EU CONEXUS
Research for Society

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EU-CONEXUS RESEARCH FO SOCIETY

D. 2.2
"Guidebook on the development of the ERA with final recommendations"

2023

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Content

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Preamble

This report entitled ***Guidebook on the development of the ERA with final recommendations*** is part of the ongoing work of the EU-CONEXUS-RESEARCH FOR SOCIETY project funded by the European Union's Horizon 2020 Science with and for Society programme that aims to build effective cooperation between science and society, to recruit new talent for science and to pair scientific excellence with social awareness and responsibility.

EU-CONEXUS-RESEARCH FOR SOCIETY (RFS) is a 3-year project aiming at the strengthening, modernisation and internationalisation of the Research & Innovation dimension of the European University for Smart Urban Coastal Sustainability – EU-CONEXUS, and the institutional transformation of the 6 EU-CONEXUS-RFS partner universities: La Rochelle Université (LRUniv), Agricultural University of Athens (AUA), Technical University of Civil Engineering Bucharest (UTCB), Klaipeda University (KU), Catholic University of Valencia (UCV) and University of Zadar (UNIZD).

Within the project, **Work Package 2 "Science and Innovation Agenda and positioning in the ERA"** had 3 main objectives:

- To develop a common research and innovation agenda for EU-CONEXUS,
- To place "Smart Urban Coastal Sustainability" (SmUCS) research areas as a thematic focus of EU-CONEXUS research activities
- To increase the impact of SmUCS research on the European Research Area.

This report aims to reflect on issues concerning the functioning of the ERA that arose from other Work Packages in EU-CONEXUS-RFS and to provide recommendations to overcome them in order to contribute to a more effective coordination of national research and innovation systems in Europe on those topics.

This document has been created jointly by Work Package 2 representatives from the 6 EU-CONEXUS-RFS partner universities as well as additional contributions from EU-CONEXUS partners *Frederick University, University of Rostock and South East Technological Institute.*

The meetings to prepare, discuss and write this document took place at the following dates:

- 18 January 2023
- 24 February 2023
- 1 March 2023
- 21 March 2023
- 4 July 2023
- 9 November 2023

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Methodology

This document is based on an analysis of the deliverables produced within the work packages 1, 3, 4, 5, 6 of the EU-CONEXUS-RFS project.

The following deliverables were analysed:

- Deliverable D1.2 ERA policy brief[i]
- Deliverable D1.3 Report on barriers and obstacles hampering the project implementation on political, legal, institutional, administrative issues[ii]
- D1.5 EU-CONEXUS Research and Innovation code of conduct regarding research integrity[iii]
- D1.6 EU-CONEXUS R&I Gender Equality Plan[iv]
- D3.2 EU-CONEXUS "A Study on the challenges of inter-campus EU-CONEXUS to implement actions required by HRS4R award"[v]
- D3.3 EU-CONEXUS RFS Study "Good practices on talent management, research and internationalisation accelerators"[vi]
- D4.1 Common strategy pooling digital scientific resources (Feasibility Study)
- D5.1 Roadmap to access Innovation Communities[vii]
- D5.2 Checklist of good practices for cooperation among actors of innovation ecosystems[viii]
- D5.3 Report on best practices and recommendations for mainstreaming entrepreneurial mindset of researchers[ix]
- D6.1 Guidelines on participatory science
- [x]D6.2 White paper on Open Science practices and barriers[xi]
- WP4 Milestone 12 Identification of synergies of digital infrastructures

Other documents

- European Research Area Policy Agenda[xii]
- Progress on Open Science: Towards a Shared Research Knowledge System[xiii]

This document summarizes the conclusions of the various work packages and compares them with the scientific policies implemented at national and European level.

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Introduction

According to the European Commission « The European Research Area (ERA) is the ambition to create a single, borderless market for research, innovation and technology across the EU. It helps countries be more effective together, by strongly aligning their research policies and programmes. »[xiv]

By 2022, priority areas for joint action were defined in the Pact for Research and Innovation[xv] consisting of four main axes which are (1) Deepening a truly functioning internal market for knowledge, (2) Taking up together the green transition and digital transformation and other challenges with impact on society, and increasing society's participation in the ERA, (3) Enhancing access to research and innovation excellence and enhancing interconnections between innovation ecosystems across the EU, and (4) Advancing concerted research and innovation investments and reforms.

This Pact was the basis of the new ERA Policy Agenda[xvi] in which 20 concrete ERA actions are defined for the period 2022-2024.

Within the various working groups that made up the EU-CONEXUS-RESEARCH FOR SOCIETY project, a number of topics emerged as being essential to tackling issues linked to scientific research on a European scale, but also at the national level for each partner. The organisational differences between institutions but also national policies become barriers when it comes to creating common goals, setting up projects and getting staff to work together. It is therefore essential to identify them and to implement actions that can act as a lever to create a European research dynamic.

Among the 20 concrete ERA actions that are defined for the period 2022-2024, this deliverable deals more particularly with five of them, namely

- Action n°1: Enable Open Science, including through the European Open Science Cloud (EOSC);

- Action n°3: Reform the Assessment System for research, researchers and institutions;

- Action n°4: Promote attractive research careers, talent circulation and mobility;

- Action n°8: Strengthen research infrastructures;

- Action n°15: Build-up research and innovation ecosystems to improve excellence and competitiveness.

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Open Science

In the light of the various documents consulted and the studies carried out, in particular by the working group on open science within the EU-CONEXUS-RFS project, three major barriers appear. Overcoming these barriers could enable open science to be much more developed in research institutions.

Firstly, many of the barriers identified refer directly or indirectly to the way research activities and researchers are evaluated. Today the majority of recognized scientific journals are not open access (Table 1 and 2 from the White paper on Open Science practices and barriers [ix]). However, the evaluation of scientific production is based on the impact factor of these journals, which, coupled with other indicators, will give the researcher's "h index". During their career and particularly when submitting a project, researchers are evaluated on the quality of their scientific production and therefore on the influence of the journals in which they publish. At the same time, the sharing of research data via open access databases is still not very widespread and not very valued. Even if many funders are asking for data sharing and the use of open access, it is clear that in practice this is still done by the minority. If open access journals remain undervalued in career analysis and in project funding rules it will be very difficult to change practices within institutions. Moreover, a harmonization of policies seems necessary between European countries so that all countries can advance side by side and there is no gap. Without increased state support, no change can be achieved in practice.

Secondly, the survey conducted within the consortium shows a lack of support for open access by research institutions. Whether it is due to a lack of existing tools, a lack of funding or a lack of dedicated services, the development of open access has had difficulties being integrated into the scientific policies of institutions. This lack of "investment" on the part of institutions is strongly correlated with the still limited promotion of open access initiatives. Supporting researchers in open access practices by deploying services and staff dedicated to these aspects and also incentives for these practices is essential here. Beyond simple training, it seems important to give ourselves the means to support these approaches and implement communication channels and platforms for regular updates, information sharing, and networking among participating universities.

Thirdly, raising researchers' awareness of the challenges of open access on the one hand, but also of the methods and tools, appears essential. This point seems essential but is strongly linked to the two previous points without which it cannot be implemented in an optimal way because the two points above are intended to enable a paradigm shift in researchers' understanding of open access. If research evaluation and project funding are no longer dependent on production in non-open access journals, and if human support and tools are made available to researchers to lead them towards open access development, then the training of researchers in open access practices will be much easier and will make real sense to them.

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Infrastructure

EU-CONEXUS partners collaborate towards sharing physical and virtual infrastructures, resources and best practices acquired within their own research fields.

There is the need for the identification of specific requirements for infrastructures and resources to be shared, including access to data and information. The shared access to universities' research infrastructures shall reduce fragmentation of the R&I ecosystem, in order to avoid duplication of effort, minimize operational costs, develop Standard Operating Procedures, pilot incentives for cooperation, train staff on best practices, make the industry more aware of the potential of Research Infrastructures and foster the embeddedness of universities' research infrastructures in local, regional, national, European and global R&I ecosystems in industrial value chains. Finally, mainstreaming knowledge circulation driven through Open Science will ensure a level playing field and reciprocity on a global scale.

The partners have to work to remove the legal and regulatory barriers and identify enablers to scientific and technological cooperation within EU-CONEXUS partner institutions and the Consortium at large, as well as with other universities, research organizations and technology infrastructures, involving local, regional and national governments. Partner Universities are closely involved in national policies and decision-making processes related to R&I.

Vision for future infrastructure operation

In order to enhance the cooperation among partners, some conditions are necessary:

- to ensure an integration of the Alliance's Student Information Systems;
- to work towards a common research information system to allow of research administration and collaboration in the alliance, adhering to international standards;
- to catalogue digital facilities that are available within the Alliance, describe the processes for access by partner academics and develop a common policy for open access;
- to create a consortium for digital assets of libraries;
- to create of a common database (or information search and sharing) platform for projects (and current scientific initiatives);
- to have a common information portal/directory of infrastructures (not only digital but physical as well). The goal is to give access to information and enable Alliance members to join projects that are already underway or initiated.
- to interconnect data management platforms, with data transfer procedures;
- to investigate common access possibilities to scientific literature;

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- to provide open data/metadata procedures among EU-CONEXUS partners (for example for the creation and use of monitoring and measurement databases) and standardization of data/metadata;

Another possible direction for the enhancement of the cooperation among partners is the development of remote research.

The following further steps are proposed:

- where possible, the infrastructure will be shared with other institutions
- Use of high-speed network and HPC
- finalizing the inventory of (complex) digital infrastructure at the EU-CONEXUS level (digital infrastructure = complex ensemble: hardware, software, data, policies etc.);
- creation of a Strategic plan on digital infrastructure in EU-CONEXUS (short term – starting with simple solutions, middle and long term strategies);
- partner platforms interconnection with EU-CONEXUS RIIS (Research & Innovation Information System) and upgrades;
- interconnection of existing digital infrastructure;
- access to funding for the development of educational & research digital infrastructure (grants/projects / private funding).
- encourage collaboration across different academic disciplines to foster innovative and holistic research approaches;
- develop programs and mechanisms to facilitate the transfer of research outcomes to the private sector and society, potentially through technology transfer offices or incubation centers.

Summary of current synergies

The main current synergies in the EU-CONEXUS Alliance are listed below:

- creation of EU-CONEXUS open science platform within OpenAIRE framework (EU-CONEXUS RFS WP6);
- creation of an online popularised science Journal (EU-CONEXUS RFS WP6);
- development of EU-CONEXUS Research & Innovation Information System RIIS (EU-CONEXUS RFS WP1);
- creation and development of EU-CONEXUS Common Digital Environment, Common HUBs;
- creation and development of EU-CONEXUS Virtual library;
- creation and development of EU-CONEXUS Smart Campus.

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Summary of future possible synergies (underpinning Open Science)

The future (possible) synergies are synthetized in the following list:

Development of EU-CONEXUS open science platform:

- o Common database for research projects proposals;
- o Standardization of data / metadata;
- o Open database on measurement data / research data / research software / ...

• Access to cloud and HPC (high performance computing);

• Sharing software services;

• Common tools;

• Interconnection of hardware/software infrastructure in EU-CONEXUS;

• Interconnection of hardware/software infrastructure with other Alliances;

• Remote research.

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Human Resources

Within EU-CONEXUS-Research For Society, WP3 worked on “strengthening socially responsible management and development of Human Resources” related to research activities within EU-CONEXUS Alliance. The main objectives were to identify the conditions and incentives for attractive research career environments, to increase research staff mobility, to develop a training offer on transversal skills for early-career researchers and to facilitate HR practice sharing between partners.

Throughout the tasks and studies on research careers and talent development carried out, **the working group identified two main areas for improvement relating to ERA Policy Actions 3 and 4:**

First, the precarious working conditions of researchers, especially early-career researchers, mainly due to a lack of professional positions, unattractive payment practices and insufficient or unbalanced funding opportunities within the European Union. These combined factors lead to a brain drain in Europe as researchers go abroad or even change their career path looking for better career perspectives. Developing a more appealing and stable labour market both for early-career and senior researchers is paramount to attract and develop talents, and to maintain research of excellence in Europe.

In that regard, increased funding from Member States and the European Union to the Research & Innovation sector in universities is essential, and early-career researchers should be a priority: there is a need to support them in getting access to stable job positions and evolution perspectives, to grants – high differences between EU countries were pointed out – and to training and mobility opportunities. A number of good practices and instruments were listed in the study “Good Practices on Talent Management, Research and Internationalisation Accelerators”. Those included mentoring programme for early-career researchers, incentives to take part in research projects (through teaching discharge, simplification of administrative procedures, university-business collaboration support fund, seed grants, training programmes, dedicated staff supporting them in project applications and other heavy administrative procedures) and measures to encourage international mobility and collaboration such as mobility funds, academic and research collaborations with other Universities, and English courses for research staff.

At the University level, EU-CONEXUS strongly encourages the adoption of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers and the active implementation of its principles, aiming to strengthen research careers. Applying to the HRS4R award (HR Strategy for Researchers award giving public recognition to research institutions that have made progress in aligning their human resource policies with the principles set out in the "Charter & Code"), although a voluntary and not-funded initiative, is seen as a great opportunity to promote institutional change and to improve the research profession. In their “Study on the challenges of EU-CONEXUS to implement actions required by the HRS4R award”, EU-CONEXUS recommended the hiring of staff dedicated to manage the HRS4R strategy and actions.

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Second, the need of a reform of research assessment: current criteria solely based on journal-based metrics (number of publications, journal ranking and impact) should be reviewed as they leave aside many other aspects of a researcher's career ranging from innovation, interdisciplinary collaboration and project coordination, to dissemination, mediation actions and thesis direction – aspects reflecting just as well their research quality and societal impact. The current assessment system also misses to support and recognize young talents who only start their research career and publications. As outlined in the first chapter, the current system is also a barrier to open science and the promotion of open-access research outputs.

In October 2022, EU-CONEXUS-RFS underlined in the ERA Policy Brief that a new common European framework to assess research careers would be useful to harmonize assessment criteria across Member States and be a first step toward setting the status of European researchers.

The implementation of HRS4R will also contribute to strengthening research careers. Some institutions are evolving their evaluation practices by recognizing additional outputs and activities, yet change remains slow and largely depends on institutional governance.

In that regard, EU-CONEXUS supports the Coalition on Advancing Research Assessment (COARA) initiative which several partners have signed. COARA signatories commit to re-think collectively research assessment and define a common direction with the Agreement on Reforming Research Assessment, a document including principles and commitments that will aim to recognize "the diverse outputs, practices and activities that maximise the quality and impact of research. This requires basing assessment primarily on qualitative judgment, for which peer review is central, supported by responsible use of quantitative indicators". The Alliance also supports the new initiatives announced by the European Commission in July 2023 to empower research careers and to strengthen the European Research Area[xvii].

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Innovation

An innovation is a new idea that results in the marketing of a new good or service. Conversely, an invention, a new idea, a concept or the discovery of an unmarketed product or process are not innovations.
Innovation is therefore the transformation of an idea or invention, which does not emerge spontaneously, but is the result of a complex process. This process is made up of numerous activities (research and development, marketing, etc.) carried out using multiple ways (multi-disciplinary groups of players, tools and methods for analysis, simulation, etc.).
A set of actors such as companies, start-ups, universities, investors, resource persons, etc. who interact in favour of innovation constitutes an innovation ecosystem. In this framework, a set of three partners, namely Government, Academia and Industry, is a specific innovation ecosystem in which universities have a major role to play. This type of ecosystem has inspired the Triple Helix model. It should be noticed that, recently, the Quadruple and Quintuple Helix models that respectively include civil society and environmental issues have emerged.

The Triple Helix system is defined as a set of the following.
(1) Components (government-industry-university);
(2) Relationships between components (technology transfer, collaborative leadership, networking…);
(3) Functions namely competencies of the system components.

Functions, or competencies, appear through what is called the Triple Helix Spaces that are the Knowledge, Innovation and Consensus Spaces.
Once the spaces are created, they interact with each other in a continuous way but mostly in a diachronic way. Thus, four stages in the life of an innovation ecosystem are defined as (1) Genesis (2) Implementation (3) Consolidation and adjustment, and (4) Self-sustaining growth and renewal of the system. Key performance indicators and metrics should be used to track the effectiveness and impact of the innovation space, thus the European funding policy direction will be an important driver e.g. challenges and missions, addressing UN SDGs, the Just transition and regional prosperity. This will be kept in mind in setting KPIs.

In this context, one of the RFS project objectives is to develop a joint science and innovation agenda in order to create a performing knowledge transfer network, encourage cooperation with local innovation ecosystems specialised in Smart Urban Coastal Sustainability themes and develop an entrepreneurial mindset within EU-CONEXUS researchers' community.
This work covered part of the whole innovation ecosystem and process described aforementioned, in particular relationships between innovation process components, and as a part of innovation ecosystem through Innovation Communities.
The snapshot realised on EU-CONEXUS researchers' knowledge about entrepreneurship through various actions that were implemented (Hackathons, Interviews of researchers, and Grass-root networking events) enabled to provide recommendations for the future.

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- Encourage awareness raising;
- Develop training programmes;
- Focus on PhD students;
- Provide coaching and mentoring;
- Promote interdisciplinary collaborations;
- Create incubators or innovation spaces;
- Facilitate technology transfer;
- Offer financial incentives;
- Establish partnerships with industry.

In the Deliverable D5.2 Checklist of good practices for cooperation among actors of innovation ecosystems, actions are suggested for better cooperation with the innovation ecosystems of the EU-CONEXUS Alliance.

- Creation of an EU-CONEXUS inventory of the existing R&I collaboration partners from other sectors; that is, determine the key stakeholders who will be involved, including government agencies, educational institutions, industry partners, startups, researchers, and entrepreneurs.
- Development of EU-CONEXUS collaboration spaces (e.g., innovation labs, hubs, science parks) which encourage engagement with actors from outside your university; Providing platforms for sharing knowledge, technologies, and research outcomes is seen as a lever to facilitate partnerships between academia, industry, and startups.
- Creation of EU-CONEXUS networking and collaboration tools and events (e.g. networking platforms, business lunches, etc.) which encourage engagement with actors from outside your university;
- Organization of EU-CONEXUS introduction courses targeted at doctoral students/candidates, and PhD holders to develop entrepreneurial skills to gain experience to collaborate with business/industry and/or to found spin-off companies;
- Organization of EU-CONEXUS advanced courses targeted at doctoral students/candidates, and PhD holders to develop entrepreneurial skills to gain experience to collaborate with business/industry and/or to found spin-off companies;
- Creation of an EU-CONEXUS Technical Transfer Office (TTO) to promote Intellectual Property management, foundation of spin-off companies by students, early career researchers, and researchers.

Within EU-CONEXUS, actors of Innovation Communities were proposed by the European Council based on a concept of the “Knowledge triangle” namely education-research-innovation. It should be noted that, in comparison with the Triple Helix model, the governments are not present as actors of the Innovation Communities.
The process for the implementation of the roadmap consisting of four steps is proposed.

- Step 1: Definition of Strategic Goals;
- Step 2: Investigation of the potential Hazards;
- Step 3: Deployment of Good Practices;

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- Step 4: Finally, the Near-Term Objectives required to provide the workplan for immediate actions.

Concerning the near-term objectives for the EU-CONEXUS Alliance to access Innovation Communities, they are advised to be the (1) Identification of Innovation Communities of Interest, (2) Analysis of the legal framework on intellectual property rights, and (3) Implementation of an Innovation Hub. It is planned that the Innovation Hub will be a website aiming to stimulate and enable innovation communication between EU-CONEXUS, private companies and other interested organizations (research institutions, public authorities, NGOs etc), in order to encourage joining the existing Innovation Communities, expanding networking with the objective to boost innovations. It will be a valuable tool for the dissemination of research and innovation, and partnership opportunities within EU-CONEXUS and beyond.

To conclude, and taking the Triple Helix as a reference model, the work carried out as part of RFS Work Package 5 Knowledge Transfer & Innovation has undeniably helped to analyse and make recommendations for the three elements that make up an innovation ecosystem. However, it should be noted that for the first one “Components (government-industry-university)”, the role of governments has not yet been sufficiently addressed and is subject to a project activity in a project under the Erasmus+ programme.

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Conclusion and recommendations

The ERA strives to make the most efficient use of resources available for research and innovation. This includes optimizing funding, infrastructure, and human capital. The present Guidebook on the development of the ERA is mainly focused on four areas which are (1) Open Science, (2) Infrastructure, (3) Human resources and (4) Innovation. As mentioned in the introduction, these four themes correspond to 5 of the 20 priority actions proposed in the new ERA Policy Agenda for the 2022-2024 period.

With regard to the Open Science axis, two barriers are clearly identified namely (1) the majority of recognized scientific journals are not open, and (2) Open access is not sufficiently integrated into the scientific policies of academic institutions. As a result, the recommendation advocating the increase of knowledge and practice of open science by researchers has been made. This is very close to one of the outcomes of the ERA Policy Agenda action n°1 suggesting to “Deploy Open Science principles and identify Open Science best practices”.

Strengthening cooperation in research and innovation is crucial for addressing global challenges and advancing scientific progress. However, there are several significant obstacles that can hinder effective collaboration:

- **Intellectual Property Concerns**: Researchers and institutions may be hesitant to share their findings openly if they fear it could hinder their ability to patent or commercialize their work
- **Lack of Standardization:** Inconsistent data formats, metadata standards, and data management practices can hinder the interoperability of research outputs. Standardizing these aspects is crucial for effective sharing and collaboration.
- **Legal and Ethical Considerations:** Open science initiatives need to navigate legal and ethical complexities, such as ensuring compliance with copyright laws, protecting participant privacy, and addressing issues related to informed consent.

Regarding the Infrastructure topic, the need for scientific and technological cooperation between institutions is first identified. This includes sharing infrastructures and resources. Then, the necessary conditions to enhance the cooperation among partners are described and discussed. Lastly, future possible actions and synergies are given. It should be noticed that the proposals made here are in complete agreement with outcomes of ERA Policy Agenda action n°8 whose “Strategic analysis of the European Research Infrastructures landscape” or “Increased cooperation between research infrastructures, e-infrastructures and stakeholders, including through EOSC”.

Sharing infrastructures and resources in research and innovation is crucial for maximizing efficiency and advancing scientific progress. However, there are several significant obstacles that can slow effective sharing:

- **Competing Priorities and Demands**: Different research projects or teams may have conflicting needs for the same resources.
- **Ownership and Control Concerns:** Researchers and institutions may be hesitant to share resources due to concerns about loss of control, ownership, or attribution.

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Establishing clear agreements and protocols for resource sharing is essential to address these concerns.

- **Cultural Differences:** Cultural norms, practices, and expectations can influence the way research is conducted and collaborations are managed. Understanding and navigating these differences is crucial for successful international cooperation.

- **Accessibility of Research Infrastructures**: Unequal access to state-of-the-art research facilities and infrastructures across different regions can influence mobility decisions.

The ERA aims to create an environment that attracts and retains top talent, and facilitates the mobility of researchers within Europe. This helps in the exchange of knowledge and expertise.

Concerning Human resources, two main areas related to improvement of researcher careers and research assessment were identified. For the first point, the precarious situation of a large number of researchers but mostly early-career researchers is highlighted. For the latter, the need of a reform of research assessment is much discussed argued and the Coalition on Advancing Research Assessment (COARA) is advantageously cited with a description of the objectives and activities of this European initiative. These two items fit very well with ERA Policy Agenda action n°3 “Reform the Assessment System for research, researchers and institutions” as well as action n°4 “Promote attractive research careers, talent circulation and mobility” respectively.

There are several major obstacles that can hinder these objectives:

- **Recognition of Qualifications and Experience**: Ensuring that academic and professional qualifications gained in one country are recognized and valued in others is essential.
- **Lack of Networking and Collaborative Opportunities:** Limited access to professional networks and collaborative opportunities can hinder the career development and advancement of researchers, particularly early-career ones.
- **Accessibility of Research Infrastructures:** Unequal access to state-of-the-art research facilities and infrastructures across different regions can influence mobility decisions.

The last topic of this Guidebook deals with Innovation. First, innovation ecosystem and process are described notably through the Triple Helix model. The Triple Helix model emphasizes the importance of collaboration and co-evolution between academia, industry, and government in driving innovation and economic development. It recognizes that innovation is not solely the responsibility of any one of these sectors, but rather a result of their dynamic interactions. This is done by considering (1) Components of the Triple Helix, (2) Relationships between components, and (3) Competencies of the system components. Then, main results of RFS Work Package 5 “Knowledge Transfer & Innovation” are given and discussed. The tasks conducted within this Work Package helped to better understand the innovation ecosystem and to make recommendations for the three components of the

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Triple Helix system mentioned previously. Through ERA Policy Agenda action n°15 entitled "Build-up regional and national R&I ecosystems to improve regional/national excellence and competitiveness", the European Commission proposed to conceptualise, pilot and launch the ERA Hubs across EU territory. It should be noticed that the ERA hub concept is based on the Quadruple Helix model which is similar to the Triple Helix model and includes civil society as the fourth component.

Implementing an innovation ecosystem involves creating an environment that fosters collaboration, knowledge exchange, and entrepreneurial activities to drive innovation and economic growth.

Complex and restrictive regulations, intellectual property issues, and legal challenges can hinder the smooth operation of an innovation ecosystem. Clear and supportive policies are necessary to create a conducive environment.

Considering all barriers and recommendations, some common points emerge related to :

- **Research assessment**

  The question of research evaluation is an issue that arises in several of the RFS project's work package deliverables. These include reviewing evaluation criteria for taking into account the multiple activities of researchers, and the discrepancy that sometimes emerges between the criteria of research funders and the injunctions of institutions and states.

- **Long-term strategic plan**

  The ambitions of the RFS project and the comparison with the actual timeframe show the importance of a long-term strategic plan in many areas, such as digital infrastructures, scientific collaborations and collaborations with socio-economic players for innovation. All this requires a long-term vision that must be supported by long-term funding to enable these actions to be deployed. The duration of current funding makes it difficult to implement many actions.

- **Work conditions**

  Working conditions for research staff are also a recurring theme. Indeed, it appears that there are major differences between European countries, leading to widely differing capacities to implement scientific research. One important point seems to be the need for support services to assist researchers in their activities. Through the EU-CONEXUS + project, it was therefore decided to create a Project Development Support Office to give universities access to more equivalent services. At the same time, it seems important to develop support services for scientific activities, to enable institutions to move towards research excellence. This point resonates with axis 17 "Enhance the strategic capacity of Europe's public research" of the ERA Policy Agenda.

  The EU-CONEXUS Research Council decided in its meeting on the 12th of December 2023 to create task forces to work further and establish Alliance-wide policies regarding at least the three points raised at the end of the report.

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