ENHANCERIA	Work package	WP2 Exploration, identification and mapping of different practices and approaches
	Deliverable	D2.5 Report on mapping activities and main findings on RI portfolio within the Alliance
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	Lead	Universitat Politècnica de València (UPV)

D2.5 REPORT ON MAPPING ACTIVITIES AND MAIN FINDINGS ON RI PORTFOLIO WITHIN THE ALLIANCE

//ABSTRACT

Research Infrastructures (RIs) are a key element in the development of science and technology. As an alliance of European technological universities, is crucial for the ENHANCERIA universities to join their RI capabilities and resources to strengthen the overall RI ecosystem of the ENHANCE alliance. For this purpose, the work of WP6 working group has begun. The work of the WP6 working group will start with task 2.5 from WP2, that is closely connected with the work of WP6: Building up a community of users for strengthening research infrastructures. This report is a result of the work performed on task 2.5. You can find a description of the work process carried out as well as the tools developed for its execution. The work began with a selection of RIs from each university. The mapping and identification of the RI ecosystem has been carried out through a selection of indicators that provide key information of the RIs analyzed. This activity was performed through a survey that members of the WP6 WG answered for the RIs of each of their universities. You can find a description of the indicators used, the survey and its results on this report, as well as the discussion and conclusions that were reached.

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// PART I INTRODUCTION

1. OBJECTIVES AND TASKS

1.1 ENHANCERIA

The main objective of ENHANCERIA is to support and strengthen the research and innovation dimensions of ENHANCE, the European Universities of Technology Alliance, through developing a transformation agenda for the alliance focusing on the role of universities as drivers and enablers of sustainable development. ENHANCERIA will enable ENHANCE to include all core activities of modern universities – education, research and innovation (including service to society) – in the activities of the alliance. In developing an institutional transformation agenda the partners will explore, exchange and develop measures towards the long-term vision of ENHANCE. ENHANCERIA will drive responsible societal transformation by enhancing a strong alliance of European Universities of Technology, empowering people to develop and use science and technology for the benefit of society and turn global challenges into opportunities.

Sub-objectives of ENHANCERIA are to:

- Explore practices, ways of working and structures across the alliance
- Establish and widen international networks of employees within research and innovation

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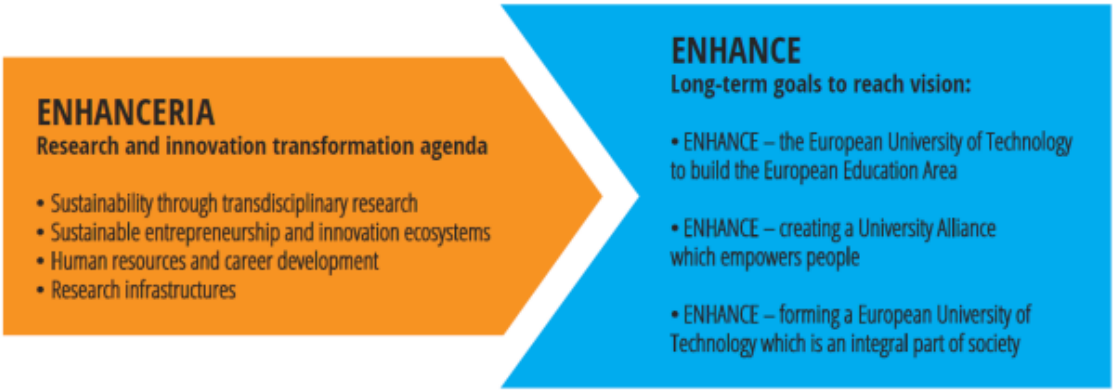
- Develop models for collaboration and recommendations for implementation
- Disseminate and exchange models and practices
- Increase the internationalization of research and innovation activities
- Identify challenges and barriers at institutional, national and European level
- Develop new initiatives to be funded through internal, national and international sources

ENHANCERIA will contribute to the aim of the European Universities: bringing together creative citizens to cooperate across languages, borders and disciplines to address societal challenges, and contribute towards the modernization of universities and the revised European Research Area (ERA).

ENHANCERIA will support and strengthen the research and innovation dimensions of ENHANCE, the European Universities of Technology Alliance, through developing a transformation agenda for the alliance focusing on the role of universities as drivers and enablers of sustainable development. Focus will be on four areas: sustainable development through transdisciplinary research, sustainable entrepreneurship and innovation ecosystems, human resource development, and research infrastructures.



Starting with the four focus areas, a broad exploration activity will be conducted to obtain better knowledge about the institutions. This will reveal **common aspects** of their profiles as leading European Technology Universities, but also lead to an understanding of **diversity**, which is important for creating synergies among them. In order to develop a transformation agenda and joint action plans, it is essential to identify which practices within the different focus areas are most relevant and successful in the different institutions, which measures contribute to a sustainable impact, which models reflect individual institutional culture and which could possibly be mainstreamed across the alliance.

The focus areas are linked to the Transformation Modules, see graphic below. Through this project, ENHANCE will contribute significantly to the EU's proposed 2030 vision and objective on the future of universities in Europe. ENHANCERIA will focus mainly on TMs 2,3,4 and 6, but will also contribute to the other TMs.

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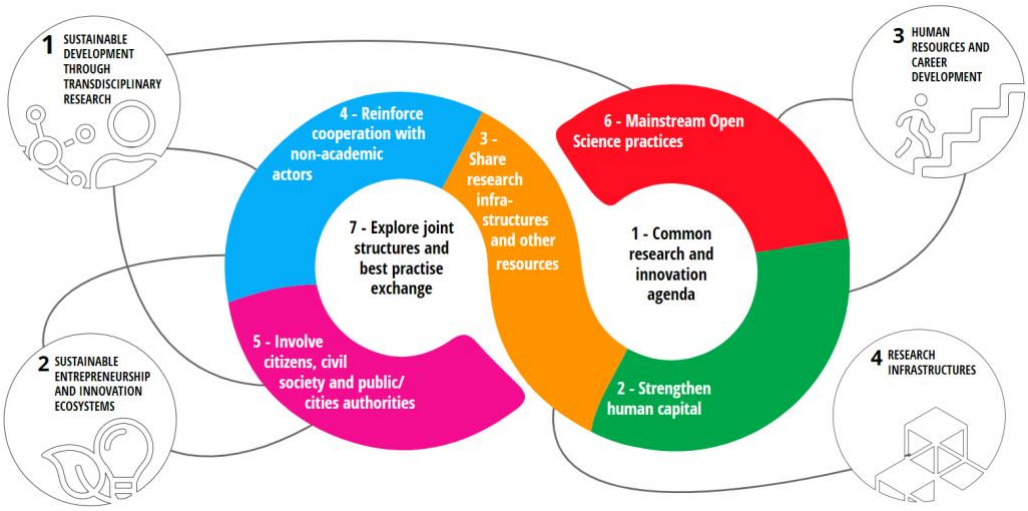

Figure 01. How focus areas addresses transformation moduls. Reference to EC Policy report Towards a 2030 Vision on the Future of Universities in the field of R&I in Europe.

This document will be focused mainly around Transformation Module 3: Sharing research infrastructures and other resources (TM3), which is directly addressed in the focus area on RI (FA4). The result is an exchange of and report on best practices in managing RIs including possible approaches to sharing resources. Good practice examples and pilots are contextual and, in most cases, not directly transferable from one setting to another. The mapping and analyses will uncover common and generic elements and distinguish them from what is contextual, identifying simultaneously what can be applied generally and what displays element which depend on local/regional/national conditions.

1.2 Focus area 4, Work Package 2 & Work package 6

Research infrastructures (Focus Area 4 (FA4))

The European Comission (EC) recognizes the increasing importance of research infrastructures (RIs) as a way to boost excellence in research, develop the scientific integration of Europe and attract the best researchers from around the world. The recent communication A new ERA for Research and Innovation confirms that the EU needs to facilitate quick and easy access to funding for cooperation and sharing of data, develop attractive career frameworks for researchers, equip them with the skills they need in a fast-changing global world and support state-of-the-art research infrastructures.

On the other hand, societal challenges, such as climate change, pollution, health crises, and poverty, demonstrate the urgent need to develop solutions and use resoures and infrastructures capable of providing answers in a quicker and more effective way. The scientific community is at the forefront in finding innovative answers to these pressing needs. Recently, the COVID-19 pandemic has shown the crucial role of research infrastructures in supporting a science-led response to the public health crisis, also helping to elaborate a fast and integrated response and to give access to research data (such as biobanks, medical facilities, etc.). This has also shown the often hidden capabilities of university facilities and the awareness that major efforts are required to release this potential and to open it to the world.

Research infrastructures make science happen. Considering research infrastructures growing significance within the open science paradigm, ENHANCERIA offers great opportunities for technical universities to identify common challenges and opportunities and explore novel ways to share their resources and discover up-coming scientific fields of common interest. This will enable the Alliance universities to align strategies, joining forces in pushing the barriers of fundamental research,

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mobilizing innovation ecosystems, and supporting the emergence of innovative initiatives, also with regard to European and global grand challenges.

The expected impacts from Focus Area 4 are:

- Increased and enhanced utilization of selected research infrastructures.
- Identified areas for further development of joint/shared resources within research infrastructures in ENHANCE.
- Established and proven sustainable management and sharing of research infrastructure.

Exploration, identification and mapping of different practices and approaches (Work Package 2 (WP2))

The main aim in this work package is to identify different successful practices and approaches in the different institutions of the ENHANCE alliance. The exploration and mapping will be done in the four defined focus areas enabling a broader overview in the different institutions and an enhanced understanding of how the focus areas are interconnected. The specific objectives of this WP are to:

- Objective 2.1 Identify different practices, methods, and structures of knowledge exchange between science and society
- Objective 2.2 Exploit the diversity among ENHANCE partners
- Objective 2.3 Contribute to a revised scientific glossary within the ENHANCERIA focus areas
- Objective 2.4 Understand synergies and interconnections among the different focus area

In particular. the functional mapping necessary for the activities of WP6 - dedicated to research infrastructures - is outlined in Task 2.5:

Task 2.5 Identifying and mapping research infrastructures (RIs)

This task will focus on mapping research infrastructures (RIs) at the Alliance level, and comparing definitions and management systems for user access and research data. In order to better understand the landscape of RI both at European and Alliance level, this task analyses, maps and gathers information on the current state-of-art of RIs. This task includes:

(i) Identifying the current ecosystem of RI at consortium level, including a mapping of the internal technological assets and of the internal skills and capabilities;

(ii) Gathering information on management systems for user access and research data currently used within the RIs of the Alliance.

This task will contribute to D2.5 (This document).

Building up a community of users for strengthening research infrastructures (Work Package 6 (WP6))

Objectives. The main aim of this WP is to increase the sustainability of research infrastructures (RI), including developing a common understanding of the potential of RIs in terms of novel research and innovation, new skills and job opportunities, and new and more efficient services towards formats for favourable access to RI across the consortium. The objectives for the WP are:

- Objective 6.1 Share best practices on management of research infrastructures between universities.
- Objective 6.2 Increase visibility of existing RIs in ENHANCE
- Objective 6.3 Increase reciprocal utilization of RIs
- Objective 6.4 Stimulate communities of RIs

Task 6.1 Exchanging best practices and sharing experiences on managing RIs

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The aim of task 6.1 is to go beyond the mapping activity carried on in Task 2.5 of WP2 , exploring interconnections between the RIs of the alliance and discovering research fields of common interest with the perspective to build common actions in the future.
Based on the results of the mapping activities, task 6.1 will identify key points/technologies of joint interest, main experts/teams responsible and major rules of management & sharing the RI applied by individual partners. This will enable in-depth discussion, analysis and elaboration of a joint/common approach to management & sharing RI. The main areas on which the analysis will be carried on will be:

- General concept of sharing RI among project partners
- User access policies
- Data management and protection policies

The discussion on the main policies used by RIs, together with the analysis of the main organizational and business practices already existing within RIs, will lead to the identification of common definitions and to an agreement on a possible common model for sharing RIs at Alliance level.
Finally, the task will highlight organizational and regulatory barriers at partners level that might hamper cooperation within the RI ecosystem. This task will contribute to D6.1.

1.3 Focus area 4, Work Package 2 & Work package 6

Although this document is part of the deliverables for WP2, the work developed on task 2.5: Identifying and mapping research infrastructures (RIs) is closely related to the activities to be developed on WP6, which will start on M12 of the ENHANCERIA project (August 2022). Thus, the working group assigned to this activity will be referred as WP6 working group, as this group will continue its work in WP6.

2. LITERATURE REVIEW

ENHANCERIA will support and strengthen the research and innovation dimensions of ENHANCE, the European Universities of Technology Alliance, through developing a transformation agenda for the alliance focusing on the role of universities as drivers and enablers of sustainable development. In order to achieve the objective of ENHANCERIA, the sustainable management and sharing practices of research infrastructures should be transparent and accesible for the community, enhancing the utilization and visibility of research infrastructures. To strengthen the capabilities and resources of the members of the Alliance, it is key to identify the current ecosystem of RIs at a consortium level, gathering information about the technological assets and internal skills and capabilities and the management systems for user access and research data currently used within the RIs of the Alliance. This activity can contribute to make the resources more open to all members of ENHANCE, more shareable and visible to the rest of the community. This can also benefit the Research Infrastructures individually, strenghthening their management systems and making them more efficient, reaching and helping more users and improve its impact and relevance at a social, technological and scientific level.

Starting from the European Comission definition, "'Research infrastructures' means facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields, including the associated human resources, major equipment or sets of instruments; knowledge-related facilities such as collections, archives or scientific data infrastructures; computing systems, communication networks and any other infrastructure of a unique nature and open to external users, essential to achieve excellence in R&I; they may, where relevant, be used beyond research, for example for education or public services and they may be 'single sited', 'virtual' or 'distributed". *(Article 2, para.1, REGULATION (EU) 2021/695 OF THE EUROPEAN PARLIAMENT*

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AND OF THE COUNCIL of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013).

Research Infrastructures are facilities that provide resources and services for research communities to conduct research and foster innovation. They can be used beyond research e.g. for education or public services and they may be single-sited, distributed, or virtual. According to the European Commission definition[1], "Research Infrastructures" may include:

- Major scientific equipment or sets of instruments
- Knowledge-related facilities (collections, archives or scientific data infrastructures)
- Computing systems and communication networks and any other research and innovation infrastructure of a unique nature and open to external users"
- Any other facility essential to achieve excellence in R&I

This definition of Research Infrastructures can be found in the *European Charter for Access to Research Infrastructures* and the *Regulation (Eu) 2021/695 of the European Parliament and of the Council of 28 April 2021.*

[1] Source: https://ec.europa.eu/info/research-and-innovation/strategy/european-research-infrastructures_en

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// PART II PREPARATION OF THE WORK PROCESS AND TOOLS

3. WP6 WORK PROCESS

3.1 Work process development

Due to the embedded connection between task 2.5 from WP2 and all the tasks from WP6, a WP6 working group was created. With the start of the project in September 2021, the work process of WP2 began. The working group has followed a work plan that has been adapted to the necessities and events that occured during the development of the activity. The working process for WP6 working group, including the steps and tools that had been used, is the following:

Work process with actions performed

1) **WP2 kick-off meeting:** (starting September 2021): Assessment of tasks, creation of WP6 working group.
2) **Agreement on definition and first of RIs** (starting November 2021): Literature review and discussion, first WP6 working group meetings, proposal for definition and examples.
3) **Final selection of criteria for mapping RIs** (starting March 2022): Follow-up meetings. Output: criteria for selecting examples of RIs, proposal for indicators of RI performance and data.
4) **Final selection of indicators of RI performance and data** (starting May 2022): Final meeting on selection of indicators, proposal of MS Forms template for identifying and mapping RI at a consortium level.
5) **Survey for identifying and mapping RIs of ENHANCE alliance** (Starting June 2022): Final meeting for assessing the MS Forms template, launching of MS Forms survey and guidelines for identifying & mapping RIs. The MS Forms was filled by the WP6 working group responsible for each university, with aid of RI responsible/managers in given cases.
6) **Assessment of survey results** (Starting July 2022): Gathering and analysis of survey results, reparation of final report on mapping activities and main findings on RI portfolio within the alliance.
7) **WP6 Kick-off meeting:** (Start August/September 2022)

Shared Miro Board as working technique

The working group for WP6/Task 2.5 has started developing a working board on the platform“Miro”.
This board includes mainly:

- First draft on how to perform the mapping activity
- A selection of indicators to measure the activity of each aspect of the RIs

This board has been used primarly as a draft source to select the best areas and aspects of the RIs to focus on and conduct the first identification and mapping of RIs at a consortium level. For further and common understanding of the scope of the activity, an open Word document was created and shared with the members of ENHANCE.

Shared MS Word document as a working tool

The working group for WP6/Task 2.5 has developed a MS Word document on MS folder Teams. This document includes mainly:

- A working definition of what constitutes a Research Infrastructure at the ENHANCE alliance level (based on the EC definition).
- The criteria to be considered for the mapping of Research Infrastructures at a consortium level.

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This document has been key to organize and have a common understanding of the criteria to use for the mapping and identification of RIs.

Shared MS Forms as a identification/mapping tool

After the sharing of criteria and a "working definition" for identifying and mapping RIs at a consortium level, a common "MS Forms" was developed for the gathering of data and information from each RI of each university.

The WP6/Task 2.5 working group agreed that:
- an average of 10 RI from each partner would be a representative sample to draw a first picture functional to the task's goal;
- a selected number of 24 questions should be asked in the survey, in order to keep it easy to fill in, as a first level of mapping.

The questions have been split in 3 paragraphs, according to the kind of information necessary to provide a quick identification and easy comparison of the selected RIs.
Other questions that initially had been chosen as crucial for the mapping, were excluded from this first mapping activity and are planned to be included in further tasks from WP6 that will extend this mapping activity of RIs. The relation between task 2.5 and tasks from WP6 will be further discussed in this document.

3.2 Work process of Task 2.5 description

With the starting of the ENHANCERIA project on September 2021, the first overview about research infrastructures of the Alliance and its managing systems began with the activities of task 2.5. After the constitution of the WP6 working group, the first objective was to determine the extent of the mapping activity. To achieve this, firstly, a literature review was conducted and findings were discussed in subsequent meetings. Secondly, an agreement on common criteria to define which facilities/resources to consider as Research Infrastructures to include in this activity was reached. Next, the discussion settled on which data and indicators were necessary to obtain from these RIs, to include in this report of main findings on the RI portfolio of the alliance. This steps were carried out in the first 8 months and it required an iterative approach, beggining with a review on criteria used in other RI mapping activities at an European level, such as the work of the ESFRI Working Group Report on Monitoring Research Infrastructure Performance (1), the Nordic5Tech Report on Research Infrastructures and RI Catalogue (2)(3), and continuing with a discussion and assessment on subsequent WP6 working group meetings, with a final selection of criteria applied to the necessities of ENHANCERIA and this activity on task 2.5.

After the criteria for selecting which RIs were most relevant and important to include in this mapping activity, and the selection of data and indicators to obtain from these RIs were assessed, a guideline tool for identifying and mapping RIs at a consortium level and a MS Forms survey template for collecting this information were developed and shared with the key responsibles of WP6 working group of each institution.

The guideline tool was mainly developed to aid the selection of RIs and the completion of the MS Forms survey. Both documents are included in this document as appendixes (appendix 1 and 2).

4. TOOLS FOR RI IDENTIFICATION AND MAPPING

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The activities of identification and mapping of different RIs of the ENHANCE universities provide – as output - a roster of structures, resources, management and sharing strategies and metodologies, networking practices and different scientific and technological areas.
This exhibits the wide range of strenghts and capabilities of the alliance. In order to conduct these activities, a guideline tool and a survey were developed and shared with the rest of the WP6 working group.

4.1 Guideline for selecting RIs and conducting the survey

The main objective of the guideline tool is to aid the selection of RIs and gathering of information with the survey. Due to the wide variety of the existing scientific equipment at alliance level (departmental laboratories, interdepartmental laboratories, large research infrastructures, etc.) it was necessary to define what the Alliance should consider as "Research Infrastructure". To make the contribution of the project partners consistent within the mapping, the project will take into account the following two key concepts related to the official definition of RI:

a) **Major scientific equipment**
b) **Unique nature**

With reference to them, the effort will be focussed on translating the qualitative basis provided by European definition into quantitative parameters in order to reach a common agreement at consortium level:

a) The "**major scientific equipment**" concept will be split into two main parameters:

- **Economic value of the equipment:**

The relevant RI start-up cost, which is to be intended only as the cost of the equipment purchase, to be considered will be within the range of (around) € 400 k- € 1,5k Mln (medium research infrastructures) and over € 1,5 Mln (large research infrastructures).

- **Dimension and complexity of the facilities**:

Features to be considered will be the existence of several integrated components, large dimension encompassing different units and presence of secondary equipment.

b) **Unique nature** of the equipment:

With the meaning:

- Equipment **not already available on the market;**
- **Self-assembled** and **self-built** equipment.

4.2 Criteria for selecting RIs to include in the mapping activity

As agreed after literature review and discussions within the working group, RI to be mapped in this activity should accomplish the following conditions:

1. Have major scientific equipment or sets of instruments; computing systems and communication networks and any other research and innovation infrastructure of a unique nature.
2. Be open to external users.
3. Have booking/billing system (OPTIONAL).

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This last condition was included as optional as some RIs use conventional booking/billing systems. This criteria would be further reviewed on tasks of WP6.

4.3 Survey for identifying and mapping research infrastructures of the ENHANCE alliance

The survey was designed to collect information from the Research Infrastructures of the seven universities of the ENHANCE alliance. This survey was shared with the key responsibles of WP6 working group. The criteria for selecting which questions were mandatory was agreed by all members of the working group after a review of the first version and discussion. Key information for a prompt identification of the RI and its nature (areas of work, university affiliation, basic information...) was requested as mandatory. Questions marked as optionals were considered as so because of the lack of the information requested for a big number of institutions, or because they exceeded the scope of this first mapping and identification of the ENHANCERIA RI ecosystem.

The survey included 24 questions grouped in 6 sections, which correspond to the goals set in the Task 2.5: map Internal technological assets; map Internal skills and capabilities; gather information on Management systems and identify the current ecosystem of RI at consortium level. The following template was used to conduct the survey:

General Information
1. Name of the Research Infrastructure (RI)
2. Main contact of the RI: First name, Last name
3. Main contact of the RI: Email
4. Website (English version if available)
5. Which university is your RI affiliated to?
▪ Chalmers University of Technology
▪ Norwegian University of Science and Technology (NTNU)
▪ Polytechnic University of Milan (Politecnico di Milano, Polimi)
▪ RWTH Aachen University
▪ TU Berlin
▪ Polytechnic University of Valencia (Universitat Politècnica de València, UPV)
▪ Warsaw University of Technology
6. Economic value of the equipment (1/2). Please indicate if the value you will insert in the next question is an:
▪ Estimation of falicity's start-up value related to the purchase of the equipment to set up the infrastructure
▪ Estimation of falicity's replacement value to purchase TODAY the equipments to set up the infrastructure
7. Economic value of the equipment (2/2). According to the choice you made in the question above, please indicate the estimated value threshold:
▪ Medium Infrastructure (400 k€ – 1,5 MLN €)
▪ Large Infrastructure (over 1,5 MLN €)
8. Please motivate the uniqueness, explaining why the equipments are not already available on the market but they are self-assembled and self-built:

Further Information (type of RI, etc)
9. Your research infrastructure is:
▪ Major equipment research facility
▪ Knowledge related (databases, repositories, archives...)

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▪ Computational facilities/tools
▪ Biobanks
10. Has your RI collaborated with any of the following universities? (Optional)
▪ Chalmers University of Technology
▪ Norwegian University of Science and Technology (NTNU)
▪ Polytechnic University of Milan (Politecnico di Milano, Polimi)
▪ RWTH Aachen University
▪ TU Berlin
▪ Polytechnic University of Valencia (Universitat Politècnica de València, UPV)
▪ Warsaw University of Technology
11. Type of RI (According to the EU definition: https://www.onlines3.eu/phase-2-analysis-context/2-2-research-infrastructure-mapping/):
▪ Single-site facility (one physical ubication)
▪ Distributed facility (various physical ubications)
▪ Mobile Facility
▪ Virtual facility
12. Has the RI a public catalogue of services?
13. Please, attach a link of the catalogue of services, if any:
14. Has the RI a public list of prices of the services?

Management System Information
15. Does the RI have a Laboratory Information Management System (LIMS) or any booking system available for external users?
16. Please, include a link of the LIMS or booking system of your RI, if any: (Optional)

Technological Assets
17. Does the RI have a list of technological/equipment assets available for external users?
18. Please, include a description of the major technological/equipment assets of your RI:
19. Specify the main fields of application of the technological assets of your RI: (Ex. Nanofabrication, Supercomputing, Cell Biology...)
20. Please, include a link of the catalogue/list of technological/equipment assets of your RI, if any: (Optional)

Skills and Capabilities
21. Yearly average of doctoral students in training:
22. Yearly estimate of working staff to mantain the facility alive: (Please, specifiy by category).
23. Yearly estimate of research staff who acceses the services of the RI:
24. Please add any information we may have not asked, or any thoughts on this survey. (Optional)

The assesssment and agreement on each question, the pre-selected responses to choose from (in some of them), and the order of the questions were conducted through follow-up meetings among the working group participants.

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Some of the questions that initially had been chosen as crucial for the mapping, were excluded from this first mapping activity and are to be included on the activities of WP6 (Task 6.1 and Task 6.2). The final scope of this initial mapping and identification activity was thoroughly discussed with the responsibles for WP6 of each university, and it was agreed to postpone the collection of some RIs information. This situation was due to the following reasons, which some of the

- The information requested was not publicly available for the majority of RIs selected, and its collection would have postponed this task exceeding the delivering deadlines.
- The request of some of that data would overlap with the objectives of the WP6.
- Some of the RIs contacted were short on staff to attend the infomation requests in time.
- In a similar sense, some of the members of the ENHANCERIA consortium have experimented staff issues and new members of the WP6 working group have joined the team on the later months of development of the activities, difficulting to extend the activity beyond its planned scope.

Questions no. 21-23 about number of access per year has been included in the first mapping to gather a first estimation, conditionally to a further in-depth analysis considering the limits of the last two-years particular situation (access restrictions due to pandemic).

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//PART III METHODOLOGY & RESULTS

5. METHODOLOGICAL PROCEDURE FOR MAPPING AND IDENTIFICATION

The methodological approch for comparison and analysis has been thoroughly adapted throughout the development of the identification and mapping process. The information gathered through the survey has been crucial to accomplish the two objectives of the task and obtain a map of the capabilities, skills and technologies of the RIs of the ENHANCE alliance. Both objectives of the task, which are to identify the current RI ecosystem, including a mapping of technological assets and skills and capabilities and gather information on management systems, have been fully accomplished.

Thanks to its final open section (question no.24)the survey has provided additional information that will be essential for the refinement of the criteria for the following mapping activities Task 6.1, Task 6.2). For this reason, the scope of the information and data to be gathered from the RIs in this task has been designed in order to comply with the project agenda.
ENHANCE universities follow different strategies and methodologies on the structuring of their RI ecosystem. The different governance structure of the institutions, as well as the contextual differences on the framework of each university imply that different methodologies and stategies coexist in the ENHANCE alliance RI ecosystem. The methodological approach we carried on the identification and mapping of the RI ecosystem has been the following:

- First, to select, from the set of facilities and resources of each university, what should we consider an RI in the context of ENHANCERIA and which criteria to apply for this selection.
- Secondly, to select from the sets of indicators and data to gather from RIs, which items we needed the most to complete the task and not exceed the scope and timeline of our work.
- Thirdly, to obtain the necessary information to accomplish the objectives of the task and generate a valuable output for the RI ecosystem mapping activity of task 2.5 and future tasks from WP6 and other work packages that will profit from the data extracted.

In the process of comparing and analyzing the data obtained, we have organized the information gathered in 6 sections, which correspond to the 6 sections in which the MS Forms survey has been divided. The division is as it follows:

- General Information
- Qualification of the RI (why it should be considered an RI in the context of this project)
- Further Information (type of RI, etc)
- Management System Information
- Technological Assets
- Skills and Capabilities

The information has been gathered in one survey but divided by sections, and so has been the analysis performed. Thus, the data has been grouped by nature and compared from a general perspective, but has been analyzed as a whole, not making comparisons between institutions or "similar" types of RIs. Since the analysis corresponds to the data from whole RI ecosystem (including just the RIs mapped, more RIs to be included in further tasks from WP6), some common problems and strenghts are easily identified, but more specific challenges and virtues require a thorough analysis and complementary data to be adequated to the reality of the RI ecosystem of the ENHANCE alliance.

6. SELECTION OF INDICATORS FOR MAPPING AND IDENTIFICATION OF RIs

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As a result of the various WP6 working group meetings and consulting with RI experts and managers from the different institutions, common ground has arised about the RI ecosystem of the ENHANCE alliance. Within the indicators selected to map the internal skills, capabilities and technological assets and resources of the RIs, different types of data have been collected. This paragraph is meant to adress the usability of each of the data collected and justify its inclusion in the survey.

6.1 General Information

The differentiation on the mere name of the RIs is appreciable: some of them have been founded with an english name even when english is not an official language of their country of location. This shows the relevance of the international scope of the work of the RIs, and that the current ecosystem is focused on a broader framework than the regional/national developings on research. Nonetheless, those RIs in which the name has been presented in the official language of their respective countries also present an english adaptation of their names. Moreover, the managers or responsibles for each RI require to have a basic knowledge of english in order to be able to adapt to a global research community and the nature of knowledge and technology sharing and transfer.

Addressing the RIs "digital presence"

The "digital presence" concept refers to the online accesibility and openness of the RIs, taking into account only their official websites and not other sources like social media or press releases. The majority of the RIs analyzed present a website with information in english (as well as in their native language). However, the websites of the RIs analyzed present important differences: some of them present the staff as well as their roles and organizational scheme, their annual budget and revenue, the services offered, the equipment/assets they manage, their multimedia resources... Ideally, the RIs website should be accesible in english for international users and present all the information listed above clearly and well-organized. However, due to distinctions in national normative or institutional requirements, the level of "completion", in public accesible information terms, of the websites of the RIs of the ENHANCE alliance is very variable within the RI ecosystem of ENHANCE.

6.2 Qualification of RIs as RIs

RIs in the context of ENHANCERIA

One of the main objectives of ENHANCERIA referred to the RI ecosystem is to boost and make more efficient the use and management of the RIs. In that sense, RIs included in the mapping activity must be open-access and shareable with external users and have shareable management systems and data. The broad dimension of services and resources of the academic and technological european community has resulted in a very inclusive EC definition of Research Infrastructures. Nonetheless, this broad definition presented initial difficulties for its implementation, and some common ground had to be discussed in order to reach a practical definition of Research Infrastructure for the purpose of the ENHANCERIA project. Moreover, this practical definition was split into practical criteria to be applied in order to take into consideration the resources and capabilities of the partner institutions as RIs. This way, the "characterization" as RIs could be justified if the analyzed structure accomplish one of two conditions:

- Presenting "**major equipment**", meaning that had a medium or high economic value. This consideration presented another problem: Which economic thresholds would be implemented to value one RI as "Medium Infrastructure" or "Large Infrastructure". This raised the question

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on how the value estimation would be adressed. This latter issue was solved offering two alternatives:

- Estimation of falicity's start-up value related to the purchase of the equipment to set up the infrastructure
- Estimation of falicity's replacement value to purchase today the equipments to set up the infrastructure

The final agreement for categorize the RIs into different value or economic thresholds was to create two different thresholds:

- Medium Infrastructures: (Equipment value from 400.000 – 1.500.000 €)
- Large Infrastructures: (Equipment value bigger than 1.500.000 €)

- Presenting "**uniqueness**" in its equipment or technologies. This is a difficult concept to approach, since its nature could derive in a subjective definition or understanding. However, for the purpose of this activity, a practical understanding and application of the term was agreed on. The term uniqueness, referring to the equipment or resources of a RI, implies that the equipment or technologies that the RI dispose of are not available on the market, meaning that the RI has a special agreement with the company that provides the equipment/technology for its use and implementation and this asset is not commercially available, or it consists of equipment/technologies self-built and/or self-assembled that cannot be found elsewhere in that configuration mode or system. This issue is more difficult to tackle on RIs such as biobanks or databases, which can dispose of unique sets of data and/or unique software methods or tools. Given the nature of the issue, the considerations for uniqueness have been a recurrent topic in the information collection task and has been adressed almost individually for each RI. This term will be further discussed in this document as well as in future tasks from WP6.

6.3 Further Information

Categorization of RIs

Referring to RIs, the "**types**" are often referred to the nature of the RI (computational facilities, major equipment research facilities, etc). However, in the context of ENHANCERIA, and taking into account the EC definition of RIs, we agreed that we refer to types of RIs as to what type of physical distribution present the facility or resource, including the following four types:

- Single-site facility
- Distributed facility
- Mobile facility
- Virtual facility

Nonetheless, the RIs analyzed have been divided into four categories depending on the **nature of the RI**:

- Major equipment research facility
- Knowledge related facility (Databases, repositories, archives...)
- Computational facilities/tools
- Biobanks

Catalogue of services and prices

The existence of an online catalogue of services is a great indicator for openness and accesibility of the RIs analyzed. However, the mere presentation of a catalogue of services does not constitute a

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complete indicator on its own, since the information presented in these catalogues may vary in its content and organization, and a thorough analysis of the complete set of catalogues should be performed in order to adress the adequateness of those to the services offered.

The public disposal of a list of prices for the services is an excellent indicator for transparency and accesibility of the RIs, but it was often not available for the greatest fraction of RIs analyzed. This could be due to a great number of factors: volatility in prices for services due to changes in the global economic context, reluctance from institutions to make publicly available their prices, RIs with services difficult to budget beforehand, etc. The transparency of the billing systems and shareability of prices-per-service should be adressed in a further RI analysis.

6.4 Management System Information

Laboratory Information Management Systems (LIMS)

The presence of LIMS in a Research Infrastructure constitutes an indicator of their managing capabilities and reveals a demand and necessity from the research community for the services it offers. The RIs that have to organize itselves with a LIMS have a wholistic approach to their work, tracking and organizing research data and managing its users. This does not imply that those structures without LIMS are not efficient in their internal organization of data and users: some of them have their own strategies and system and perform an excellent job in their field. However, RIs that organize their data with LIMS have an optimized system for trackability and reproducibility of their data, helping them to accomplish excellence in their jobs and reaching multiple users in an efficient way.

6.5 Technological Assets

Catalogue/list of assets

The presence of a publicly available catalogue of technological assets or resources has been considered a major indicator on the openness and transparency of the RIs analyzed. Most of the equipment and assets from the RIs of the ENHANCE alliance come from regional/national/european funds, so it is legally required to make public its ownership and cost. Most of the RIs analyzed have a complete list of assets available on their website. However, some of them did not include specifications such as data sheets, prices, etc. Nonetheless, for the purpose of the ENHANCERIA project and the optimization in sharing RIs across the ENHANCE alliance, the catalogue of assets is a key element to map the RIs and compare equipment and generate synergies between alliance members, their researchers and RIs.

Fields of application/work

This measure has been one of the most challenging to obtain objectively, due primarily to the lack of a scientifical consensus when referring to some disciplines/areas of science or technology. The denomination of the different fields of application will require a thorough analysis from WP6 working group since it would be a key element when designing the catalogue of RIs of the Alliance for task 6.2. For the purpose of this analysis, the information about the fields of application has been considered and gathered in a free text box (question 24), in order to give an initial overview of the Alliance RI ecosystem.

6.5 Skills and Capabilities

Staff to mantain alive the RIs

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For the purpose of this activity, we have divided the staff of the RIs into three main categories. Note that we have excluded the auxiliar personal of the RIs (cleaning staff, security staff...) but it is nonetheless crucial to mantain alive any service related to research and innovation, and even from any field of work. The three categories were:

- Administrative staff
- Technical staff
- Research staff

The results from these questions will be shown in latter chapters.

Researchers that access RIs yearly

The number of researchers who have access to the Research Infrastructures has been one of the most challenging data to compare; in most of the cases it was not available, and in those that it was, it varies from RI to RI depending on multiple factors: nature of the RI, areas of application, staff working on the RI, presence of booking/billing systems, etc. A more comprehensive analysis of users should include: the nature of those users (internal users, external users from public institutions, external users from private institutions, etc), the number of requests per user, etc.

PhDs at training in the RIs yearly

As well as the number of researchers, some of the RIs have not available the information on the number of PhD students that access the RI yearly. Since in the majority of cases data is lacking, this indicator has not been taken into account for a thorough analysis, but it is included in the report nevertheless. Those RIs that provided data in this field presented different numbers of doctoral students, often in accordance and number of staff working there.

7- SURVEY RESULTS

Analyzed Research Infrastructures participating in the present survey

POLYTECHNİC UNİVERSİTY OF MİLAN (POLİTECNİCO Dİ MİLANO, POLİMİ)

CFDHub@Polimi
DriSMi – Driving Simulator Politecnico di Milano
Center for Ultrafast Science and Biomedical Optics - CUSBO
LaborA – Modellistica fisica e virtuale
Laboratorio Prove Materiali, Strutture e Costruzioni del Politecnico di Milano
Polifab
SOLID-LIQUID INTERFACE NANOMICROSCOPY AND SPECTROSCOPY LAB (SOLINANO-Σ LAB)
GVPM Galleria del Vento
CIRC EV - CIRCULAR FACTORY FOR THE ELECTRIFIED VEHICLES OF THE FUTURE
Laboratorio di Sicurezza dei Trasporti (La.S.T.): Passive safety + Active safety)

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CHALMERS UNİVERSİTY OF TECHNOLOGY

Chalmers Materials Analysis Laboratory
Chemical Imaging Infrastructure
Chalmers Mass Spectrometry Infrastructure
Computational Systems Biology Infrastructure
Kollberg Laboratory
Chalmers Nanofabrication Laboratory
Onsala Space Observatory
REVERE Chalmers
Chalmers e-commons
Aldenhoven testing center

NORWEGİAN UNİVERSİTY OF SCİENCE AND TECHNOLOGY (NTNU)

Centre for Advanced Structural Analysis (CASA)
Fluid Mechanics Laboratory and Wind Tunnel
NMR Laboratory (NNP node)
Norwegian Laboratory for Mineral and Materials Characterisation (MiMac)
Norwegian Manufacturing Research Laboratory (ManuLab)
Norwegian Micro- and Nanofabrication Facility (NorFab/NTNU NanoLab)
NTNU SeaLab
The Applied Underwater Robotics Laboratory (AURLab)
The European CCUS Research Infrastructure (ECCSEL)
The National Laboratory for Age Determination
The Norwegian Centre for Transmission Electron Microscopy (NORTEM)
The X-ray Physics Laboratory (NEXT node)
X-ray powder diffraction laboratory (RECX node)

POLYTECHNİC UNİVERSİTY OF VALENCİA (UNİVERSİTAT POLİTÈCNİCA DE VALÈNCİA, UPV)

Servicio de Microscopía Electrónica (Electron Microscopy Service)
Radiation Service (Servicio de Radiaciones)

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UPVFab (UPV Clean Room)

Photonics Laboratory (iTEAM, UPV)

Calibration Service (UPV)

Bioinformatics & Genomics Service (COMAV, UPV)

Micro/Nano Fabrication Facilities of the Nanophotonics Technology Center (NF-CTN) of the UPV - (Micro and Nano-Fabrication Clean Rooms Network- MICRONANOFABS)

Engine Test Benches (CMT-UPV)

Institute Of Plant Molecular and Cellular Biology (IBMCP)

ESA-VSC High Power Radio Frequency Laboratory

ESA-VSC High Power Space Materials

RWTH AACHEN UNİVERSİTY

Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons

Competence Center NGP² Biorefinery

TECHNICAL UNIVERSITY OF BERLIN (TECHNISCHE UNIVERSITÄT BERLIN)

Mineralogical & Geochemical Micro-Analytical Laboratory (MAGMA Lab)

Center for Electron Microscopy (ZELMI)

WARSAW UNİVERSİTY OF TECHNOLOGY

Integrated Photonic Laboratory (Research Centre FOTEH of the Faculty of Electronics and Information Technologies)

Experimental semiconductor pilot line (Centre for Advanced Materials and Technologies CEZAMAT)

Laboratory of Medical Biotechnology (Centre for Advanced Materials and Technologies CEZAMAT)

Laboratory for the synthesis of polymers and chemical compounds on a semi-technical scale (@Faculty of Chemistry)

Laboratory of Electron Microscopy for Materials Structure Characterization (EMMS)

Nanoelectronics Laboratory (Faculty of Physics)

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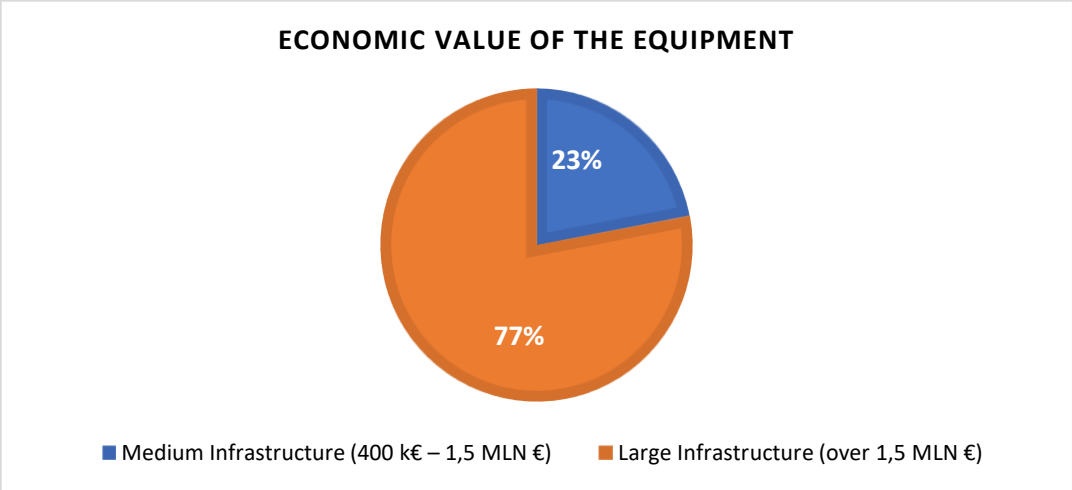
Antenna Laboratory (Research Centre FOTEH of the Faculty of Electronics and Information Technologies)

Integrated line for manufacturing and characterization of prototype printed electronics devices (Center for Advanced Materials and Technologies CEZAMAT)

Economic value of the RIs

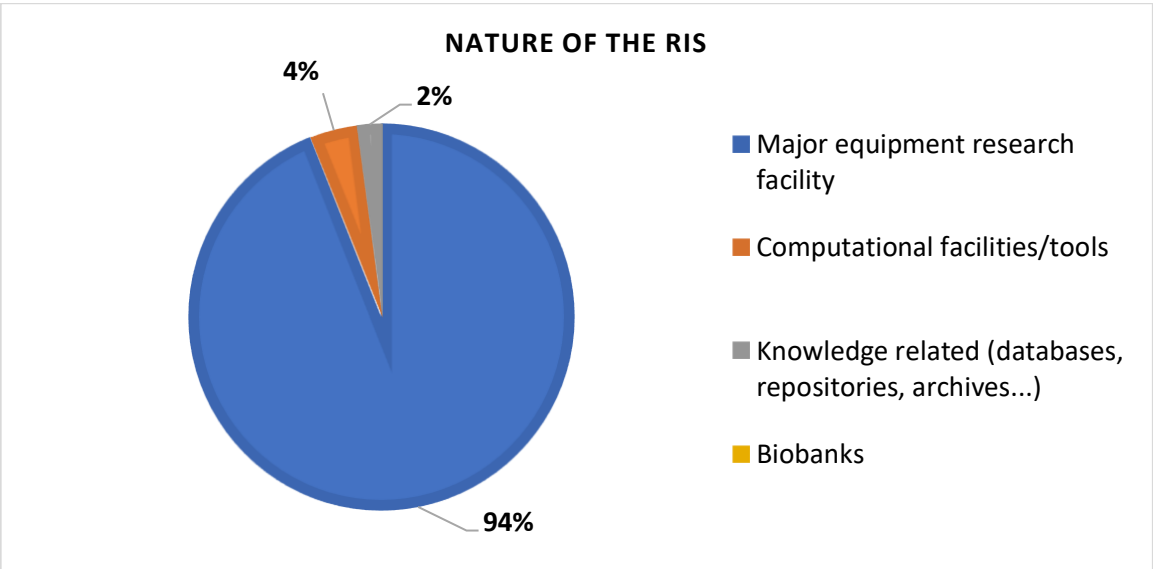
- Medium Infrastructure (400 k€ – 1,5 MLN €) 13 **(23%)**
- Large Infrastructure (>1,5M €): 44 **(77%)**



-

Nature of the RIs

- Major equipment research facility: 54 **(94%)**
- Knowledge related facility (Databases, repositories, archives…): 1 **(2%)**
- Computational facilities/tools: 2 **(4%)**
- Biobanks: 0 **(0%)**



Type of RIs

- Single-site: 39 **(68%)**

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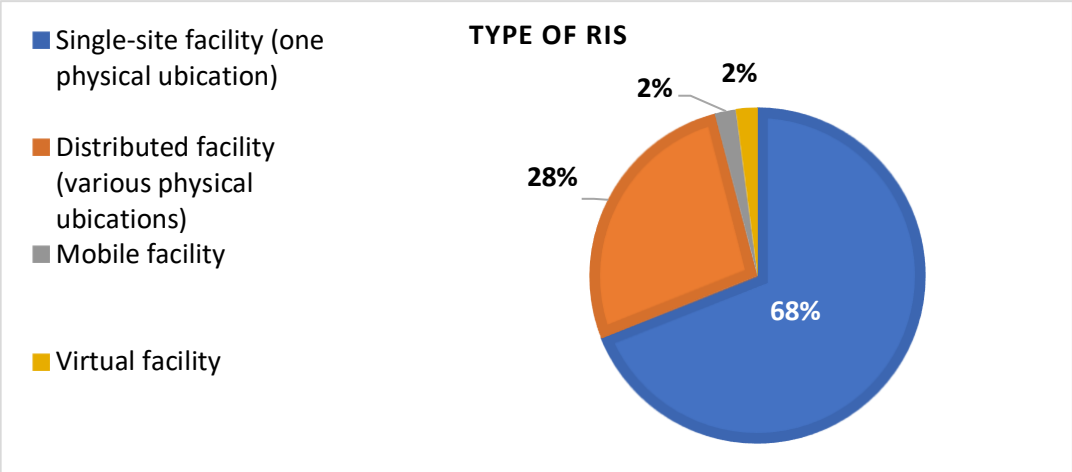
- Distributed: 16 **(28%)**
- Mobile: 1 **(2%)**
- Virtual: 1 **(2%)**

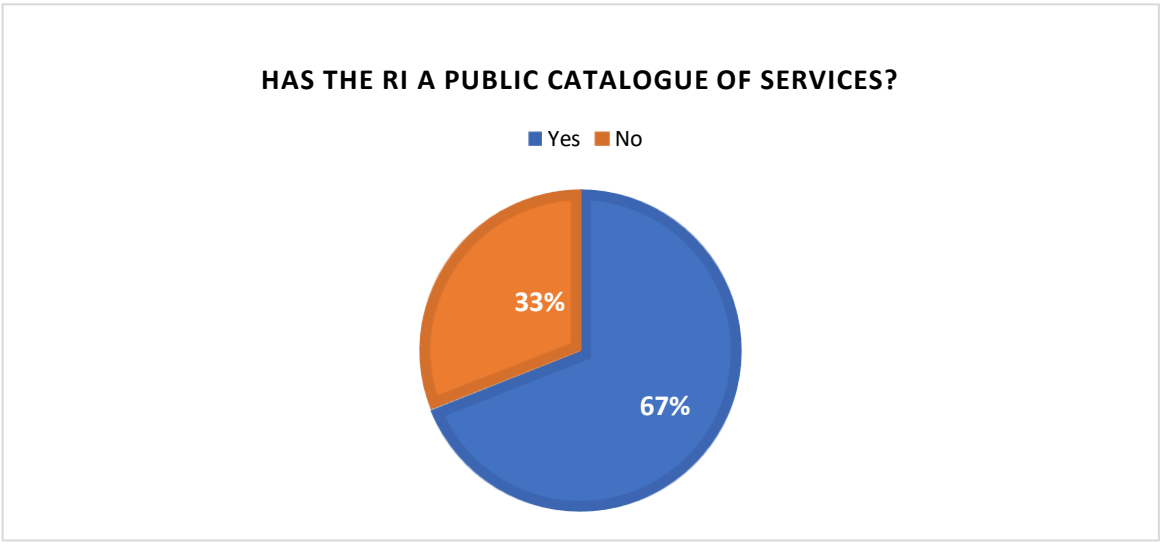


Existence of a public catalogue of technological assets/equipment

- Catalogue publicly available: 45 **(78%)**
- Catalogue not publicly available: 12 **(2%)**

Existence of a public catalogue of services

- Catalogue publicly available: 38 **(67%)**
- Catalogue not publicly available: 19 **(33%)**



Existence of a public list of prices for the services

- List of prices publicly available: 10 **(18%)**
- List of prices not publicly available: 47 **(82%)**

Existence of LIMS or any booking system for external users

- Booking/billing system for external users available: 19 **(33%)**
- Booking/billing system for external users not available: 38 **(67%)**

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Staff to mantain the RI alive

Out of 57 responses, only 8 did not provide any information for this parameter (14%). The mean values with the standard deviation for these categories were:

- **Administrative staff:** 3,1 ± 4,81
- **Technical staff:** 4,53 ± 5,73
- **Research staff:** 7,95 ± 10,74

For the given 57 RIs analyzed, the results from the MS Forms survey for mapping the ENHANCE alliance RI ecosystem are the following. Since some of quantitative information gathered in the survey offers a quick and broad perspective of the RI ecosystem, the analysis has focused on these indicators to give a first mapping of the capabilities and strenghts of the RIs analyzed.

The results values present a high variance, and it could be due to differentiation in both the categorization of the type of employee that each institution uses or due to differences in the process of gathering this information. A further analysis on the human capital of the RIs should be adressed by tasks of WP6, since they are a fundamental part of the RIs and the data obtained from the working staff is key to extend the mapping of internal skills and capabilities of the RIs of the ENHANCE alliance.

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// PART IV ENHANCED GLOSSARY

8. TOOLBOX OF KEY TERMS FOR IDENTIFYING AND MAPPING RESEARCH INFRASTRUCTURES OF ENHANCE

The following toolbox encompasses the terms on which the WP6 working group has discussed and reached a common definition/understanding in order to facilitate the reference to its meaning in the context of identifying and mapping RIs at the ENHANCE alliance level. The majority of terms have emerged from the effort to translate the qualitative basis provided by the EC definition of RI into quantitative parameters in order to reach a common agreement at a consortium level to proceed with the RI ecosystem mapping activity.

TERMS	DEFINITION
Major scientific equipment	In the context of RI analysis, this concept refers to the assets or equipment of a RI and implies that the economic value of the equpment/assets and/or the dimension and complexity of the facilities are notoriously bigger or broader compared with the majority of scientific/technological structures or resources. It is a measure of relevance in the research and innovation context of the RI ecosystem.
Dimension/Complexity of the facilities	One of the characteristics that define a RI as major scientific equipment in the context of the RI ecosystem. It is a characteristic of the Research Infrastructures that considers features like the existence of several integrated components, large dimension encompassing different units and presence of secondary equipment.
Economic value of an RI	One of the characteristics that define a RI as major scientific equipment in the context of the RI ecosystem. It is an estimated feature based on two approaches: the stimation of the falicity's start-up value related to the purchase of the equipment to set up the infrastructure or the estimation of falicity's replacement value to purchase today the equipments to set up the infrastructure.
Type of RIs	Referring to RIs, the type concept is borrowed from the EC definition of an RI. It refers the physical distribution and location presented by the facilities of the RI, and includes for categories: - Single-site facility (one physical location) - Distributed facility (more than one physical location) - Mobile facility (services offered on-site - Virtual facility
Nature of a RI	This concept closely connected to the services and equipment that a RI offers and possesses. It is a type of categorization that divides the RIs into working categories and even refers to different users. This term and the categories it encompasses should be further reviewed and discussed, since a quantitative definition is still to be decided. The categories in which the nature of a RI can be classified are: - Major equipment research facility - Knowledge related facility (Databases, repositories, archives...) - Computational facilities/tools

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	- Biobanks

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//PART V: DISCUSSION & CONCLUSIONS

9. DISCUSSION, OUTLOOK AND FURTHER STEPS

9.1 Discussion on survey results and methodology

The methodology for thedevelopment of this activity and the results obtained from the survey have been analyzed by the working group. The most relevant issues that were thoroughly discussed by the WP6 working group during the development of this activity are the following:

- There has been some divergences on the understanding of the EC definition of Research Infrastructure. However, for a practical purpose, we established a consensus on the criteria for considering a facility or resource a RI: being due to its economic value or the unique nature of its equipment/tools/resources (meaning not being publicly available on the market or self-built or self-assembled).
- In a similar way, there has been some divergences on the understanding of the "economic value" of a RI, and even on the importance of this data as a RI indicator for this activity. Due to the difference in nature of the RIs, the areas of work, the years of existence, and even the country in which they are located, the value of the resources of an RI can vary a lot, and it may not correspond to the importance of the service that a given RI provides. Furthermore, there has been considerations that a categorization of RIs by its economic value could generate an apparent underestimation of those who fall into the lower categories. However, for practical purposes and based on the definition of the EC of RI, two economic value categories have been defined, in order to provide a source of economic value to the collection of data. This aspect will be further discussed by the WP6 working group on the development of the RI catalogue of the ENHANCE alliance.
- In the ENHANCE alliance, every member has a very relevant RI ecosystem, but there exist some differences in the "digitalization" aspect from RI to RI (even within institutions), meaning that some of the RIs analyzed does not have their websites in english or with the total of information asked in the MS Forms survey. This meant that some surveys had to been filled with aid of responsibles/managers from RIs, which ideally has been the best approach to obtain all the information. However, some of the surveys have been filled in with information available on the webpages of the RIs or on public repositories of the institutions that contain those RIs (e.g. for CHALMERS Research Infrastructures).
- The divergence in the number of infrastructures mapped by each University relates to the policy agenda regaring the RI topic in the Universities participating in the Alliance. For example, TU Berlin Research Infrastructures are presenting, in this first mapping, just three cases because a mapping of RI is also one of the tasks of the Berlin University Alliance which has only recently took up its work and will thus need more time to get going. The information will be integrated in the following mapping of Task 6.1 and Task 6.2.
- Due to some of this differences on the availability of public information of billing/booking systems on some of the RIs, this information has been requested as optional. However, task 6.1 and 6.2 from ENHANCERIA will tackle this issue and explore thorougly the billing/booking system or strategies that each RI mapped follows.
- The information about knowledge transfer and technology transfer from the RIs analyzed has not been requested in this mapping activity. There were initial divergences on this matter, but it was agreed to comply with the scope of this task and the timeline of the project.
- Similarly, the information about policy-related output has not been requested since it exceed the objectives of this task.
- Some of the questions of the survey are presented as optional, since the information requested is not fundamental to the mapping activity and some members found that

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information not initially available on their institutions (as it is been adressed on paragraph 4.3). The questions are the following:

- 10. Has your RI collaborated with any of the following universities?;
- 13.Please, attach a link of the catalogue of services, if any;
- 16. Please, include a link of the LIMS or booking system of your RI, if any;
- 20. Please, include a link of the catalogue/list of technological/equipment assets of your RI, if any;
- 24. Please add any information we may have not asked, or any thoughts on this survey.

- The societal impact of the RIs is very difficult to track and measure, since it has a more direct impact on academia and industry than on society. Cross-cutting innovation from RIs to society is still a challenge for the Research & Innovation community.
- The results of some of the questions show that some of the data requested is not publicly available or is not being adequately tracked. This will be further adressed on WP6 activity for developing a catalogue of RIs from the ENHANCERIA consortium.

9.2 Outlook and further steps

- One of the prompt realizations that arise from the RI ecosystem analysis is the difference in the "digitalization" aspect of each RI. Ideally, we could find the whole information about an RI on its website, and have a Laboratory Information Management System or any public billing/booking online system with prices available for all users. However, due to the differences of development of each RI, even due to differences on its nature or its scientific areas of operation, there exist big differences on the "digital presence" of the RIs analyzed, and it is an issue to further analyze on WP6 activities.
- The lack of survey data from doctoral students its an issue that has to be considered, due to the variety of data tracking systems of the RIs. Therefore, the methodology to collect this data in further activities has to be diversified, contacting the responsibles of the RIs that do not have this information publicly available, or the doctoral students office of the universities of the ENHANCE alliance.
- Similarly, the users/researchers access to each RI is being tracked differently and not showed publicly in most of the cases, so an effort to unify tracking systems has to be done. In activities for WP6, the working group will try to contact RI responsibles and/or managers to gather this information.
- RI LIMS are not necessary for the good governance and management of RIs data and users. Nonetheless, they constitute the most robust/optimal tool for doing so at the moment, and also a great tool to organize and share data.
- RI websites are a key element to maximize the transparency and openness strategies of the RI ecosystem of the ENHANCE alliance. Some of the websites consulted were not completed, with a lack of data about resources and services. RI websites should present a catalogue of services and equipment and resources to upgrade their transparency. Another transparency aspect that could be included is the economic information of the RI (annual budget, income, etc).
- In order to maximize their impact on the European community, RI websites should be presented in both english and the official language of the country in which the RI are located, since english is known by the majority of RI users globally. Also, RI websites interfaces should be clear and attractive, in order to maximize their reach on external users and industry users.

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- Improving transparency and openness of the RIs could results in an improve of the management satisfaction and users satisfaction.
- There is a necessity to obtain "advanced" data in the form of research output, tech transfer and knowledge transfer indicators. This information could be useful to reach a more complete mapping and identification of the RIs selected and the RI ecosystem as a whole, and can help the ENHANCE alliance to strenghten its links and optimize its internal and external tech and knowledge transfer, with a proper analysis that would be performed on WP6 activities.
- As it has been mentioned before in this report, there is a necessity to go beyond this preliminary mapping and identification activity and involve more RI managers and/or responsibles in order to provide an accurate picture of the ENHANCE RI ecosystem and its agents.
- Some of the institutions analyzed presented a lack of specialized staff needed to better perfom the activities within the facilities, which not only difficults the RIs ordinary tasks, but has presented difficulties for external activities (such as attending conferences to represent the RI, consulting activities or this mapping and identification activity). The existence of specialized staff for RI services and activities could improve its performance and generate new job opportunities. This is an issue that has been presented as reoccuring, and should be adressed in the WP5 activities for developing better recruiting conditions for researchers and specialized staff in research.
- The importance of involvement of the facilites within national or european networks and other partnerships has been showed as a factor to obtain international relevance, but also funding and collaboration opportunities that improve the functioning of the RIs and its scope to a bigger number of users.

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//PART VI - APPENDIXES

10. APPENDIX 1: MS FORMS SURVEY FOR MAPPING RI ECOSYSTEM OF ENHANCE ALLIANCE

MS FORMS EDITOR LINK:

https://forms.office.com/Pages/DesignPageV2.aspx?origin=NeoPortalPage&subpage=design&id=31VGvnOsH0CnrhmMO3LQxi7GUoCNNZRCvJe019p7BWZURDEwSUdXQVdSWEtBQzJFWlNYQlBSNlFITy4u

This MS Forms document will be attached as a PDF document.

11. APPENDIX 2: GUIDELINE TOOL FOR MAPPING RI ECOSYSTEM OF ENHANCE ALLIANCE

FIRST MAPPING ACTIVITY ON RESEARCH INFRASTRUCTURES IN ENHANCE ALLIANCE–

GUIDELINES ON HOW TO CONDUCT THE SURVEY

DEAR USERS,

HEREAFTER WE PROVIDE YOU WITH GENERAL GUIDELINES AND SUGGESTIONS ON HOW TO FILL THE FORM IN A WAY THAT WOULD BE THE MOST INFORMATIVE, USEFUL FOR AUTHORS, AND ALSO USER-FRIENDLY. PLEASE READ THE DEFINITIONS BELOW PRIOR TO FILLING OUT THE FORMS – THESE ARE INTENDED TO SPARE YOUR TIME. WE WOULD BE EXTREMELY GRATEFUL IF YOU COULD PROVIDE ANSWERS TO NOT ONLY OBLIGATORY QUESTIONS BUT ALSO OPTIONAL ONES.

THIS IS THE FIRST STEP WITHIN EHNANCERIA PROJECT TO SHARE BEST PRACTICES ON THE MANAGEMENT OF RESEARCH INFRASTRUCTURES (RIS), TO INCREASE THEIR VISIBILITY AND THEIR RECIPROCAL UTILIZATION, AND FINALLY TO STIMULATE THE CREATION OF A COMMUNITY OF RIS WITHIN THE ENHANCE ALLIANCE.

IF YOU WOULD HAVE ANY DOUBTS OR COMMENTS, PLEASE DO NOT HESITATE TO CONTACT US.

STARTING FROM EC DEFINITION

«'Research infrastructures' means facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields, including the associated human resources, major equipment or sets of instruments; knowledge-related facilities such as collections, archives or scientific data infrastructures; computing systems, communication networks and any other infrastructure of a unique nature and open to external users, essential to achieve excellence in R&I; they may, where relevant, be used beyond research, for example for education or public services and they may be 'single sited', 'virtual' or 'distributed».

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(Article 2, para.1, REGULATION (EU) 2021/695 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013).

Following the definition above, the Research Infrastructure(s), which is the subject of the Enhanceria project mapping activity, should include at least one of the elements commented below[2]:

- *major scientific equipment or sets of instruments;*
- *knowledge-related facilities (collections, archives or scientific data infrastructures);*
- *computing systems and communication networks and any other research and innovation infrastructure of a unique nature and open to external users, essential to achieve excellence in R&I.*

Due to the wide variety of the existing scientific equipment at the alliance level (departmental laboratories, interdepartmental laboratories, large research infrastructures, etc.), in order to avoid any confusion, below we provide Enhanceria's vision on how to interpret the concepts ~~terms~~ "*major scientific equipment*" and "*unique nature*" for the scope of this survey.

With reference to them, the effort will be focused on translating the qualitative basis provided by the European definition into quantitative parameters in order to reach a common understanding and agreement at consortium level:

a) ***major scientific equipment***: By "major scientific equipment" the project means the equipment of high technical/technological importance to the partner and critically important for the R&D potential.

   Economic value might be considered as well as a key element. In that case, for this first mapping exercise, we would propose to qualify the infrastructures within the range of (around) € 400.000 and € 1,5k MLN as *Medium research infrastructures*; and over € 1,5 MLN as *Large research infrastructures;*

b) ***unique nature of the equipment*****:** by "unique nature of the equipment" the project means the equipment of some (subjective) unique features, providing the predominance of the facility on the R&D market (which might be, but are not limited to: equipment not available directly on the market, extremely rare, hard to copy, hardly replaceable and replicable, requiring unique skills of operators, resulting in the predominance of the partner on the R&D market, etc.)

[2] Source: https://ec.europa.eu/info/research-and-innovation/strategy/european-research-infrastructures_en

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CRITERIA TO BE USED FOR INCLUDING A RESEARCH INFRASTRUCTURES WITHIN THE SURVEY

RIs to be mapped should:

1. (MANDATORY) Have major scientific equipment or sets of instruments; computing systems and communication networks and any other research and innovation infrastructure of a unique nature;
2. (MANDATORY) Be open to external users;
3. (OPTIONAL) Have booking/billing system.

12. APPENDIX 3: MS EXCEL TABLE OF RESULTS FOR MS FORMS SURVEY

This table will be provided in a separate MS Excel document.

13. APPENDIX 4: MEDIA MATERIAL OF THE RIs ANALYZED

To facilitate the sharing of the media material (due to its relative big size) it will be collected via MS Teams on the ENHANCERIA MS Teams Folder.

13. APPENDIX 5: BIBLIOGRAPHY

1. https://ec.europa.eu/info/research-and-innovation/strategy/european-research-infrastructures_en

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