online] <http://www.enseignementsup-recherche.gouv.fr/pid25310-cid59286/20-laureats-pour-la-seconde-vague-des-appels-a-projets-de-l-action-sante-et-biotechnologies.html> [Last access 11/2018]
- MEYS (2014a) 'Ex-ante Evaluation Methodology – Evaluation form B'. Document is not public, provided by the consultation respondent from MEYS [Last access 11/2018]
- MEYS (2014b) 'Evaluation Methodology for Research Infrastructures'. Retrieved from <https://www.slideshare.net/ipnmetodika/evaluation-methodology-for-research-infrastructures> [Last access 11/2018]
- MEYS (2015) 'Roadmap of Large Infrastructure for Research, Experimental Development and Innovation of the Czech Republic for the years 2016–2022'. Prague, October 2015. Retrieved from www.msmt.cz/file/37456_1_1 [Last access 11/2018]
- Ministero dell'Istruzione, dell'Università e della Ricerca Accesso (2017) 'Programma Nazionale per le Infrastrutture di Ricerca (PNIR) 2014-2020'. Retrieved from <http://www.ponricerca.gov.it/notizie/2017/pnir/> [Last access 12/2018]
- Ministry of Economy and Competitiveness of Spain (2015) 'MAP of unique scientific and technical infrastructures (ICTS)'. Madrid: Secretary of State for Research, Development, and Innovation. Retrieved from https://ec.europa.eu/research/infrastructures/pdf/roadmaps/spain_national_roadmap.pdf [Last access 12/2018]
- Nardello, I. et al. (2017) 'EMBRC-ERIC Business Plan, update'. Retrieved from <http://www.embrc.eu/embrc-eric-business-plan-nardello-et-al-april-2017> [Last access 11/2018]
- NWO (2016) 'National Roadmap Large-Scale Scientific Infrastructure'. Retrieved from <https://www.nwo.nl/en/documents/nwo/permanent-commission/roadmap-large-scale-scientific-infrastructure> [Last access 11/2018]



- NWO (2017) 'Call for proposals: National Roadmap Large-Scale Scientific Infrastructure'. Document was provided by the consultation respondent from NWO [Last access 11/2018]
- NWO (2018) 'National Roadmap: 138 million euros for ten top research facilities' [online] <https://www.nwo.nl/en/news-and-events/news/2018/04/national-roadmap-138-million-euros-for-ten-top-research-facilities.html> [Last access 11/2018]
- OECD GSF website (2018) <http://www.oecd.org/sti/inno/oecdglobalscienceforum.htm> [Last access 12/2018]
- Osterwalder, A. (2004) 'The business model ontology a proposition in a design science approach'. PhD thesis. Lausanne: Ecole des Hautes Etudes Commerciales (HEC). Retrieved from: http://www.hec.unil.ch/aosterwa/PhD/Osterwalder_PhD_BM_Ontology.pdf [Last access 12/2018]
- Operational Programme Competitiveness, Entrepreneurship and Innovation 2014-2020 (EPA-nEK) [online] http://www.antonistikotita.gr/epanek_en/index.asp [Last access 11/2018]
- RCN (2018a) 'Tools for Research. National strategy for research infrastructure 2018-2025'. Lysaker: the Research Council of Norway. Retrieved from https://www.forskningsradet.no/prognett-infrastruktur/National_strategy_for_research_infrastructure/1253976458361 [Last access 11/2018]
- RCN website (2018b) 'National Financing Initiative for Research Infrastructure (INFRASTRUKTUR)'. https://www.forskningsradet.no/prognett-infrastruktur/Home_page/1224697900438 [Last access 11/2018]
- RCN website (2018c) 'Norway's national strategy for research infrastructure 2018-2025'. https://www.forskningsradet.no/prognett-infrastruktur/National_strategy_for_research_infrastructure/1253976458361 [Last access 11/2018]
- UHR (2014) 'A Norwegian Research Infrastructure Resource Model. A methodology for declaring the costs and pricing the use of research infrastructure in externally funded projects at Universities and Colleges'. Retrieved from https://www.uhr.no/f/p1/i7917a849-7f91-49c4-9e66-55d715c525ba/a_norwegian_research_infrastructure_resource_model_270214.pdf [Last access 12/2018]
- Thorndyke M. et al. (2013) 'EMBRC-ERIC Business Plan'. Retrieved from <http://www.embrc.eu/sites/embrc.eu/files/public/EMBRC%20Business%20Plan.pdf> [Last access 04/2018]
- Zatloukal K., et al. (2012) 'BBMRI Business Plan, v21.1'. Retrieved from <http://www.bbmri-eric.eu/wp-content/uploads/BBMRI-Business-Plan.pdf> [Last access 03/2018]
- Wilkinson, M.D. et al. (2016) 'The FAIR Guiding Principles for scientific data management and stewardship'. Scientific Data 3. Doi: 10.1038/sdata.2016.18



ANNEX

QUESTIONS OF THE SECTION 3 IN THE INROAD CONSULTATION

- Is the existence of a business plan an eligibility criterion for an infrastructure to be included in the national RI roadmap? (yes / no)
- If not, does it become a criterion for an RI to be able to stay on the national roadmap after a certain period of time? (E.g. regular updates of the national roadmap, or after an established period for an infrastructure to reach maturity, etc.) (yes / no)
- Please provide detailed information on how you request business plan information, such as: instructions for the roadmap process, application forms etc. incl. a description of the business plan components, as requested from the RI, incl. a description of the assessment criteria related to the business plan.
- Please indicate which topics (if any) are present in your national roadmapping procedure and indicate any additional ones that are addressed within the framework of the business plan:
 - o RI budget
 - o RI annual full cost
 - o RI full life time cost (including termination)
 - o RI financial sustainability and funding sources
 - o In-kind resources calculation method
 - o Risk analysis
 - o Key performance indicators
 - o RI in house research
 - o Governance
 - o Management structure
 - o Socio-economic impact
 - o Access policy
 - o Use and capacity of RI
 - o Service and support for users
 - o Commercial policy
 - o Procurement policy
 - o Use of market studies
 - o Technology Readiness Level (TRL)
 - o Data and intellectual property rights policy
 - o Legal framework
- Please describe briefly which key weak points you have identified in business plans
- Please describe briefly your procedures and policies to phase out or repurpose facilities
- Do you provide support measures aimed at improving the business plan of a research infrastructure?
If yes, please give a detailed description of the measures, and upload the corresponding documents if available.



EXAMPLE OF THE INTERVIEW GUIDE

Each of the interview guides was adapted to the specific situation of the investigation subject (e.g. published and publicly available business plan, is subject single-sited RI, national node of a European RI or its central management office). The example below show a guide targeted at the national node managers.

I) Business Plan drafting. BP as a management tool for the national node implementation and operation.

1. Do you have business plan (separately from ERIC one)? **(yes/no)**
2. **If node BP exists:** was it designed prior or after the ERIC business plan?
3. If designed prior to the ERIC BP, how did it contribute to the development of the ERIC business plan?
 - a. Which components of this business plan were used in the drafting of the ERIC BP?
4. If designed after the ERIC business plan was approved, did you use the former as a model to draft your own?
5. **If there is no node BP:** Have you had *other strategic documents* that contributed to the ERIC BP development? (e.g. Financial Plan, Socio-economic impact study, etc.)
6. **If there is no node BP:** do you plan to design a Business Plan for your node in the near future?
 - a. If yes, what is the incentive to draft a separate BP? (e.g. requirement from the funder; ERIC BP is not sufficient for the node management activities)
 - b. If not, why?
7. Did you gather feedback from your user community for the ERIC BP or your node BP development? (*via* surveys, dialogues, user meetings, etc.)
8. Are there *business plan chapters* where you see a strong need for more frequent revision and update than the business plan as an integral document? (for instance, Governance and Organization, Financial and Funding Framework, Income and Revenue, Costs, Access policy, Key Performance Indicators, Risk Management)
 - If yes, should such revisions be done solely on the level of the central hub, or do you envisage to perform them at the level of national node?
9. Which support measures (from ministries, funding or other policy-making organisations) would be useful to improve BP drafting at the level of national node?

II) Business Plan as a management tool for the RI implementation and operation phases.

10. Is business plan used as a main strategic tool for EMBRC-GR node management? **(yes/no)**
 - a. If yes, how is it used in such a capacity?
11. Are there parts of the business plan, which are used more extensively than others for the facility management activities? (please elaborate)

III) Evaluation and monitoring of RI performance. Link to funding and roadmapping procedures

12. Which internal monitoring mechanisms are in place at your RI?



13. Are KPIs, used for the facility evaluation and monitoring, the same as described in the ERIC business plan?
 - a. If not, did you develop a separate set of KPIs to manage and monitor the national node performance?
14. Is business plan required in the frame of a national roadmapping process? **(yes/no)**
15. **If not:** are there separate components of business plan that were required for a roadmap update (such as having an access policy in place, multi-annual budgetary plan, etc)?
16. **If yes:** how business plan (node BP if applicable, or ERIC BP) was evaluated in frame of the latest national roadmap update?
17. **If yes:** Did you rely solely on existing business plan to satisfy funder's requirements, or did you need to develop and provide some additional documents?
18. What are the principal differences between funder's procedure on RI evaluation and the procedures applicable for the node / national RI performance monitoring?

IV) Long-term sustainability of Research Infrastructure
--

19. Please, identify the key factors that affect mostly the long-term sustainability of your RI (pillars of sustainability)

Financial planning

20. How do you plan to assure a financial long-term sustainability in terms of funding and revenues? Please describe briefly
21. Have you performed the full life cycle cost calculation?
 - a. If yes, what are the biggest challenges in estimating the full RI life cycle costs?
 - b. If not, why isn't it useful?
22. How termination and decommissioning are included in the full life cycle cost calculation?
23. For the financial planning of the node, do you use the same cost categories that are described in the ERIC business plan? **(yes/no)**
Please, elaborate further if you use different cost categories
24. Are the cost categories described in the ERIC Business Plan the same that were requested by funders in the RI evaluation procedure at the national level? Please, describe the principal differences.

Risk management

25. Do you use the risk management plan described in the ERIC business plan? **(yes/no)**
26. If yes, how it is implemented at the national node level?
27. If not, did you develop a separate risk management plan?
 - a. What are specific risks at national node that encouraged the development of a separate risk management plan?
28. How are financial risks covered? Is there dedicated funding available for handling such risks (e.g. contingency plan)?

Access policy and commercial strategy

29. How important are access policy and commercial strategy in assuring long-term sustainability of the RI?
30. Is the European Charter for access implemented at the node level?
31. How the access policy under ERIC brand differs from the access policy of the national infrastructure?



32. Which method are you using for calculation of the 'cost of the access unit'?
33. How are in-kind contributions included into the access policy?
34. Do you implement the same commercial strategy that described in the ERIC BP?
(yes/no)
 - a. If not, please describe the principal differences between central Hub and node strategies.
35. What is the percentage of the economic activities (services provided to industrial users)?
 - a. Are there limitations for economic activities? (limitations imposed by the funding mechanisms / funding bodies / limitations defined by RI capacity)
36. Which support measures (from ministries, funding or other national policy-making organisations) would be useful to improve the long-term sustainability of your node / national RI?

V) Socio-economic impact (topic which was only included in selected interviews)
--

37. Was socio-economic study performed at the national node level?
38. Was the socio-economic impact study done as a requirement from the funder or internal need for the RI strategy development?
39. How socio-economic impact study takes into account the regional specificities?
40. What is the role of RI in creation of innovation hubs? Could you provide an example?



ELEMENTS OF RI PROPOSAL AND EVALUATION CRITERIA APPLICABLE IN STUDIED NATIONAL ROADMAP PROCEDURES

Greece

RI proposal evaluation criteria used in the second Call for expressions of interest issued by GSRT¹⁵:

I. ON/OFF criteria

A. Compliance with the definition of research infrastructure (yes/no)

Reference to the definition of RIs in EU Regulation 651/26.6.2014

B. Contribution to the RIS3 priority areas:

- a) Its main activities are fully aligned to product / process / organisational innovation of RIS3 priority sectors (yes/no)
- b) The majority of the RI deliverables and services contribute to the RIS3 priority sectors (yes/no)

II. Ranking criteria

A. Scientific, technological potential and maturity of the RI (1-5)

- a) Scientific excellence (significance of the RI for the specific research fields addressed)
- b) Degree of interdisciplinarity
- c) Perspectives for scientific and technological breakthroughs in the field of RI operation
- d) Maturity of the RI

B. Effective Networking, Synergies within the Knowledge Triangle and International Visibility (1-5)

- a) Competence and complementarity of the partners and added value of the national RI network at the regional, national and international level
- b) Synergies, degree of networking and creation of critical mass
- c) International networking, openness and visibility of the RI with emphasis on ERA integration effects, e.g. ESFRI participation
- d) Education and training for students, researchers, technicians, engineers and administrators of RI

C. Access Policy (1-5)

- a) Access policy for researchers
- b) Access policy for industry and enterprises (addressing IP rights, fees and confidentiality issues, collaboration with enterprises, open access policy to enterprises and the private sector in general)
- c) International Openness and Access for International Users

D. Governance and Sustainability of the RI (1-5)

- a) Clear management structure & governance of the proposed research infrastructure.
- b) Involvement of private sector representatives in the Research Infrastructure
- c) Technical feasibility, including human resource issues & cost effectiveness in the proposed infrastructures
- d) Clear investment plan securing the long-term viability of the RI.

E. Innovation Potential & Contribution to Private Sector Innovation (1-5)

- a) Contribution to increase the potential for innovation and technology transfer through the construction and operation of the RI, based on expected results and spillover effects of the RI
- b) Contribution to the creation of high growth SMEs
- c) Foresees support of SMEs in organisational innovation.

F. Contribution to National and Regional Growth & Socioeconomic Benefits (1-5)

- a) Contribution to private sector R&D investment

¹⁵ Ενδεικτικό Πολυετές Σχέδιο Χρηματοδότησης των Εθνικών Υποδομών Έρευνας και Καινοτομίας [Indicative Multiannual Plan for Financing National Research and Innovation Infrastructures], November 2016, p.25



- b) Creation of an attractive environment for knowledge intensive activities and new employment for highly skilled scientists and engineers
- c) Revenue from licensing and/or patents commercialisation
- d) Economic and social benefits for Greece as a location for conducting cutting edge research at national, regional and international level
- e) Expected impact of the RI on additional socioeconomic issues (e.g. employment, environment, related commercial/business activities) in the national & regional economy.

Italy

Aspects assessed by CNR in the frame of the [PNIR¹⁶](#) update, performed in February 2017:

- RI organisation and governance;
- Contribution to the S3;
- Risk analysis;
- Socio-economic impact of RI: deep knowledge of territories;
- Added value at European level: requirement to receive at least 30% of international (European) users, mobility of researchers, policy for open data for innovation;
- Management quality; human and financial resources;
- Technological quality: development of methods and processes for industries and services;
- Scientific quality: frontier research and networking, benchmarking with other RIs at international level.

Czech Republic

Areas addressed by the [form B¹⁷](#) requested in the **Czech** RI ex-ante evaluation procedure:

- Description of the Research infrastructure (Research focus and technologies used, Management structure);
- Significance of the RI (Compliance with research disciplines and research institutions in the Czech Republic/abroad, added value);
- Cooperation (Relationships within the ERA, relationships outside the ERA);
- Capacity of use and outputs of RI (User access strategy, capacity use, scientific results, contribution to development of new technologies);
- Benchmarking of the RI (Benchmarking with other RIs operated in the respective research field internationally);
- Feasibility and Technology development;
- Costs and budget (Personnel costs, operation costs – overheads, services, travels –, membership, investments / annual costs breakdown 2018-2022);
- Portfolio of indicators.

The Netherlands

RI assessment criteria applied at the funding stage in the **Dutch** roadmap procedure¹⁸:

1. Science and excellence case (*relative weight 33.3%*)
 - a) The importance for science and the potential to attract researchers;
 - b) The embedment of the investments;
 - c) The urgency of the investment for Dutch science.
2. Innovation and strategic case (33.3%)
 - a) The importance for society and industry and connections to societal developments;

¹⁶ Programma Nazionale per le Infrastrutture di Ricerca <http://www.ponricerca.gov.it/notizie/2017/pnir/>

¹⁷ The ex-ante Evaluation Methodology_Evaluation form B was provided by the consultation respondent from MEYS, it is not a publicly available document

¹⁸ Call for proposals 'National roadmap for Large-scale Research Infrastructure', December 2016, p.15

- b) National interest.
- 3. Technical, business and management case (33.3%)
 - a) Technical feasibility;
 - b) ICT infrastructure;
 - c) Organisation and governance;
 - d) Accessibility;
 - e) Financial aspects;
 - f) Risk analysis.

Norway

Main parts of the RI application template requested in the INFRASTRUKTUR call from the Research Council¹⁹:

0. RI project title, project leader and host institution, type of RI
1. Relevance to the call for proposals
2. Status of current research and infrastructures in Norway and internationally
3. Description of the Research Infrastructure
4. Impacts of the Research Infrastructure
5. Importance of the research infrastructure for various user groups
6. Plan for access and knowledge management
7. Data management
8. Partners
9. Project management
10. Work plan (breakdown per Work Package), time-schedule, deliverables and milestones
11. Risk analysis and mitigation measures
12. Costs and funding plan (covering the investments and 10-years operational plan)
13. Environmental and ethical perspectives

Corresponding criteria used for the evaluation of RI proposals²⁰:

- Relevance relative to the call for proposals
- The national importance of the infrastructure
- Benefit to research of the infrastructure
- Internationalisation
- Relevance and benefit to trade and industry
- Relevance and benefit to society
- National cooperation
- Distribution of national research responsibility
- Feasibility (with regard to technical solutions / to the available expertise / to personnel and financial resources)
- Plan for establishment and operation of the research infrastructure
- Administrative leadership of the infrastructure
- Strategic basis and importance
- Quality of the application documents
- Ethical perspectives
- Environmental impact

¹⁹ The template for project description used in the Call for proposals issued in August 2016 was provided by the consultation respondent from RCN.

²⁰ The guiding document 'Assessment criteria for Research Infrastructure grant applications' issued in June 2016 was also obtained directly from the consultation respondent.



Spain

A Strategic plan requested from all RI projects applying for a roadmap update should not necessarily conform to a specified format, but the following minimum content was suggested by the Ministry of Economy and Competitiveness of Spain (MINECO) with a recommended page limit of 20 pages²¹ (translation from Spanish):

0. Analysis of compliance with the previous Strategic Plan (for established RIs)
 1. Mission and Vision
 2. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis
 3. Objectives of the next four-year period, which will include:
 - 3.1. Description of the objectives
 - 3.2. Strategies to achieve the objectives
 - 3.3. Development of strategies (actions planned)
 - 3.4. Resources
 4. Investment Plan
 5. Timeline and monitoring

RI evaluation criteria applicable in the roadmap update²² (translation from Spanish):

- Unique and strategic nature of RI
- Objectives
- Investments and financial plan
- Open access
- Scientific-Technical Advisory Committee
- Management structure
- Dedicated personnel
- Implementation and performance
- Public ownership

²¹ Actualización continua y Seguimiento del Mapa de Infraestructuras Científicas y Técnicas Singulares, a working document of the Executive Committee of the CPCTI (June 2017), Annex B-2

²² Same document, Annex A

