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Milestone 4.2- Assessment of Current Approaches to Alignment:

Case Study No.5- JPI Oceans' Shared Research Vessel

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ABSTRACT

This case study examines the key features, outputs and overall strengths and weaknesses of a specific modality that supports greater alignment of research activities, namely the **shared use of the German Research Vessel SONNE**, undertaken in the context of a transnational research project launched by the **Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans)**. While focusing on the specific experience of JPI Oceans, the case study also provides lessons for other public-to-public research partnerships wishing to develop a similar approach to facilitate the sharing of research infrastructure, in view of promoting cross-border alignment. The case study does however not aim to provide an in-depth assessment of JPI Oceans' approach.

The study highlights the many benefits of jointly using national research infrastructure. This **cost-effective** approach allows to reduce costs related to the implementation of a research project at national level as the latter are borne by all participating partner countries. As such, countries with less financial resources can benefit from expensive cutting-edge research facilities or equipment. In addition, researchers from different countries work as a team for a joint project in the same place and at the same time. This has contributed to **trust-building amongst researchers**, the **development of a common understanding** and the **integration of national research activities around a common scientific objective**. At an operational level, the shared use of research infrastructure has facilitated **standardised data collection**, **coordination of research methods** and **open access to research data**. Lastly, this has in turn allowed for **more effective collective European contributions to international policy-making**.

Yet, JPI Oceans' participating members have also been confronted with: (i) limited time to set up the terms for sharing the research vessel, as Germany had to quickly start planning next research cruises on its newly built research vessel, hence preventing the implementation of a competitive bidding system; and (ii) a challenging elaboration of a new funding mechanism for cross-border infrastructure sharing, and particularly for the *simultaneous* use of a research vessel by several research institutes under the same transnational research project.

The case study builds on the ERA-LEARN 2020 Task 4.1 ("Definition and Typology of Alignment"), and relies on a review of existing literature and targeted interviews with the member of JPI Oceans' Secretariat in charge of following the related joint research project and the Project Manager. The case is part of a series of nine short case studies that form the basis of the ERA-LEARN 2020 Task 4.2 "Assessment of Current Approaches to Alignment". The nine case studies that have been selected for this Task each rely on a different instrument (Member-State instrument or EC instrument, e.g. ERA-NET), cooperation mode (e.g. networking amongst researchers, programme integration, institutional cooperation, etc.) and approach (strategic, operational and/or financial) that promote alignment, and that are often put in place at different stages of the research programming cycle (planning, strategy, implementation, etc.).

ACKNOWLEDGEMENTS

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1. Introduction

This case study examines the key features, outputs and overall strengths and weaknesses of a specific modality that promotes alignment, namely the **shared use of the German Research Vessel SONNE**, undertaken within a transnational research project launched by the **Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans)**. The study assesses in what context such an approach is best used for promoting greater alignment of national research programmes and activities. While focusing on the specific experience of JPI Oceans, the case also provides **lessons for other JPIs and public-to-public research networks** wishing to develop a similar approach to facilitate the sharing of research infrastructure to promote cross-border alignment.

According to the Typology of Alignment (ERA-LEARN 2020 Task 4.1), the shared use of existing national research infrastructure is implemented thanks to an agreement among countries on the procedures, rules and fees for the common use of research infrastructure. This modality relies on alignment at operational and financial levels. It mainly concerns the implementation phase of the research programming cycle. In JPI Oceans' case, the development and implementation of the research project that has supported the joint use of a national research infrastructure has particularly involved research performing organisations and individual researchers.

2. Key features of JPI Oceans' infrastructure sharing approach

2.1 Overview

The three-year pilot action "Ecological Aspects of Deep-Sea Mining" was launched by JPI Oceans in January 2015. This transnational research project aims to assess the ecological impacts that could arise from commercial mining of deep-sea minerals called polymetallic nodules. The project brings together researchers and 25 different research performing organisations active in the field of deep-sea research across 11 European countries[1]. It was initiated by the German Federal Ministry of Education and Research, which offered to share the use of its newly built research vessel *RV SONNE* during 118 days to support this transnational research project. This research cruise took place around the international concession areas for deep sea mining in the Eastern Pacific, between March and October 2015. Each cruise leg lasted about a month to a month and a half. Shore-based analyses of the data collected onsite are being conducted in order to quantitatively estimate the potential impacts of polymetallic nodules deep-sea mining.

Several countries are considering undertaking deep-sea mining as an economic activity. As there is only very limited knowledge on its potential impacts, the United Nations (UN) seeks to establish a global governance framework for deep-sea resources. It wishes to define a legal framework which regulates deep-sea mining activities and has put the International Seabed Authority[2] (ISA) in charge of elaborating common standards and governing rules. Hence, a common European input towards this global framework is needed. The joint action launched by JPI Oceans seeks to address this European challenge by providing scientific knowledge and policy advice on the ecological impact of deep-sea mining. As a ship is required to carry out this type of research, sharing an existing research vessel was most suited in this case in order for a European research team to jointly collect and analyse the required data.

The approach of sharing a research vessel is quite unique as it has been implemented for very few ships worldwide (e.g. through barter systems). Even then, the agreement of lending the ship is generally only bilateral since the latter is usually used by one research institute at a time, and not by a transnational team **bringing together research institutes from various countries simultaneously** as it is the case for JPI Oceans' pilot action. More broadly, the coordination and sharing of research infrastructures is being increasingly promoted at the European level in order to facilitate the access of scientists to most up-to-date infrastructures, enhance economies of scale and develop highly interoperable research processes.[3] The **European Strategy Forum on**

[1] Belgium, France, Germany, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Sweden and the United Kingdom.

[2] The International Seabed Authority was established under the 1982 United Nations Convention on the Law of the Sea and is an autonomous international organization through which States Parties to the Convention organize and control activities on the seabed and ocean floor and in the subsoil beyond the limits of national jurisdiction and within the geographical boundaries defined in the Convention.

[3] In the field of marine research, this has for instance been enhanced through the European Network of Marine Research Institutes and Stations (MARS; http://www.marsnetwork.org/).

Research Infrastructures (ESFRI) supports competitive and open access to high quality Research Infrastructures across Europe (see Box 1).

Box 1. The European Strategy Forum on Research Infrastructures (ESFRI)

ESFRI seeks to facilitate multilateral initiatives leading to the better use and development of research infrastructures, at EU and international level. It identifies **Research Infrastructures (RIs) of pan-European interest** meeting the long-term needs of Europe's research communities across all scientific areas. As such, it provides to the Council of the European Union a coherent and strategic vision regarding European RIs through the publication of updated ESFRI Roadmaps.

ESFRI acts as an incubator for new RIs or for the upgrading of existing ones through their inclusion in its Roadmap as **ESFRI Projects**. It supports their implementation within a maximum of one decade, in order to reach sustainability for the long term operation, therefore assuring maximum return on investment in terms of science, knowledge, innovation, training, socio-economic benefits and competitiveness. ESFRI Projects are selected for their high degree of maturity and for their strategic importance within the European Research Infrastructure system. **ESFRI Landmarks** are successfully implemented ESFRI Projects that are featuring top science services or effectively advancing in their construction. ESFRI facilitates their continuous support for successful completion, operation and upgrade in line with the optimal management and maximum return on investment. ESFRI currently supports 21 ESFRI Projects and 29 ESFRI Landmarks.

In addition, ESFRI provides a mapping of Research Infrastructures open to European scientists at national, European and international levels through its **Landscape Analysis**. The latter hence gives an overall view of the European RI system and is key to the selection of new ESFRI projects as it allows to better understand the potential impact of proposed RIs.

Over the past decade, ESFRI has improved the efficiency and impact of the European RI system. Most national strategies are now coordinated with that of ESFRI and move towards a sustainable investment for overall competitiveness.

Source: ESFRI Roadmap 2016

2.2 Mission and activities

The overall aim of JPI Oceans' deep-sea mining research is to provide joint European scientific recommendations for the future regulation of deep-sea mining activities at the UN level. Researchers participating in JPI Oceans' pilot action and joint cruise seek to:

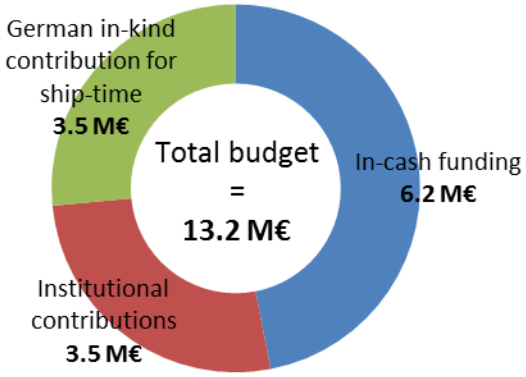
- Predict the ecological, biogeochemical and hydrodynamic consequences of a mining impact;
- Test a range of modern rapid assessment methods and monitoring techniques for defining the ecosystem status, especially before and after anthropogenic disturbances;
- Conduct a comparative baseline study across different deep-sea environments (e.g. trophic states and seamounts): this aims to strengthen baseline studies that must be undertaken by European holders of exploration licenses from the International Seabed Authority;
- Communicate the results to stakeholders, policymakers to initiate the revision of ISA regulations, where appropriate, and a discussion on how to minimize the ecological impacts of future deep-sea mining activities.[4]

2.3 Approximate resources and time needed for implementation

JPI Oceans' pilot action **relies entirely on participating countries' funding**. Its total budget amounts to 13.2 M€, which includes about half of in-kind contributions and half of in-cash contributions (see Fig. 1).Using a deep-sea research vessel is very costly, which is why Germany's contribution for ship-time represents over 25% of the total costs. Institutional contributions are provided by participating research performing organisations. In-cash funding has served to cover the costs for hiring additional staff, travelling, renting equipment, etc.

[4] JPI Oceans Annual Report 2015; http://www.jpi-oceans.eu/ecological-aspects-deep-sea-mining

Figure 1. Total budget of JPI Oceans' pilot action



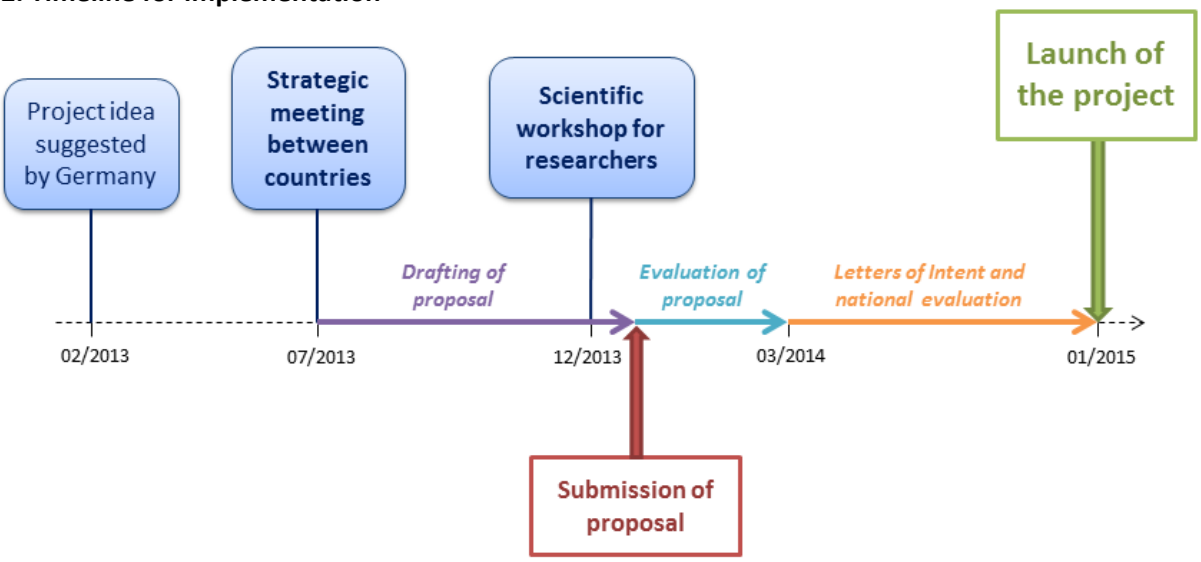
Source: Interview with John Hanus (JPI Oceans Secretariat)

As indicated in the timeline below (Fig. 2), **less than two years** were required to set up JPI Oceans' joint action once Germany had proposed to the Management Board of JPI Oceans to launch a joint action and use its ship for onsite deep-sea research. This short duration was linked to Germany's time constraint for planning the schedule of future cruises on its research vessel (see Section 5.1 below).

A first meeting took place between interested countries. Research funding providers and national scientific experts discussed and jointly agreed on the **strategic objectives** to be achieved by the joint action. The meeting gave way to a collective process for the drafting of a proposal for a joint cruise by researchers, which was finalised during a scientific workshop in December 2013. The latter brought together about 100 researchers from 25 different research institutes. The joint proposal was then submitted and evaluated by Germany with the contribution of international experts, as well as by JPI Oceans' Strategic Advisory Board, which consists of leading scientists, technologists/industrialists and representatives of civil society.

Once the joint proposal was approved both by Germany and JPI Oceans' Management Board (i.e. JPI Oceans' decision-making body), each project partner sent a Letter of Intent describing and guaranteeing its specific participation in the project (i.e. funding, scientists, and equipment provided; research activities to be implemented). These national proposals and commitments were also evaluated at national level. Due to time constraints, no formal joint call could be implemented to select proposals. Researchers were selected at national level, hence without common selection procedures and criteria across participating countries (see Section 5.1).

Figure 2. Timeline for implementation



Source: Interview with John Hanus (JPI Oceans Secretariat)

3. Principal outputs to date

As the project is still on-going and finishes in June 2018, all expected outputs have not yet been achieved. So far, the JPI Oceans project has succeeded in supporting:

- The launch of three joint research expeditions: the first one (SO-239) took place in the German, Belgian, and French license areas and, for the first time, in one of the nine protected areas defined by the ISA in the Clarion Clipperton Zone (CCZ). Samples and data were collected in order to (i) assess the ecosystem status prior to any mining activities, (ii) study the genetic connectivity between distant deep-sea populations and (iii) compare the fauna from seamounts with the fauna living attached to the nodules to evaluate if seamounts are suitable refuges and sites of recolonisation for species from mined areas. The two other expeditions (SO-242a/b) took place in the Peru Basin to revisit the DISCOL (DISturbance and re-COLonization experiment) area, where a disturbance experiment had been conducted 26 years ago to simulate mining impact. They enabled to investigate the scale of recovery and the current ecosystem and biogeochemical status of this site, in order to assess the long-term impact of mining activities.
- The development of an efficient methodology for environmental impact assessment and monitoring thanks to available technology: the joint cruise allowed to fulfil international obligations regarding the monitoring and observation of licensed areas in international waters, especially in view of contributing to mandatory baseline studies before implementing mining activities.
- The establishment of first scientific results: analyses have demonstrated the importance of nodules for deep-sea biodiversity and have revealed that effects of disturbances from mining activities on deep-sea ecosystems will likely last for many decades and impact all levels of fauna.
- The elaboration and dissemination of first recommendations for policy-makers and the industry, through which researchers affirm the need to define within mining areas preservation zones which are to be based on robust scientific criteria. So far, these recommendations have been disseminated in particular through the organisation of a workshop by JPI Oceans specifically dedicated to this matter during the EC's European Maritime Day, through the publication of two scientific articles in Nature and through the active communication regarding this pilot action via JPI Oceans' website.

4. Overall strengths of this tool, including key achievements

Sharing the use of a research infrastructure provides many benefits. In particular, it allows to significantly reduce costs of conducting a joint research project and greatly contributes to operational alignment and integration of different national research activities. It also creates the conditions for greater collective impact on policy-making.

4.1 Cost-effectiveness of the approach

Sharing the use of research infrastructures such as marine instrumentation platforms (e.g. Research Vessels, Remotely Operated Vehicles, Autonomous Underwater Vehicles) allows to distribute the different costs related to the implementation of a joint research project among partners, instead of duplicating them at national level. This is especially true in the field of marine research, where infrastructures and equipment are very expensive. Hence, sharing them **significantly reduces costs**. In JPI Oceans' case, Germany was able to afford the construction of a new deep-sea research vessel and was ready to offer time to use it free of charge. It was then comparatively cheap for other countries to participate in the joint research project, as they only needed to fund the participation of researchers in the cruise, the use of required equipment and the subsequent analyses in the lab. The allocation of joint project tasks was determined by researchers themselves during the drafting of the proposals, bearing in mind the financial and/or institutional resources that had been committed by their countries. For countries with limited resources, sharing such expensive infrastructure allowed their researchers to participate in a high-quality research project and to benefit from the infrastructure and equipment provided by advanced countries. In addition, Germany consolidated its leading position in research by showcasing and sharing its new cutting-edge deep-sea research vessel. It wishes to make its ship available to other research implementing organisations in order to benefit from a return on investment. Lending the research vessel for JPI Oceans' project was hence an opportunity for Germany to advertise its new infrastructure in view of setting up a barter system,

such as the existing Ocean Facilities Exchange Group (OFEG) which facilitates the exchange of marine facilities and equipment free of charge[5].

Furthermore, involving the industry has also been beneficial for research projects that require new nodule-mining equipment. Indeed, public institutions cannot afford to build such expensive equipment, whereas the industry has a high potential return on investment in the field of deep-sea mining and is hence willing to invest in this type of equipment. For example, participating members of JPI Oceans are planning to collaborate with partners from the private sector in order to benefit from newly built equipment and financial resources. In particular, this will allow to field test deep-sea nodule mining and carry out mandatory ex-ante environmental assessments.

4.2 Development of a common understanding and integration of national research activities around a common scientific objective

Through the joint use of research infrastructure, researchers participating in the project not only spent long periods of time together (i.e. at least a month for each cruise), but were on the ship together twenty-four hours a day and seven days a week during those periods of time. This approach for sharing of infrastructure, particularly specific to marine research, allows for strong **team- and trust-building amongst researchers**. There was much enthusiasm amongst scientists for participating in a joint cruise and research project: for instance several participants wrote regularly in their blogs about the cruise. Researchers were then keen to implement further research activities for joint shore-based analysis of the data collected onsite. Moreover, they had a high **common understanding of the project and its expected scientific outcomes**, thanks to team work that was greatly enhanced through the joint use of infrastructure and also thanks to the organisation of several large project conferences gathering all participants (Kick-Off Meeting in February 2015; 2nd Meeting in 2016; 3rd Meeting to come in Spring 2017; and Final Conference to come in November 2017). Thus, sharing research infrastructure greatly fostered strong cooperation and **co-creation of the research community** participating in the joint project.

Furthermore, the sharing of infrastructure enables a better integration of national research activities. Indeed, as explained above, researchers are **working as a joint team for a joint project in the same place and at the same tim**e, also providing the advantage of quick implementation of onsite research activities. The operational alignment and integration of research activities relies on the already existing alignment at strategic and financial levels (i.e. at the level of JPI Oceans' Management Board, which is the decision-making body of the JPI). Indeed, national representatives first need to jointly define **shared research objectives** and secure funding before addressing the operational aspect of a research project. The **bottom-up elaboration of the proposal by researchers** ensures an effective integration of various disciplines and expertise and the relevant design of research activities to be implemented with a shared infrastructure.

4.3 Standardised data collection, coordination of research methods and open access to research data

The collective use of a single research infrastructure within a joint project requires the **agreement among partners on the research methodologies and technologies** to be used. The latter relies on the identification of complementarities between national resources such as equipment, other material resources and expertise available at national levels. It enables to have access to a **diversity of cutting-edge technology and equipment**, which would not have been the case at national level. The sharing of equipment associated with the sharing of infrastructure gives broader possibilities regarding the scope and ambition of research activities and in terms of research methodologies. In particular, new technologies were made available by research-intensive countries.

In addition, the project involves joint observation, sampling and measurement. For countries that have less-advanced research capacity in the field of deep-sea research, their researchers participating in this project greatly benefited from the experience of sharing a research vessel and associated equipment. Several PhD students also took part in the joint cruise. The latter led to capacity building amongst researchers and to **standardising of data collection and analysis** within the project, enhancing the scientific quality of the project's quantitative outcomes and greatly contributing to operational alignment. For instance, as mentioned in Section 3, participating researchers jointly developed a common methodology for environmental impact assessment and monitoring. The

[5] http://www.ofeg.org/

collected data has been made easily accessible to participating researchers for its analysis. It is stored in **public world-wide databases**[6] and is also made available to the Legal and Technical Commission of the International Seabed Authority (ISA) to facilitate the project's contribution towards new common regulations. Hence, jointly collecting data and producing research outcomes through the collective use of research infrastructure has enhanced open access to this information, which is required for further research and policy-making.

4.4 More effective collective European contributions to international policy-making

The joint scientific understanding of the issue of deep-sea mining, greatly facilitated by the joint use of a research infrastructure, allows to provide joint recommendations for policy-makers. Indeed, JPI Oceans is seeking to **influence the global political agenda** on deep-sea mining through its pilot action. Its research is informing the International Seabed Authority (ISA), which is responsible for developing a code to regulate deep sea mining activities at the level of the United Nations. JPI Oceans has been presenting the pilot action's latest results to the ISA. JPI Oceans' work was also highlighted by the G7 Science Ministers in their Communiqué of the 2015 Summit, which affirms the importance of protecting the marine environment from potential negative effects of deep-sea mining and recalls the ISA's role regarding this issue.[7] JPI Oceans is exploring new possibilities for **international collaboration** on this matter (e.g. with North-America, Japan and New-Zealand).

5. Overall limitations with this tool, including difficulties encountered during implementation

Challenges in the implementation of the shared use of Germany's research vessel were linked to the tight deadline for applying to a joint cruise on this ship and to securing national funding commitments.

5.1 Limited time to set up the terms for sharing the research vessel

As Germany had finished building its new ship, it was already starting to plan the schedule of future cruises when the idea of a joint project on deep-sea mining emerged. A cruise schedule is usually determined years in advance: hence, if JPI Oceans wanted to benefit from the opportunity of setting up a joint cruise, a decision had to be made quickly. This is why there was not enough time to put in place a formal transnational project proposal selection through a competitive bidding system. Participating scientists were selected at national level with no common procedures. This led to difficulties regarding the contribution of certain funding agencies. Indeed, some were not allowed to financially support a research project without a competitive call for projects. Thus, the scientists of the concerned countries were only able to participate in the project with institutional funding or financial resources from other running projects[8].

However, the overall added value of having access to a newly built cutting-edge research vessel surpassed the technical issues linked to the time constraints. This was clearly demonstrated by the significant interest generated among the scientific community and the large number of researchers participating in the workshop for the preparation of the joint proposal. More anticipation would be required for a similar project in the future, as a tight schedule is not fit for long-term national strategic planning. Indeed, national research funding organisations usually require up to a year and a half in order to allocate resources to a research programme, which means that funds are not readily available. Hence, a more adapted approach would rely on a transnational open call and an international peer review to select joint research projects.

5.2 Challenging elaboration of a new funding mechanism for cross-border infrastructure sharing

The shared use of research infrastructure required the implementation of an innovative funding mechanism as the *simultaneous* use of a research vessel by several research institutes under the same project constitutes a novel approach. The national funding contributions were distributed among participating JPI Oceans members to cover all costs, however not equally as Germany provided the largest institutional and financial contributions. Only countries with enough resources could effectively finance the project, while countries with more limited budgets only provided researchers. It has required flexibility in national funding procedures in order to secure

[6] For instance, PANGAEA is a public database in Open Access that publishes data for Earth & Environmental Science.
[7] Leaders' Declaration G7 Summit, 7–8 June 2015
[8] E.g. the European FP7 project on Managing Impacts of Deep-seA reSource exploitation (MIDAS).

funding, especially with the absence of a joint competitive call, and has been successfully implemented with no major difficulty. This sharing approach was also easily accepted by partners as there is a long history of sharing national research facilities with other countries free of charge through barter systems in the field of marine research and geosciences more broadly.

In comparison, the *joint construction* of a new research infrastructure owned by several countries would probably be harder to achieve. The costs involved can be extremely high in some cases, hence greatly hindering the participation of countries with limited resources. In addition, funding countries may have to address a high level of complexity in defining common rules for sharing the use of the involved transnational infrastructure among them and with others. In contrast, a barter system that allows common access to existing *national* infrastructures simplifies the management and funding of their shared use, as the latter is regulated by a single country. However, rules for transnational access to national research infrastructure may differ from one country to another and be hard to align. Hence, when building a new national research infrastructure, the country should consider adopting commonly accepted rules to regulate transnational access to this infrastructure in order to enhance barter schemes. Also, the recognition of national prestige associated with the construction of a new infrastructure such as a deep-sea research vessel would be lost if jointly build. This aspect is traditionally not neglected by countries, especially for such specific and highly needed infrastructures.

6. Conclusions: Suitability and key factors of success

The joint use of existing national research infrastructure is especially recommended in cases where **expensive research facilities or equipment are required to conduct research**. Indeed, this allows to avoid the duplication of costs for the construction or use of infrastructure at national levels, and hence to reduce them significantly. Sharing research infrastructure is usually developed for specific areas of research. Moreover, the involvement of *several* research institutes across various countries enables to **distribute all costs related to a joint research project at the transnational level**. This novel approach also effectively facilitates a **common understanding of transnational research issues and priorities** to be addressed through community building amongst researchers of different countries and integration of research activities in space and time. Capacity building and prestige related to the joint use of cutting-edge infrastructure and hence to the achievement of high quality scientific results are key motivations for researchers to participate in such transnational research activities. In addition, the enhanced team work and research quality facilitated through the joint use of infrastructure enables researchers to collectively **address transnational societal/political issues of high priority**.

Key factors of success:

1) At strategic level:

- **Develop a collaborative strategy for the sharing of research infrastructure within a specific field of research** or build on an existing one in order to promote the joint use of research infrastructure at a transnational level: this fosters the mutual understanding of common benefits of such an approach and provides the pre-conditions for enhancing its adoption in the long term.
- **Identify transnational societal/political issues of scientific nature that can be better addressed thanks to the joint use of research infrastructure**: in particular, developing a strategic platform (e.g. JPI) that facilitates the effective uptake of scientific outcomes and joint recommendations (e.g. by policy-makers, the industry, consumers, civil society, etc.) is crucial.

2) At financial level:

- **Design a funding mechanism that distributes adequately all costs amongst participating countries**: this includes costs related to the use of the research infrastructure, the participation of researchers and additional staff, the use of specific equipment, travelling, etc. In addition, setting up a joint competitive call can allow to secure more in-cash funding from countries.
- If possible, **establish public-private partnerships** in order to benefit from the industry's financial resources to fund required new equipment.

3) At operational level:

- **Adopt a bottom-up approach that fosters strong involvement of researchers in designing the operationalisation of the joint use of infrastructure**: this ensures a balanced and relevant allocation of related research tasks amongst participating research institutes according to their available resources (i.e. in-cash and institutional contributions) and to their specific expertise.
- **Implement a centralised monitoring** of the joint use of research infrastructure by the national owner.
- **Carry out community building activities amongst researchers** in order for the transnational research project to fully benefit from the joint use of research infrastructure (e.g. by setting up large project meetings that gather all participants): this allows participating researchers to develop a mutual understanding of the project's goals, activities and outcomes.
- **Ensure open access to generated data and results**: this increases the transnational added value of jointly using a research infrastructure and provides a transparent and effective scientific input towards transnational policy-making, standardisation activities, etc.

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ISA: https://www.isa.org.jm/

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MARS: http://www.marsnetwork.org/

MIDAS: http://www.eu-midas.net/

OFEG: http://www.ofeg.org/

PANGAEA: https://www.pangaea.de/

Interviews

John Hanus: JPI Oceans Secretariat

Norbert Blum: Project Manager - Jülich

ANNEX 1. JOINT PROGRAMMING INITIATIVE HEALTHY AND PRODUCTIVE SEAS AND OCEANS[9]

The Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans) is a coordinating and integrating platform, open to all EU Member States and Associated Countries. JPI Oceans aims to align the marine and maritime research and innovation landscape in Europe and focuses on making better and more efficient use of national research budgets, which represent 88% of the research funding within Europe. One of JPI Oceans' goals is to develop joint research programmes in which countries can be involved on a voluntary basis (variable geometry). Participating countries also decide what contribution to make: this may include institutional, project-related or new funding.

Member-States of JPI Oceans have jointly identified three main goals which address the intersections between the marine environment, climate change and the maritime economy through observations, infrastructure, technologies and human capacities:

- Enable the advent of a knowledge based maritime economy, maximizing its value in a sustainable way
- Ensure Good Environmental Status of the seas and optimize planning of activities in the marine space
- Optimize the response to climate change and mitigate human impacts on the marine environment

In December 2014, JPI Oceans adopted its Strategic Research and Innovation Agenda (SRIA). The SRIA outlines ten areas of strategic priority, which were identified through an extensive consultation process and with advice from the Strategic Advisory Board of JPI Oceans. These strategic areas are:

1. Exploring the deep seas.
2. Technology and sensor development.
3. Science support to coastal and maritime planning and management.
4. Linking oceans, human health and wellbeing.
5. Interdisciplinary research for Good Environmental Status.
6. Observing, modelling and predicting oceans state and processes.
7. Climate change impact on physical and biological ocean processes – Oceans circulation.
8. Effects of ocean acidification and warming on marine ecosystems.
9. Food security and safety driving innovation in a changing world.
10. Use of marine biological resources through development and application of biotechnology.

In the consultation three cross-cutting areas reflecting JPI Oceans' vision were identified as critical and are to be embedded within the actions of JPI Oceans in order to enhance its impact: (i) Science-Policy, (ii) Human Capacity Building and (iii) Infrastructures: Shared Use and Common Procurement Strategies.

JPI OCEANS VISION: *To enable Blue Growth and jobs, whilst fostering the health and productivity of seas and oceans and addressing the pressures of climate change and human impacts on the oceans.*

JPI OCEANS MISSION: *To align national research programmes and budgets by avoiding fragmentation and unnecessary duplication, planning common and flexible research initiatives, facilitating cooperation and foresight, and establishing efficient mechanisms for interaction and knowledge transfer between the scientific community, industry & services, and policy makers at high level in order to address European marine and maritime challenges.*

JPI OCEANS IMPLEMENTATION PROCESS: So far, JPI Oceans has launched four joint pilot actions:

1) Multi-use of infrastructure for monitoring;
2) Ecological aspects of microplastics in the marine environment;
3) Ecological aspects of deep-sea mining;
4) Intercalibration for the EU Water Framework Directive.

[9] http://www.jpi-oceans.eu/what-jpi-oceans; JPI Oceans Strategic Research and Innovation Agenda; JPIO Oceans Draft Implementation Plan

ANNEX 2. JPI OCEANS' GENERAL APPROACH TOWARDS MARINE INFRASTRUCTURE SHARING[10]

The shared use of research infrastructures is a cross-cutting issue which can benefit from the new cooperation mechanism offered in the framework of JPI Oceans. A high political commitment and dialogue between relevant authorities is required to ensure sustainable and cost-effective observing systems: JPI Oceans offers a platform for such a dialogue to **develop common procurement strategies and associated business plans**. These can be adapted for the optimal use of costly infrastructures, by bringing together relevant authorities, users and producers.

Initiative 1: Development of a common vision for marine research infrastructure shared use and access

Cross-border access at European level is usually intended to offer the best suited infrastructures to EU scientists. This contributes to the optimal use of existing infrastructures. The transnational access opportunities offered by various Framework Programmes projects are welcomed by scientists, but are limited in size and ambition.

The development of a common vision and actions for marine research infrastructure use and access in the framework of JPI Oceans would ensure cost effective coordination between science, monitoring needs and research infrastructure support. Depending on the research needs, shared use of infrastructure could be addressed either at regional scale, at pan-European level or even with the two dimensions combined for an optimal efficiency.

When appropriate, it may be effective to establish public-private partnerships. The shared use and access issue is particularly important in the field of research vessels, autonomous observing systems, marine laboratory coastal stations, experimental facilities for research in aquaculture and land-based facilities for ocean engineering. Not to mention the marine data issue which needs a shared vision of the e-infrastructures needed and will facilitate accessing and knowledge sharing, as well as agreements at Member State level for more data exchange and access.

Initiative 2: Set up common procurement strategies, develop common business plans

JPI Oceans can overcome the unconnected nature of decisions relating to larger investments in the field of research and monitoring infrastructures. This action would help to streamline and harmonise national infrastructures roadmaps. Developing common procurement strategies and business models would harness economies of scale, shared investment risk, standardisation and interoperability.

This action is particularly important in the field of research vessels. There is a need for strategic reassessment and coordination at European level of the oceanographic vessels as part of a broader European approach to marine research infrastructures. JPI Oceans could coordinate this assessment with member countries, the European Commission and existing initiatives.

Longer term public-private partnerships can be developed in the framework of JPI Oceans. Public-private partnerships are already in operation in Europe within the marine research communities, mainly regarding operation of robotic vehicles. Industry cooperates closely with governments and research institutes in the design and development of new Research Vessels, Remotely Operated Vehicles and Autonomous Underwater Vehicles.

Initiative 3: Strengthen land-based facilities and develop *in situ* testing sites for ocean engineering, shipbuilding, ocean energy, sub-sea technologies and instrumentation

Land-based testing sites allow marine technology to be tested under a range of conditions before being deployed into the ocean. Facilities include deep wave basins and wave flumes, water circulation canals, hyperbaric tanks, shock and vibration generators, climatic rooms, calibration laboratories.

These facilities are essential in developing technology for the deep-sea, monitoring and many types of ocean engineering projects. Joint actions at European level can make real progress to:

[10] JPIO Oceans Draft Implementation Plan

- Facilitate trans-national access to facilities to establish a European network of infrastructures;
- Support the design and development of new sub-sea technologies and common prototypes for both research and commercial uses with the maritime community;
- Develop a shared and clear vision for in situ testing site development.