

D6.3

IPR Management and Sustainability Plan

White Research

14/03/2024



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Pioneering resilient and adaptive multimodal transport networks

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ABBREVIATIONS

ADR	Alternative Dispute Resolution
BG	Background IP
CA	Consortium Agreement
CC	Creative Commons
D&E	Dissemination & Exploitation
EC	European Commission
EPO	European Patent Office
ER	Exploitable Result
FIR	ForschungsInstitut fuer Rationalisierung (RWTH Aachen University)
GA	Grant Agreement
GDPR	General Data Protection Regulation
HE	Horizon Europe
HRP	Horizon Results Platform
IP	Intellectual Property
IPR	Intellectual Property Rights
KER	Key Exploitable Result
NDA	Non-Disclosure Agreement
ReMuNet	Resilient Multimodal freight Transport Network
ROL	Results Ownership List
SMEs	Small and Medium-sized Enterprises
TBD	To be determined
WP	Work Package
WRE	White Research

Executive Summary

The present deliverable constitutes the preliminary version of IPR Management and Sustainability Plan, ensuring the establishment of a structured Innovation Management methodology and strategy and an initial definition of project background IP and exploitable results, and their target groups, together with a preliminary discussion of the general terms of (re-)use and IPR provisions per asset. Before this discussion, the report presents the relevant underlying information needed for the reader, as well as the consortium partners, to understand the approach and the terms used throughout the document and the related task in ReMuNet: it provides an overview of relevant Innovation Management concepts and a clear explanation of the Innovation Management methodology.

At this stage of the project, 14 Exploitable Results were identified. As the implementation of ReMuNet's activities is work in progress and the project has only reached its halfway point, this list is subject to modifications as new developments arise. For the same reason, the identified IPR conditions and characteristics (e.g., ownership, envisioned IPR mechanisms, etc.) are also subject to change as partners evolve in their continuous evaluations and discussions of the most appropriate strategies to protect the project's IP and ensure the exploitation and dissemination of ReMuNet's results.

This preliminary version of ReMuNet's IPR Management and Sustainability Plan will be updated by the final version (V2), due by the end of the project (M36), and will include a final identification of the project's developed results and a careful consideration of their overall and individual (i.e., per partner) strategies for their protection and exploitation.

The **main sections** of this document are presented below:

Chapter 1: An *introduction* to the IPR Management and Sustainability Plan and its goals.

Chapter 2: A brief description of the *ReMuNet project*.

Chapter 3: An *overview of key Innovation Management concepts*.

Chapter 4: A list of definitions of important *definitions of IP protection measures*.

Chapter 5: The strategy of ReMuNet's *Innovation Management strategy throughout the project's life cycle*.

Chapter 6: The *methodology* of ReMuNet's IPR Management and Sustainability Plan.

Chapter 7: The identification and definition of *ReMuNet's Background IP and (Key) Exploitable Results*.

Chapter 8: A preliminary *plan for the IPR Management and exploitation for the identified (Key) Exploitable Results* of ReMuNet.

Chapter 9: A more general exploitation strategy for *the identified KERs* of ReMuNet, including a discussion of value propositions and business models.

Chapter 10: The *conclusions* of the present report and the *next steps* towards the final version of the IPR Management and Sustainability Plan are presented.

1. Purpose

1.1. Objective of ReMuNet's Innovation Management strategy

A main objective of the project's Innovation Management strategy is to carefully monitor R&D activities during the implementation of the project, keeping track of any knowledge or Intellectual Property (IP) brought to it by project partners as well as of results generated from the research activities.

Therefore, the Innovation Strategy sets the ground for monitoring the protection of IP and Intellectual Property Rights (IPR) within the consortium, which eventually will support the creation of value from the exploitation and use of the project results and facilitate further innovation from the technologies developed during the project, in addition to their successful deployment.

Besides the protection of exploitable results (ERs), the objectives of the Innovation Strategy also reflect the intention to ensure and support the exploitation and sustainability of project outcomes and their wider availability to all relevant stakeholders. Importantly, when relevant for each result, exploitation of results will rely on commercial and scientific activities that will take place after the project's completion.

Following a structured strategy that relies on best practices and official EC guidelines will ensure that all the innovative ideas, methodologies, and results stemming from ReMuNet are exhaustively identified and pertinently protected, thus helping maximise their impact by being made widely available to other stakeholders through commercialisation or, when applicable, scientific or other type of use.

To this end, the specific objectives of the ReMuNet Innovation Management strategy are the following:

- Define the iterative approach that will yield a comprehensive identification of Background (BG) and the results that emerge from all the activities within the lifecycle of the project.
- Define the methodological framework for the management of all BG and (exploitable) results, including the definition of rights for access and reuse within the project and the potential IPR protection avenues.
- Develop a common understanding among the consortium partners concerning IP-related concepts, as well as a risk mitigation approach, in order to prevent – or, if not possible, eventually resolve – potential IP conflicts.
- Deliver an exhaustive identification of IPR management strategies for all exploitable results of the project as well as from each partner's perspective.
- Relatedly, define ownership for each exploitable result, thus also serving as guidance for partners when they draft their own joint ownership agreements by not only identifying ownership shares but also other underlying usage conditions and responsibilities.
- Help define the more detailed exploitation strategies for the project's key exploitable results (KERs) in the relevant project tasks by not only identifying the relevant types of exploitation for each KER but also discussing how the KERs cover the needs of and add value to the main relevant stakeholders.
- Define the main outcomes of interest and the overall post-project valorisation plans for each consortium partner.
- Define the roles and responsibilities of each project partner to contribute to the project's innovation management. Successfully fulfilling most of the previous objectives is contingent

upon collecting timely input provided and, where relevant, agreed upon by all relevant partners, hence the (pro)active involvement of the consortium in this task is crucial.

1.2. General aim and ambition of Innovation Management activities

In the context of international research projects, it is crucial to understand how to manage IPR as their improper handling could cause real problems concerning the validity of the rights granted, or the risks of legal disputes between partners.¹

Ensuring that IP is timely identified and that the ownership and protection of the generated IP are adequately allocated will help with the smooth reuse and exploitation of the project results. In order to record all the relevant activities linked to the conception and development of an invention, it is advisable to keep a proper track of the innovation process, providing crucial evidence regarding the date of the invention, its authorship and ownership. A timely disclosure and accurate description of the invention would also help in the choice of whether to pursue further IPR protection and what means or type of protection to use (e.g., patent, utility model, design, trade secrets). Thanks to these records, partner organisations and consortium partners will be able to monitor the creation of results with exploitable potential within the frame of the project and to have a clear understanding of the ownership of each IP asset and result, their rights to access/use them, and the pertinent ways to protect them.

Ultimately, creating value for partners, relevant stakeholders and society as a whole is the main objective of publicly-funded research and innovation projects. Innovation management efforts are essential to support project partners in boosting the value and impact generated by their efforts beyond the consortium.

Defining a tailored and appropriate innovation management strategy is also important in order to support consortium partners with the necessary balance to both comply with Open Science requirements while at the same time ensuring the protection of IP to support the commercial exploitation of the project results.

In general, IPR promote economic, social, and cultural progress by stimulating creative work and technological innovation. For small and medium-sized enterprises (SMEs), particularly, a proper IP strategy and protection can help enhance market growth and support competitiveness, prevent loss of market share, prevent reputational damages, and give prospective investors the incentive to finance their activities².

1.3. Obligations under Horizon Europe

A main objective of the ReMuNet project's Innovation Management strategy is to comply with the explicit obligations that beneficiaries of Horizon Europe (HE) programmes must fulfill. In general,

¹ European IP Helpdesk (2022a).

² European IP Helpdesk & Enterprise Europe Network (2024).

these rules aim to ensure that partners in a collaborative R&I project make good use of all the knowledge, IP and results from the project to maximise its impact and added value.

The obligations discussed below may need to be fulfilled either individually or as a consortium. Building upon a clear understanding of these obligations, the present Innovation Management strategy has been formulated in a way that will ensure that following it will provide such compliance. To this end, this section reviews EC guidelines and summarises the most relevant obligations under Horizon Europe related to Innovation Management.

HE rules establish guiding principles for Innovation Management concerning aspects such as ownership, IP protection, access rights, exploitation of project results, etc. Most of these rules are delineated in the Grant Agreement (GA) and the Consortium Agreement (CA). While the GA contains 'default' overarching rules, the CA specifies certain rules further according to what is agreed upon by the project's consortium.

Obligation to protect. A key obligation for HE beneficiaries is that the project's results must always be adequately protected if (a) they can reasonably be expected to be commercially exploited and (b) protecting them is possible, reasonable and justified. Such 'adequate' protection of results implies that protection shall be attained for an appropriate period of time and with an appropriate territorial coverage.

Innovation management activities must therefore ensure that exploitable results (ERs) will be captured, assessed and appropriately protected, in order to support their commercial exploitation. This includes the obligation to define concrete measures for Key Exploitable Results (KERs)¹.

Mandatory Results Ownership List (ROL). Under Horizon Europe, beneficiaries must include a list of KERs in their final reporting, where the following information pertaining to each KER must be present²: (i) description, (ii) ownership status, (iii) sector of application, and (iv) protection measures - geographical coverage (if applicable). As a minimum, the ownership status information must include whether the ownership is single or joint, the name of the owner(s), the country of establishment of the owner(s) and whether the results will be exploited by the owner(s)³. Failure to present this ROL will block both the submission of the final periodic report and the final payment.

Obligation to exploit. Another crucial obligation is the responsibility of beneficiaries to do their best to exploit the project's KERs they own: consortium partners must, up to four years after the end of the project, take measures to exploit results their results either directly or indirectly⁴. In particular, indirect exploitation refers to the exploitation by another legal entity through the transfer or licensing of the IPR pertaining to the KER.

A subsequent obligation is formalised in HE' Model GA as follows: "If, despite a beneficiary's best efforts, the results are not exploited within one year after the end of the action, the beneficiaries must (unless otherwise agreed in writing with the granting authority) use the Horizon Results Platform

¹ European IP Helpdesk (2022c).

² European Commission, European IP Helpdesk Service (2021).

³ European IP Helpdesk (2022c).

⁴ See p. 87 of European Commission (2024).

(HRP) to find interested parties to exploit the results.¹ The HRP can also provide a commonly used platform to help making results visible².

In addition, regulations in Horizon Europe state that any exploitation taking place in non-associated third countries must be accompanied by a justification of how this exploitation is still in the EU's interest³.

Obligation to disseminate. The beneficiaries must disseminate their results as soon as feasible, in a publicly available format, although subject to any restrictions arising from concerns regarding the adequate protection of intellectual property, security rules or legitimate interests. Nevertheless, according to article 8.4 of ReMuNet's CA, "prior notice of any planned publication shall be given to the other [project partners] at least 30 calendar days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement by written notice to the Coordinator and to the Party or Parties proposing the dissemination within 30 calendar days after receipt of the notice." In addition, a project partner "shall not include in any dissemination activity another [partner's] Results or Background without obtaining the owning Party's prior written approval unless they are already published." More details can be found in ReMuNet's CA.

Beneficiaries are requested to make their scientific publications available as Open Access publications, and grant access to their data as open as possible and only as closed as necessary. Project partners must ensure open access to peer-reviewed scientific publications relating to their results, in particular ensuring that publications are available through scientific publications and repositories that provide immediate open access under Creative Commons or equivalent licenses. Partners (or authors) must retain sufficient intellectual property rights to comply with the open access requirements⁴.

Pathways to impact and reporting. Horizon Europe guidelines introduced the following new methods to monitor and assess a consortium's plan and efforts to valorise the knowledge and results from the project in the long run⁵.

- "Pathways to Impact" is a way to monitor impact pathways for KERs and plan concrete steps towards exploitation. It consists of steps towards the achievement of the expected impacts of the project over time, after its end. From the definition of the project's KERs, such steps comprise communication, dissemination, and exploitation activities, leading to the expected outcomes and ultimately to wider scientific, economic, and societal impacts.
- Continuous dissemination and exploitation (D&E) reporting templates. While beneficiaries are no longer mandated to fill in part B for D&E, the adapted templates for HE are designed to capture a clear picture of KERs and their ownership, the number of patents projects apply to, etc.

¹ See p. 87 of European Commission (2024).

² See the relevant section, 'Seeking support beyond the project', for an explanation of the HRP and related support tools.

³ European IP Helpdesk (2022c).

⁴ See article 17 of the Horizon Europe's Model GA in European Commission (2024).

⁵ European IP Helpdesk (2022c).

- Post-grant surveys. Two years after the end of the grant, beneficiaries will need to report on their progress, needs and obstacles on their path towards exploitation. At the time of writing this report, the guidelines regarding this questionnaire were still in the process of being drafted by the EC.

(Joint) ownership. Particular emphasis should be given to the management of ownership of key project results. While the GA states that results are owned by the beneficiary that generates them, in the collaborative environment of a HE research project two or more partners may jointly contribute to an individual result. In these cases, the IP is jointly owned by different partners, who should therefore agree on the ownership terms through a Joint Ownership Agreement. In addition, they must agree on appropriate and shared strategies for the management, protection, and exploitation of the jointly owned results¹.

Granting of access rights. HE rules also mandate the obligation of beneficiaries to grant access to other consortium partners to the knowledge they bring to the project or the generated results whenever such access is necessary to implement project activities or to exploit the project's collaborative results. This is discussed in more detail in the relevant section titled 'Access Rights'.

2. About ReMuNet

ReMuNet is a project that aims to enable and incentivize synchromodal relay-transportation on European rail, road, and inland waterways to increase network resilience, reduce emissions, and improve freight transport efficiency during disruptive events.

The project involves identifying and assessing disruptive events, reacting in real-time, supporting route planning resilience, and communicating alternative transport routes to stakeholders. ReMuNet comprises four core functionalities: standardized methodology for describing multimodal transport networks, an algorithm for calculating route alternatives and capacity utilization, a collaborative platform for managing disruptions and providing alternative route planning information, and the use of AI to model and evaluate alternative courses of action.

The project aligns with the vision of the Physical Internet and aims to contribute to the resilience and sustainability of European trade. The approach involves improving logistic and freight transport network resilience through digital technologies and synchromodal operative layer planning. It will define a multimodal freight transport and logistics network ontology, specify a typology of disruptive events, develop an algorithm for generating alternative routes, create a collaborative platform for information and capacity exchange, integrate a self-learning algorithm, and implement corridor-based pilots. Extensive stakeholder networks will be utilized for maximum impact and dissemination success.

Thus, the overall objectives of ReMuNet are to:

- Lay the foundation for a common standard to **describe sustainable European multimodal transport networks** for all stakeholders.

¹ European IP Helpdesk (2022c).

- **Reduce** European inland transport **emissions** on the main run by over 50%.
- Enable the multimodal freight network to **react and respond 20% more quickly** to disruptive events.
- **Provide 50% more alternative transport routes** in the face of disruptive events and **make multimodal route planning 10-20% more accurate and efficient**.
- **Create new approaches for benefit-sharing cost-efficient business models and integrate 30% more companies** (including >50% SMEs) into the multimodal freight transport ecosystem.
- **Predict the impact of disruptive events** on multimodal transport corridors with a 90% accuracy.
- **Enable civil protection organisations** to set up aid delivery logistics for crisis areas 25% faster.
- **Create a unified data pool** that portrays real-time utilization of multimodal European transport infrastructure in compliance with data protection regulations.
- **Engage a variety of relevant stakeholders** especially international organisations, industrial parties, scheme owners, certifications bodies and policy makers.

Lastly, the project involves several work packages (WPs) to achieve these objectives. In WP1, an ontology for the European multimodal freight transport and logistics network will be defined, describing the infrastructure, and classifying disruptive events. WP2 focuses on developing a reference model that replicates the infrastructure and its utilization, while also creating an algorithm capable of generating alternative routes considering dynamic capacities. WP3 involves the creation of a collaborative platform for information and capacity exchange, enabling synchromodal relay transport. WP4 integrates a self-learning algorithm into the platform to improve its performance over time. Corridor-based pilots will be implemented in WP5 to validate the project's results under different scenarios. In WP6, extensive stakeholder networks will be utilized to maximize the impact and dissemination of the project. Lastly, WP7 ensures ReMuNet's successful and timely completion by implementing strategic project coordination, managing contractual reporting, conducting gender equality measures, and maintaining quality standards while addressing project risks.

3. Overview of Key Innovation Management Concepts

3.1. IP and IPR

To start, it is important to make a distinction between Intellectual Property (IP) and IP rights (IPR). While Intellectual Property (IP) refers to assets, IP rights (IPR) refers to legal tools to support commercial exploitation.

More specifically, IP refers to intangible creations of the human intellect that may be protected by law. In contrast, IP rights provide the legal framework by granting exclusive rights for a specified period, allowing creators to safeguard their ideas and creations from unauthorized use or reproduction. IPRs are territorial rights, meaning that they are valid only in the jurisdictions where

they have been registered¹. There are several types of IPR, a description of which can be found in the respective sections of this document.

3.2. Ownership, Inventorship and Authorship²

A second distinction must be made between the concepts of ownership, inventorship and authorship. The inventor of an innovation does not always correspond to the owner and vice versa. Moreover, the inventor is not necessarily the author.

While inventorship identifies the creator of an invention, ownership recognises the proprietary right to possess an invention. Thus, ownership gives the right to prevent others from using the IP. Authorship is used in the copyright domain, more precisely in a publication environment, in which a person – the author – has produced a piece of writing or any other specific publication.

While inventors and authors are always natural persons, owners can also be legal persons (organisations), for instance the employer of an inventor/author. It is important to note that assigning ownership to an employer does not affect inventorship or authorship.

The factors that determine whether someone is a (co-)inventor include (i) conception of the idea, (ii) material contribution to the development of the invention, and (iii) implementation of the idea into practice.

The common default regime in most national legal frameworks of EU member states that copyright from inventions and the IP created by employees belong to the organisation/employer. However, in order to avoid later disputes, it is strongly recommended that employment contracts and assignment agreements contain explicit provisions and rules on the allocation of ownership for IP rights to inventions.

3.3. Background

Background IP (BG) can be defined as data, know-how or information – including any rights – owned or licensed to a project partner prior to the start of the agreement and needed to implement the action or exploit the project's results.

The implementation of any collaborative research project requires the use of pre-existing IP (i.e., background) resulting from work carried out prior to the project, and belonging to one of the partners. Partners shall outline the respective background that each of them will bring to the project. In the CA, project partners need to create a list of background IP, as well as specific IP they wish to exclude access to³.

All project partners must identify the background that they brought to the project to carry out its activities. The background can be identified and agreed upon (i) within the consortium agreement, after the internal evaluation of pre-existing knowledge, (ii) in a separate agreement ("agreement on the background"), and/or (iii) in the Innovation Management deliverables. In any case, the consortium

¹ European IP Helpdesk & Enterprise Europe Network (2024).

² European IP Helpdesk (2022a).

³ European IP Helpdesk (2022c).

must identify the background that each project partner provides and that is imperative for successful implementation and exploitation of the project. This list of background can also be part of joint ownership agreements, and shall be kept updated during the project's implementation phase in the respective versions of the Innovation Management deliverables.

Besides this identification, it is important to define the access rights associated to the project's background. This is discussed in the next section.

Furthermore, it is important to define what will be considered modifications/improvements to the background. The distinction between derivative and new work is not always obvious. Therefore, ownership of the background modifications needs to be defined contractually.¹

Regarding ownership, examples of common IPR ownership arrangements related to background include the following:

- That each contributing party retains the sole ownership of its background.
- Relatedly, that any modifications to such BG or derivative works based on it remain the property of the BG's original owner (i.e., the partner that brought the BG to the project).

Furthermore, since most of the joint results will contain partner-contributed IP, the background will constitute the object of future contracts and influence the conditions for the use of the results. Therefore, it is advisable to provide contractual clauses about the use of the individually-owned background IP, besides discussing the use of the joint IP.²

3.4. Access Rights

Access rights refer to a given project partner's right to request access to another project partner's IP (be it BG or project results) in order to implement its project activities or exploit its own results. The rules and provisions governing access rights within the project are pre-defined in the Consortium Agreement (CA) and article 16 of the Grant Agreement (GA) of ReMuNet.

Irrespective of ownership provisions, the background that is strictly needed for carrying out the project activities or exploiting the results must be accessible to the other project partners on a royalty-free basis. Partners have the right to request access rights to the other project partners' background and results as long as they need them to carry out the project work or to exploit the project results.³ More specifically, each party should grant access rights to the respective partners that need certain background, allowing them to use it in accordance with the project's scope (usually royalty-free), and within their business activities during and after the project (usually royalties-bearing).⁴

In line with this, the attachments to ReMuNet's CA specify the specific Background included at the beginning of the action, together with any restrictions and/or conditions for implementation or

¹ European IP Helpdesk (2022b).

² European IP Helpdesk (2022b).

³ European Commission, European IP Helpdesk Service (2021).

⁴ European IP Helpdesk (2022b).

exploitation that the owning parties have established for each of these Background IP brought to the project.

In addition, these access rights can be requested throughout the duration of the project and up to one year after its completion when needed to carry out the exploitation of results that incorporate such BG (unless agreed otherwise in the CA). Once requested, access rights may be exercised as long as they are needed for exploiting the results (e.g. until the background patent expires).

The following table provides an overview on the access rights regime under Horizon Europe, differentiating on the type of IP and the purpose for its use¹:

Table 1. Access rights regime in Horizon Europe projects

Purpose of Access	Access to Background	Access to Results
Implementation of the project	Royalty-free, unless otherwise agreed by participants before their accession to the GA	Royalty-free
Exploitation of project results	Subject to agreement, access rights shall be granted under fair and reasonable conditions (which can be royalty-free)	

Examples of access rights clauses within the scope of collaborative research projects include the following:

- Each party grants the other parties the non-exclusive right to use its background free of charge, as long as such access is strictly necessary to implement the project actions;
- Each party grants the other parties a non-exclusive, royalty-bearing, non-transferrable right to use its background, as long as such access is strictly necessary for the other party to make, sell or otherwise exploit the project result;

3.5. Project (exploitable) results and KERs

As part of the project's innovation management it is important to map any results and assets that are generated through the implementation of project activities. Results can be defined as any tangible or intangible output generated within the project's activities, whatever their form or nature, including materials, data, knowledge or other pieces of information, whether or not they can be protected, as well as any rights attached to them, including IPR². It must be noted that output generated outside project activities cannot be categorized as 'project results'.

In general, project results are owned by the partner that generates them. However, given the collaborative nature of the project, some results can be jointly developed by several partners. In this

¹ European IP Helpdesk (2022c).

² See the IP Helpdesk's glossary: https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk/europe-glossary/europe-ip-glossary-r_en

case, joint ownership can arise among the contributing partners and is subject to joint ownership agreements.

In addition, it is important to highlight that results generated within the project were formally called 'foreground', while current terminology, already updated in the EC's Horizon 2020 guidelines, prefers to only make a distinction between 'background' and 'results'¹.

Nevertheless, results can be categorized in different ways. For instance, a granular result can be part of a larger (composite) result, which may be a more important outcome of the project or be more relevant for exploitation purposes.

Accordingly, one can differentiate between 'results' and 'exploitable results'. An exploitable result (ER) is a project result that meets the following two criteria: (i) has commercial, social and/or academic relevance, and (ii) can be commercialised/exploited as a standalone result. However, not all results may meet the above conditions. Furthermore, ERs ought not to be ready to be exploited right after the end of the project, even though they must hold that potential; for instance, they may require further R&D, engineering, or validation before becoming a product that can be commercialized. As mentioned before, exploitable results can be a combination of more granular project results.

Furthermore, it is important to consider the concept of 'Key Exploitable Results' or KERs, which are the main project results in terms of exploitation interest and potential². Among the various identified results generated by the project that can potentially be exploited, a prioritisation must be made to distinguish the main results as Key Exploitable Results or KERs. KERs are identified and prioritised due to their high potential to be reused and valorised (in other words, exploited) and the consortium's interest in doing so.

3.6. Exploitation

In the latest available Horizon Europe Model Grant Agreement³, *exploitation* is defined as the use of results in further research and innovation activities beyond the project, including among other things, the commercial exploitation through the creation, manufacturing, marketing or provision of products or services, the development of processes, or in standardisation activities⁴.

Therefore, exploitation refers to using a result generated in ReMuNet in other activities, with the goal to valorise the result at the organizational level and/or to maximise its impact for other stakeholders. Other ways to make use of project results include, albeit apparently out of the scope of this definition of exploitation, conducting further research or providing relevant input for future policy-making. While we argue that further R&D can be interpreted as exploitation through, for instance, the development of new processes, the publication of results in scientific publications or as policy recommendations

¹ European IP Helpdesk (2019).

² European IP Helpdesk (2021).

³ European Commission (2024).

⁴ See page 85 in European Commission (2024).

would rather fall under the scope of ‘dissemination’ of results (see the relevant section below for a discussion on dissemination).

One option regarding exploitation of results is for a beneficiary to transfer the ownership of IP to one of the joint owners of such (exploitable) results or even third parties¹.

3.7. Dissemination

Dissemination is defined in the latest Horizon Europe model GA as “the public disclosure of the results by appropriate means, other than resulting from protecting or exploiting the results, including by scientific publications in any medium.”².

The appropriate means for the dissemination of project results (e.g. scientific publications, publication on web sites, conferences, etc.), can be selected by project partners, always taking into consideration the Open Science requirements in Horizon Europe.

In any case, partners have to first ensure the protection of a project’s Exploitable Results and then proceed to dissemination actions of the underlying result(s). In this regard, it is important to note that certain IPR protection measures require the relevant IP to be kept confidential before registering it for protection.

Regarding publications, prior notice of any planned publication shall be given to the other consortium partners at least 30 calendar days before the publication.

3.8. Results, outcomes and impact

Horizon Europe clearly distinguishes between results, outcomes, and impact. Results are achievements made during or shortly after the implementation of the project. Outcomes are the effects of the project in the medium term, achieved through the uptake, diffusion, and use of the results. Impacts are the effects on society, the economy, and science in the long term, enabled by the outcomes of the project. The specific time periods in which results, outcomes, and impacts are expected depend on the specific project, but typically may be three, five and seven years from the project start, respectively³.

3.9. Joint ownership

Joint ownership, also called co-ownership, refers to a situation in which two or more (legal or natural) persons have proprietary shares of an asset. Joint ownership often occurs in connection with collaborative innovation and is thus of particular relevance to EU-funded programmes and any research project involving co-development of IP.⁴

Joint ownership of IP requires that results (e.g., research results) are jointly generated by the partners, and that the exact share of the work (i.e., of the ‘material’ contributions) cannot be

¹ European IP Helpdesk (2022c).

² See page 85 in European Commission (2024).

³ European IP Helpdesk (2022c).

⁴ European IP Helpdesk (2022b).

determined easily, or that the final work or result is indivisible by nature.¹ In addition, joint ownership may arise with regard to all the forms of IP (e.g., patents, copyright, trademarks, trade secrets, etc.).

Partners should define the terms of the resulting joint ownership in a separate *joint ownership agreement* or, alternatively, in clauses within the more general *collaboration agreement*. However, when drafting a joint ownership agreement or a collaborative agreement, it is crucial to seek legal advice, given the complexity and technicality involved in doing so.

Exploitation rights on jointly owned assets may vary across the various relevant jurisdictions. Hence, it will be determined on the national level who, among the joint owners, can grant licenses and/or sub-licenses. Likewise, the co-owner's right to be compensated for not exploiting those assets might be differently regulated or even absent in some jurisdictions. In this context, the respective co-owners need to carefully consider the choice of applicable law and jurisdiction. Choosing a jurisdiction will allow partners to uniformly interpret their joint ownership agreement and to set common rules in case disputes among them emerge. Any national law can be selected, even though it is preferable to choose a jurisdiction that offers the highest degree of impartiality as well as a high standard of protection and efficiency. It is also advisable to select a law that is applicable to the parties' respective national systems or the core of the agreement.²

Partners should define the expectations regarding jointly created results before any research activity is carried out. In addition, if possible, partners should define co-ownership issues of the expected results by considering the following factors³:

- The allocation of the ownership shares of IP results between joint owners. One of the most common options is to equally share the results among the partners. An alternative is to divide it according to their involvement in the development of the results.
- The conditions of use of the jointly owned results (IP). Co-ownership arrangements usually grant each party an unrestricted use of the jointly owned IP. However, if restrictions were to be deemed necessary, two options can be envisaged: either (a) joint ownership is maintained with the provision of mutual restrictive conditions (e.g., use strictly necessary for research activities), or (b) the property of the entire asset – hence supporting all the related costs – is assigned to a single party who will grant licenses to the other partners on an “as-needed” basis.
- The conditions of exploitation of the joint IP, under which each co-owner can assign, license and exploit the jointly owned results. For instance, whether the other partners will receive compensation when exploiting the joint results; or any rights and obligations regarding licensing costs and income.
- The conditions for dissemination of the joint IP. To maintain secrecy on the knowledge, parties can establish confidentiality rules. For instance, joint owners can agree on limits to the disclosure of data and results, bearing in mind that dissemination can be an impediment to future IP rights registration (i.e., patents, utility models and industrial designs). Common clauses include the following: (i) that a party intending to publish any research results provides a certain period of time for the other parties to verify whether the contents of such

¹ European IP Helpdesk (2022b).

² European IP Helpdesk (2022b).

³ European IP Helpdesk (2022b).

- dissemination should be kept confidential; or (ii) that confidential information shall not be disclosed, reproduced, or otherwise made available to any other third party, without the consent of the other parties, at least for a certain term (e.g., until patent applications are filed).
- The management of the jointly owned results (IP). This refers to the protection, maintenance and defence of the results. Regarding IPR protection, an agreement shall include: (i) the type of protection measure, (iii) when the protection will be registered, (iii) which party will file the application and then follow the procedure, and (iv) which party will bear the costs of the IP protection and maintenance. Regarding IPR infringement and enforcement, joint owners should decide which party will be responsible for monitoring and policing the joint IP as well as assume the expenses for any infringement in connection with it. The latter can arise either because the jointly owned IP infringes a third parties' IPR or because a third party infringes the co-owned IP. In the case of IPR infringements owners can legally enforce their rights against infringers¹. However, it is also recommended to first evaluate an Alternative Dispute Resolution (ADR) mechanisms such as negotiation, mediation, expert determination, arbitration, etc.²
 - Governing law and jurisdiction and alternative dispute resolution mechanisms. Such mechanisms are a rapid and cost-effective way of solving disputes in contractual relationships.

It is best practice for partners to establish, during or after the project, a separate joint ownership agreement in order to define the allocation of ownership and the terms discussed above.

As mentioned at the beginning of this document, exploitation of the project results may be done by partners directly or indirectly through another party through licensing or transfer of IPR. Hence, each joint owner can grant non-exclusive licenses to third parties to exploit the jointly-owned results (without any right to sub-license). In such case, unless otherwise agreed in the CA or the joint ownership agreement, the remaining joint owners must be given at least 45 days advance notice and fair compensation³.

Lastly, it is important to note the difference between joint ownership of collaborative results and a common exploitation of composite results belonging to multiple partners. Exploitation of co-developed results can take various forms. For instance, jointly-owned results may be exploited individually by partners who have formally decided on the allocation of ownership and IPR of the results through a joint ownership agreement. However, jointly-owned results may also be exploited collaboratively, for example through joint ventures, special-purpose vehicles, or similar types of legal entities owned by multiple parties. Such joint exploitation may also not rely on jointly-owned results; i.e. not all parties that own shares in the legal entity must also be the IPR owners of the underlying results being exploited by that entity. Compared to joint ownership, agreements on the joint exploitation of individually-owned results are a common, and often simpler, pathway to manage the

¹ It is recommended to utilise monitoring services, online searches, and industry networks to identify potential infringements and, if infringement is detected, to consult an IP attorney (European IP Helpdesk & Enterprise Europe Network, 2024).

² ADR are a rather simple, fast and inexpensive procedure that brings parties together with the objective to resolve disputes out-of-court. Types of ADR include negotiation, mediation, expert determination, arbitration, etc. (European IP Helpdesk & Enterprise Europe Network, 2024).

³ See article 16 of the Model GA in European Commission (2024).

IPR and exploitation of project results. The aforementioned vehicles can exploit multiple elements owned by different partners through a single entity. Partners would still need to agree on (a) the division of the proprietary shares of such entity, and on (b) how to transfer the IPR to exploit the results to this new company. Although still complex and requiring further negotiations among partners, a joint exploitation through establishing a dedicated entity may be a more realistic strategy, depending on the nature of the project results. Regarding the ownership of IPR, the new common entity would either become the owner of the KER through the transfer of IPR, or simply acquire a license to exploit the result. In the latter case, the partners owning the individual elements would license their technology to this entity, according to their agreed terms.

3.10. Protection of digital IP

The threat posed by copying, industrial espionage, reverse engineering and manipulation of software solutions has led companies to increasingly invest in software protection. Additionally, IPR can arise in various aspects of a webpage or social media content: Be it - in respect of the logo used, the text/images that appear, the interface design, typography, domain name, databases included or the coding which determines the way the website is laid out and formatted. Some of this may have been created by the company but some of the content may have been created by others. Particularly, if your client is using an agency, pay careful attention to the property clauses. It's important to be aware of IP considerations when creating and sharing content on webpages or social media platforms to ensure they respect the rights of others and protect their own IP. Laws and regulations regarding IP can vary by jurisdiction. For software protection, depending on the jurisdiction, explore legal options like patents, copyrights, and trade secrets¹.

¹ European IP Helpdesk & Enterprise Europe Network (2024).

4. Definitions of IP Protection Measures

This section will discuss in more detail the most relevant and common types of instruments that may be considered for IP protection in a research project. To provide an understanding of the different measures and their use, we will clarify their characteristics and present examples of IP assets that could be protected by them.

The effective exploitation of the innovative results developed in the frame of the project is contingent on the adequate protection of their underlying IP. Project partners shall safeguard the identified exploitable results with adequate protection schemes, which will offer adequate protection period within a suitable geographical territory. When considering IP protection, project partners must not only consider their own interests but also the interests of the whole consortium.

IP protection constitutes a tool to create value through the licensing, sale or commercialisation of IP in the form of products and services. Moreover, its utilisation is vital for a prospective commercial or industrial exploitation as it can contribute to support the branding of products and services both to customers and investors. It should be noted that an asset can be of high exploitation value even if its characteristics do not mandate IP protection; for instance, this is the case of open source results with high potential for exploitation and/or wide deployment by relevant stakeholders (e.g. publications of project findings).

The geographical territory of the IP protection will have to be agreed on by the parties in advance, based on where the IP will be used. By default, Europe is considered to be the suitable territory within which the identified ERs will be safeguarded, but it remains at the discretion of the interested parties to collectively reach an agreement with regard to this matter.

There exist different types of IPR to protect R&D results from research projects. Consequently, when considering IP protection the most appropriate protection strategy must be chosen. The selection of the most suitable form of IP protection depends on the nature and specific characteristics of the results under consideration and the objectives of the IPR owner.

For instance, copyright and related rights are commonly used for artistic works, databases, etc. The granting of such IPR does not require registration. In contrast, trade marks, patents, utility models, industrial designs, etc., are more suited for 'industrial' results and require registration. In addition, trade secrets can be used to protect 'soft' or 'intangible' IP such as know-how or confidential information.

Overall, such rights grant a monopoly on the use and/or commercialisation of the innovation for a limited amount of time, which depends on the type of protection measure. Such exclusivity can also help attract funding and investment.

However, while ownership of IPR provides exclusivity, this does not equal protection in practice. It is therefore important that results are not only protected but that IPR are managed and enforced.

4.1. Patents and utility models

A **patent** is a legal title granting its holder the right to prevent third parties from commercially exploiting an invention without the authorisation of the patent holder. Therefore, the value of a patent arises from giving its owner a monopoly.

Patents are granted for inventions that demonstrate potential for industrial application. A patent protects inventions (i.e., products or processes) offering a new technical solution or facilitating a new way of doing something. Therefore, patents must be novel and demonstrate progress beyond the state-of-the-art. Quoting the European Patent Convention, "European patents shall be granted for

any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.”¹

Patent protection requires registration, which can be filed in the patent office of choice. In return, the patent holder must disclose the invention to the public in the patent application, which requires showing how the invention functions. Some patents are granted only per country, while others give supranational protection (e.g., at the European level).

In addition, patent rights are granted for a certain period of time, generally for 10 or 20 years, depending on each legislation². Once a patent expires and the protection ends, the invention becomes part of the public domain, meaning that the patented invention becomes available for commercial exploitation, free of charge, by others³.

For patents, the inventor is also the first person with the right to be granted patent protection for their creation. In fact, a patent can only be granted to its inventor or to the person who claims ownership through the inventor.⁴

Patent owners may give permission to other parties to use the patented invention during the protected period. Moreover, they can offer a license or even sell the patent right (i.e., the ownership of the patent) to another person.

According to the European Patent Convention, mathematical methods, programs for computers or aesthetic creations, among others, are not regarded as inventions with regards to patentability⁵. Software is thus excluded from patentability to the extent that a patent application relates to a computer program “as such”. However, computer-implemented inventions, defined by the European Patent Office (EPO) as innovations that “involve computers, computer networks or other programmable apparatus, whereby at least one feature is realised by means of a [software] program”⁶, are accepted at the EPO. It is relevant to note that a computer program and a computer-implemented method are distinct from each other: while the former refers to a sequence of computer-executable instructions specifying a method, the latter refers to a method being performed on a computer.⁷ Relatedly, database management systems, defined as technical systems implemented on computers to perform the tasks of storing and retrieving data using various data structures, are considered a method that uses technical means and are therefore not excluded from patentability either.⁸

¹ See art. 52 in European Patent Office (2020).

² European IP Helpdesk & Enterprise Europe Network (2024).

³ See p. 17 in WIPO Intellectual Property Handbook (2008).

⁴ European IP Helpdesk (2022a).

⁵ See art. 52 in European Patent Office (2020).

⁶ See Part F – Chapter IV-10 in European Patent Office (2024).

⁷ See Part G – Chapter II-17 in European Patent Office (2024).

⁸ See Part G – Chapter II-21 in European Patent Office (2024).

Like patents, **utility models** are exclusive rights granted for an invention (i.e., a product or a process) that either provides a new way of doing something or offers a new technical solution to a problem. In addition, in order to obtain protection, registration must be granted. However, utility models are not available in every country¹.

Also referred to as a “petty patent”, a utility model is an exclusive right granted to a right holder, for an invention that does not fulfil patentability requirements (e.g., because it is a minor improvement of an existing product) but may still have an important role in a local innovation system. Utility models are also considered to be particularly suited for products that have a short commercial life. Once granted, this type of protection allows the right holder to prevent others from commercially using the protected invention, without their authorisation, for a limited period.

In the EU, utility models can be granted at the national level in some of the Member States, but there exists no European-wide utility model protection. The eligibility requirements also vary across countries.

Generally, this type of protection is subject to less stringent requirements and procedures than patents, and offers a shorter term of protection. However, given that they are designed to respond to local needs, requirements and protection duration vary between different jurisdictions.

4.2. Trademarks and Industrial designs

Trademarks are signs capable of distinguishing the goods or services of one enterprise from those of others (e.g., its competitors). Therefore, they offer an exclusive right over the use of a sign in relation to the goods and services it represents. Examples of such signs include combination of words or letters, drawings, symbols, and even sounds or fragrances, among others. This type of IPR confers an exclusive right to the use of the registered trademark. While the trademark lasts for 10 years, it is renewable indefinitely². In contrast, a patent always expires.

The aim of trademark law is to distinguish between products of different manufacturers. There are different types of trademarks, such as word mark, figurative mark, word-picture mark, sound mark, shape mark, colour mark (the list is not exhaustive). Trade mark law protects the design only indirectly. Neither novelty nor a creative level of creation are necessary. But there are also disadvantages: Firstly, protection is limited to the goods and services designated in the trademark register, and secondly, for a trademark that has not been used for more than 5 years, anyone can apply for its cancellation for the unused goods and services³.

Lastly, protection for trademarks can be obtained through registration at national, EU or international levels. In addition, the trademark right holder may license the trademark to a third party, specifying the conditions in a license agreement.

Industrial designs can also be protected by exclusive rights. Design protection protects the two- or three-dimensional external appearance of a whole product or a part thereof. More specifically, a design refers to “the appearance of the whole or a part of a product resulting from the features of, in

¹ European IP Helpdesk & Enterprise Europe Network (2024).

² European IP Helpdesk & Enterprise Europe Network (2024).

³ European IP Helpdesk & Enterprise Europe Network (2024).

particular, the lines, contours, colours, shape, texture and/ or materials of the product itself and/or its ornamentation.”¹ Examples include the design of vehicles, furniture or clothing, as well as product packaging, equipment and other graphic symbols.

For this type of IPR to be granted in the EU, the design must be registered in the industrial property office of a Member State, and it must demonstrate novelty and singularity or ‘individual character’. A design is considered new if no identical design has been made available to the public before the filing of the application for registration. Individual character requires that the impression the design produces on the informed user differs from the impression produced by any existing design.

4.3. Trade secrets and Confidentiality (or non-disclosure) agreements

A **trade secret** is a type of IP that encompasses confidential, proprietary information (such as manufacturing processes, formulas, techniques, customer lists, marketing strategies, software algorithms, data and more). Unlike patents, copyrights, or trademarks, trade secrets rely on maintaining their secrecy. To qualify as a trade secret, the information must be confidential (i.e., unknown or not readily accessible to the public or competitors) and have economic value. In addition, the owner of the trade secret must take reasonable efforts to keep the information confidential, for instance through non-disclosure agreements or access controls².

Any confidential business information providing a competitive advantage to an enterprise can be considered a trade secret. Therefore, it can include know-how, technical knowledge (potentially protectable as a patent), but also business and commercial data such as lists of customers, business plans, recipes or manufacturing processes.

Contrary to other protection modalities, trade secrets are protected without any procedural formalities, and can be protected for an unlimited period of time. Trade secrets offer a lesser degree of protection compared to patents, yet they serve as a valuable method for preserving proprietary business information that may not qualify to be protected by patents. Right holders may sell or license the protected information and its protection. However, protection for trade secrets hinges on the secrecy of the information; if disclosed publicly, trade secret protection can be instantaneously lost. Lastly, trade secrets are enforced through actions for breach of confidence or, if a non-disclosure agreement or clause exists, breach of contract.

Confidentiality agreements, also known as non-disclosure agreements (NDAs), are contracts that provide protection to organisations wishing to disclose valuable information and ideas to other parties in confidence. These written agreements establish the obligation of the recipient (i.e. the legal person to whom the information is disclosed) to not disclose the information to third parties. Therefore, they provide an assurance that confidential information will be used only for the agreed purposes and will not be used or revealed to third parties without consent.

Therefore, confidentiality agreements are crucial for inventors or other parties willing to protect confidential information. This is also the case for participants in collaborative R&I projects, where the

¹ European Parliament, Council of the European Union (1998).

² European IP Helpdesk & Enterprise Europe Network (2024).

exchange of valuable, confidential information is necessary to set up, implement the project, in addition to exploit its results.

Confidentiality agreements can protect project results which represent confidential information that, if kept secret, can offer an organization a competitive advantage and thus be part of wider exploitation efforts, e.g. in the development of technology, products or processes. Examples of information commonly covered by NDAs include a product design or a business idea.

In order for a confidentiality agreement to be legally enforceable, the information must be secret, hold commercial value, and the owner must have taken reasonable steps to protect its confidentiality.

While NDAs are not categorized as IPR, they are valuable instruments to protect sensitive information or trade secrets. NDAs generally incorporate contractual terms that establish compensation if a breach of confidentiality occurs.

4.4. Copyright and Creative Commons Licenses

Copyright law protects authorship understood as the expression of an original work created by an author. The general rule is that the author is the first owner of the copyrighted material and has the right to decide the type of use that other persons can make of his or her works.¹ Thus, copyright represents the IPR that authors have over their work.

Copyright generally applies to literary, musical, artistic works, but also to other intellectual works such as computer programs, databases, advertisements, maps, and technical drawings. Copyright can also protect software or information stored on hardware and used by computer systems to execute operations, including algorithms, program codes and graphical interfaces.²

In the EU, copyright protection grants the following exclusive rights: (i) economic rights, guaranteeing control over the work and remuneration for its use through selling or licensing; and moral rights, usually protecting an author's rights to claim authorship and the right of being cited as the author (i.e., right of attribution) and the right to refuse a modification of the work (i.e., right to the integrity of the work)³, as well as the right to withdraw the work from publication.⁴

Unlike other IPR measures, copyright protection arises automatically upon the creation of the work, without need for registration. Nevertheless, it is a common practice for organisations to register copyrighted works with ad hoc services offered by some national IP offices or private organisations.⁵

The decisive criterion for a work to qualify for copyright is based on originality; quality or functional novelty are irrelevant. Consequently, copyright can also apply to original software outputs (e.g., source code or a user interface) and databases. Nevertheless, copyright does not protect ideas nor the functional aspects of a computer program.

¹ European IP Helpdesk (2022a).

² European IP Helpdesk & Enterprise Europe Network (2024).

³ European Union – Your Europe (2023).

⁴ European IP Helpdesk (2022a).

⁵ European IP Helpdesk (2022a).

Copyright gives the owner the exclusive right to use a work - with some exceptions. When a person creates an original work that is recorded on a physical medium (e.g. audiovisual works: TV programmes, series, films and online videos; written works: lectures, articles, books and musical compositions; video games and computer software, and many more), that person automatically holds the copyright in that work¹.

Copyright law is largely harmonized in the EU through 13 directives and 2 regulations. In the EU, copyright protects IP until 70 years after the (last surviving) author's death. Outside of the EU, the duration of copyright protection varies but it lasts until at least 50 years after the author's death.²

Creative Commons (CC) Licenses. CC licenses are a free, universally accessible and standardised manner to grant copyright permissions for creative and academic works. CC licenses are free of charge and do not require creators or other rights holders to register with a Creative Commons organisation to assign a CC license to their work³.

CC licenses are copyright licenses and depend on the existence of a copyright to work; as such, they work worldwide and last as long as applicable copyright lasts. CC licenses are appropriate for creators willing to make their work available to the public for limited kinds of uses. However, they are not recommended for IP owners willing to keep all of their rights under copyright law⁴.

Different types of CC licenses exist, with distinct levels of restrictiveness regarding the reuse of the protected results. For instance, 'Attribution-NonCommercial-NoDerivs' are the most restrictive type of CC license, only allowing third parties to share the licensed work as long as the owner is credited, without allowing them to change the work in any way nor use it commercially. On the other hand, 'Attribution' licenses are the most permissive type of CC license, letting third parties distribute, remix, adapt, and build upon the licensed work, even for commercial purposes, as long as the owner is credited for the original creation. Thus, they are recommended for owners that want to achieve the largest dissemination and reuse of their licensed work.

4.5. Domain names

Domain Names are the typographical characters corresponding to registered IP addresses, which are used to identify a particular website on the internet. Although a domain name is unique and may be a valuable commercial asset, a domain name registration is not considered as a type of IPR.⁵

However, when the domain name contains a trademark, it can then be considered as protected intellectual property. If one has a registered trademark, other parties are not allowed to register that trademark as a domain name.⁶

¹ European IP Helpdesk & Enterprise Europe Network (2024).

² European Union – Your Europe (2023).

³ Creative Commons (2023).

⁴ Creative Commons (2023).

⁵ See the Glossary of the IP Helpdesk: https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk/europe-glossary_en

⁶ DNS Belgium (n.d.).

4.6. Sui Generis Protection (database rights)

European sui generis protection is applied with the aim to protect the content of a database, preventing the extraction and/or reuse of the whole or substantial part of its content. This type of protection is relevant when the structure of the database is not an original creation – the structure of a database may be protected by copyright. To benefit from this right, the maker of the database must prove to have made a substantial investment – in terms of financial, material and/or human resources – in either obtaining, verifying or presenting the database content.

Database protection can apply to both electronic and non-electronic (i.e. paper) databases as well as both static and dynamic databases. The sui generis right protects, as an intangible asset, the results of the substantial investment carried out towards the methodical and systematic classification of independent data.

The sui generis database right protects the content of your database. As such, it can prevent the extraction and/or reuse of the whole or a substantial part of the database's content. However, this right does not affect existing copyright protection which may apply to the contents of the database.

In the EU, the terms of sui generis protection are defined in Directive 96/9/EC. Protection extends to systematically or methodically arranged collections of independent works, data, or materials that exhibit originality through the selection or arrangement of their content. Protection is granted for 15 years, starting either from the creation date of the database or from the moment it was made publicly available. Lastly, the right can be transferred or licensed to third parties and applies regardless of the database's eligibility for copyright protection or other rights.

5. Strategy throughout the project's life cycle

Relevant IP aspects arise throughout the lifecycle of a project: from the conceptualisation stage, during its activities, and even beyond its implementation through the potential exploitation and commercialisation of its results.

Before the start of the project, it is essential to define the existing IP that is brought to the project by the partners (i.e., the background). It is also important to monitor the patent landscape. During the project implementation, partners must identify relevant IP elements and discuss possible IP protection methods. After the end of the project, it is crucial to discuss and agree on (joint) exploitation strategies and pathways, as well as studying possible IP ownership arrangements and defining the related responsibilities for managing IPR protection. It is also crucial to explore potential agreements related to licensing or transfer of IPR.

At the strategic level, the Innovation Management approach in ReMuNet is aligned with the five pillars of IP management in Horizon Europe¹, with the aim of addressing the diverse IP issues that typically arise at different stages of a collaborative Horizon Europe project.



Figure 1. Strategic pillars of IP Management in Horizon Europe research projects

IP awareness. At the start of the project, or ideally even before its start, it is crucial for the consortium to be – or become – aware of the relevant IP policies, rules and agreements that apply to the project and its prospective results, given the nature of the project's R&I activities and the technologies it deals with. To this end, the present report provides a thorough understanding of the relevant IP and Innovation Management concepts, rules and processes for HE, based on an up-to-date review of existing EC guidelines and trainings. It also identifies the relevant literature and material that consortium partners wishing to explore these aspects further can use.

IP created. Also before and at the start of the project, consortium partners must identify and agree on which pre-existing IP (i.e., background) is to be shared among consortium partners and under

¹ See European IP Helpdesk (2022c).

what terms and conditions it becomes available for use both during the project as well as after its end if needed for project implementation or results exploitation purposes. As the project progresses, the IP created needs to be defined; an Innovation Management approach such as the one presented in this report needs to be put in place to ensure the capture of these results and facilitate agreements on ownership and relative contributions, as well as on who will manage the results and how.

IP assessment. IP assessment refers to the process of identifying, evaluating and analysing IP assets, as well as identifying the relevant IPR related to the identified IP. Hence, during the project's implementation phase, the commercial and scientific exploitation potential of the results must be assessed. Results are also assessed with regard to their readiness (e.g., their expected technological readiness level). In addition, protection strategies for KERs should be defined. If relevant, a preliminary assessment of the IP landscape should be performed, which may include a freedom-to-operate analysis and patentability checks. Altogether, this IP assessment will help in making informed decisions regarding the management, exploitation and/or protection of project results.

IP protection. In addition, appropriate measures for the protection of results should be put in place, when relevant to support a financially-sensible commercial exploitation. It is relevant to consider that the costs of protection are eligible costs in HE projects. Protection measures includes applicable IPR, trade secrets, trademarks, etc. Towards a smooth valorisation of IP, it must also be ensured that specific provisions are put in place regarding access rights to results in order to safeguard the interests of the IP owners while at the same time allowing other project partners to exploit project results.

IP valorisation. Towards the end of the project, as the key exploitable results of the project are developed, the focus must shift to the planning of tailored exploitation and dissemination pathways for these KERs, with the aim to ensure their long-term sustainability and impact. IP valorisation includes project activities as well as post-project ones. Specific IP valorisation activities during the project may include (i) an assessment of the market potential of KERs (e.g., market analysis, SWOT analysis), (ii) an assessment of how the KERs relate with similar IP of competitors (e.g., competitor mapping, competitive advantage assessment), (ii) a delineation of suitable, detailed strategies for the commercialisation of KERs (e.g., business models). As outlined at the beginning of this document, HE beneficiaries are expected to exploit the KERs they own after the project. When relevant, IP valorisation also includes IPR management activities, including potential IP transfers (under agreed terms and conditions) and agreements for post-project efforts to maintain and potentially enforce the IP protection (including, for example, cost and revenue sharing agreements).

This strategic approach is also aligned with the slightly different 6-pillar IP strategy identified in previous material from the IP helpdesk¹. The main difference rests on the split of the IP valorisation phase in two: on the one hand, dissemination and exploitation actions and on the other hand, post-project management activities.

Overall, the present innovation management strategy relies on an iterative approach that consists of a continuous monitoring of project developments in order to identify any IP elements and the respective IPR owners and adequate protection measures. At the more practical level, the followed

¹ European Commission, European IP Helpdesk Service (2021).

approach will be tailored to the needs of the project and the needs of the IPR management strategy at each stage of it. This tailored methodology, comprising a series of guidelines and templates, will support all consortium partners in identifying and managing in a structured way the BG and the (exploitable) results of the project, assessing relevant protection measures and agreements to enable the successful exploitation of the project's results. ReMuNet's methodology is thoroughly explained in the relevant chapter of this report (see 'Methodology').

Below we explain in more detail the entire innovation management strategy throughout the different relevant stages within an R&D project. The relevant timeline covers a period spanning pre-project and post-project stages, besides, naturally, a project's implementation period.

5.1. GA preparation stage

Both the Grant Agreement (GA) and the Consortium Agreement (CA) discuss several issues related to IPR. Their unique provisions represent a reference point for IPR issues that might present themselves during and after the project. These provisions can also facilitate any further advancements regarding IPR actions that project partners wish to put in place.

Grant Agreement. The GA constitutes a contract which sets out the key rules and conditions of the project and is agreed upon between the European Commission (EC) and the project partners. It represents the main contractual basis for the project, including several fundamental provisions referring to IPR, under which the management of the project's IP is regulated. For instance, it defines access rights and obligations related to the background brought to the project. In addition, the Grant Agreement defines issues concerning the ownership and protection of the project's generated results, as well as their exploitation and dissemination outcomes. Finally, transferability and access rights to results are also defined in the project's GA.

Consortium Agreement. The CA constitutes a contract among the consortium partners that aims to define rights and obligations for the purposes of carrying out the project's foreseen actions and activities. To complement the provisions outlined in the GA, the CA addresses specific IP provisions as well as provisions for settlement of internal disputes. Regarding IP provisions, the CA discusses, among others, aspects of confidentiality, background selection, use of IP generated parallel to the project (sideground), ownership/joint ownership of results, legal protection of results (IPR), access rights, and procedures for dissemination of results¹.

The Consortium Agreement minimises the probability of later disputes as it provides rules and responsibilities to be followed during the project as well the delineation of access rights to be granted to the partners in the context of the project. In addition, it outlines the rights and responsibilities among the consortium members concerning IPR issues. For instance, the CA covers the following IPR-related aspects:

- *Results*, sets out provisions on ownership and joint ownership of results, as well as on their transfer and dissemination.
- *Access Rights* clarifies the access rights governing principles along with the access rights for the exploitation and dissemination purposes. It also states specific provisions for access rights to the software.

¹ European IP Helpdesk (2022c).

- *Background included* presents a preliminary list of usable background identified at the pre-project stage.

5.2. Implementation stage

During the implementation stage of ReMuNet, IP handling procedures are applied among the consortium partners in order to properly identify and manage all project results and assets. With this goal in mind, it is important to establish a dedicated IP monitoring methodology that shall be followed from the early stages of the project and throughout its lifespan. As presented in more detail in the '6.Methodology' section, we established mechanisms to guarantee that IP information is reliably and timely captured.

Overall, the IPR management strategy of ReMuNet consisted of the following interconnected and iterative steps: (i) **identification of any further background IP** and definition of access rights among partners within the project; (ii) **identification of the results** generated under each project task; (iii) prioritisation of results to **identify the project's Key Exploitable Results**; (iv) plotting of the corresponding **(co-)owners and their type of exploitation interest**, along with the contributing partners to each result; (v) **definition of IPR protection measures, rights of use and exploitation pathways per partner** for the defined KERs; (vi) discussion of the KERs' **value proposition to the main target stakeholders**; and, lastly, (vii) the descriptions of each **partner's individual post-project valorisation plans** to make use of the overall knowledge gained during the project and the assets developed in it.

The initial and interim versions of the Innovation Strategy focus on the identification of the knowledge brought to the project by the different partners and the preliminary mapping of project results and their IPR. More specifically, at the initial implementation stages of the project, the Innovation Strategy of ReMuNet identifies the background IP of the project and, to the extent possible, the main expected ERs. Access rights to the BG are also defined. As the project evolves, the initial focus on BG knowledge evolves to put more relative emphasis on the identification of ERs, with the respective discussions on asset ownership, access rights and IP protection, together with preliminary expected exploitation interests and pathways.

As the project advances, the ReMuNet Innovation Management approach emphasises the handling of IP protection issues related to the specific results that are of strategic importance to the project, in order to facilitate the exploitation of its key exploitable results, including their further development, wider deployment and, where applicable, their commercialisation. Accordingly, during the later stages of the project's implementation, the focus shall shift to the consideration of KERs and the pathways to guarantee their sustainability and wider impact in post-project stages. In particular, technical developments must be monitored following an iterative plan that ensures that project results are timely identified and regularly up to date.

By the end of the project, the consortium must ensure that the identification of IP elements, together with their ownership, protection conditions and exploitation plans, is exhaustive, validated and aligned. Lastly, at this stage, it must also be clear how the KERs add value to their main target stakeholders, as well as how they compare with existing competing products or state-of-the-art scientific outputs.

5.1.1 Main roles

Within ReMuNet, clear roles and clear responsibilities have been established with the aim to efficiently and effectively carry out the Innovation Management strategy defined throughout this deliverable.

The **Innovation Manager** (White Research) is responsible for defining the Innovation Management strategy of ReMuNet. This includes writing the respective reports and ensuring that all the discussed IP elements and strategies are captured and defined, respectively. In addition, the Innovation Manager guides consortium partners in order to commonly establish the most adequate and efficient IPR strategies based on the nature of the newly identified assets and the purposes of the consortium concerning the exploitation of this asset. Finally, the Innovation Manager also assumes a mediation role in case of IP conflicts, helping the involved partners find a mutually agreeable solution (including written agreements whenever necessary) and always in line with the provisions of ReMuNet's CA.

The innovation manager also plays a role in identifying potential risks and matching expectations among consortium partners, which is a pre-requisite for developing the necessary trust environment for the exploitation of collaborative results. The nature of collaborative international projects gives rise to interdependencies among consortium partners and their work. In turn, these interdependencies entail potential challenges from the alignment of different partners' cultures and objectives. This is particularly the case when both research organisations and SMEs/industry actors are present; while the former are driven and rewarded by publishing their findings, the latter are driven by increasing their competitiveness and growth, which can be hampered when publishing results before adequate protection has been secured¹. The increased focus on Open Science practices in HE increases the need to appropriately address potentially conflicting expectations by taking into account the different interests and objectives of all partners. To this end, partners shall strive to find a clear collective purpose and vision regarding the project's expected outcomes.

Throughout the entire project's duration, the Innovation Manager will be in close communication with the **Project Coordinator** (FIR) in order to ensure the optimal management of all IP assets.

All partners. The efficient management of IP in a collaborative project can only be achieved through an active, participatory process, in which all consortium partners contribute to the timely identification and assessment of the IP (strategies) arising from their project activities and their respective organisational interests. Therefore, each partner is responsible for: (i) identifying the IP they are bringing as background for the implementation of the project and/or the exploitation of its results; (ii) capturing the results stemming from their work in the project; (iii) assessing the exploitability of such results and the most suitable protection avenues; and ultimately (iv) safeguarding their exploitation by identifying and taking any necessary actions during or after the project (e.g. deciding on ownership issues, drafting IP sharing or transfer agreements, maintaining protection measures, etc.). Project partners can rely on the support of the Innovation Manager and the structured tools prepared as part of the project's Innovation Management methodology in order to carry out these responsibilities in a time-efficient and structured manner.

Naturally, Work Package and task leaders play a crucial role in the monitoring of the results generated under their respective WPs and tasks. Consequently, they are responsible for informing the Innovation Management of the IPR-relevant aspects within their WPs and tasks, especially when joint ownership aspects may be present.

¹ European IP Helpdesk (2022c).

Finally, it is good practice for partners to inform and consult with the Innovation Manager and the Coordinator before deciding whether to protect a KER stemming from their activities – particularly when joint ownership is present.

5.3. Post-project stage

At the formal conclusion of the project, the final version of the IPR Management and Sustainability Plan (D6.6) will report the final and validated findings concerning IP aspects, detailing the intellectual property rights applied and, potentially, registered. D6.6 will guide consortium partners by providing an understanding of the specific partner contribution to each asset, presenting a clear split of the ownership of IPR among the consortium, and facilitating a clear-cut exploitation route that has been agreed upon by the relevant partners for each result. D6.6 will complement the business modelling work of WP3, which will present a detailed strategy for the deployment and commercialisation of the ReMuNet's platform, one of the project's main KERs, after the end of the project.

5.3.1 Seeking support beyond the project: Available support services from the EC

A plethora of publicly-financed services are available to Horizon Europe beneficiaries for support with the IPR management or the exploitation of project results beyond the grant's lifetime.

The **Horizon Results Platform (HRP)** is the European Commission's corporate platform promoting Key Exploitable Results (KERs) of Horizon Europe projects. It is free-of-charge and hosted on the Funding & Tenders portal. To support the exploitation of KERs, the HRP provides matchmaking opportunities through an ecosystem of partners, access to investors, as well as training from mentors and coaches.

The **European IP Helpdesk** is a free-of-charge IP support service from the EC. Its goal is to support European SMEs and beneficiaries of EU-funded research projects manage their IP through the following services, among others¹:

- Training and awareness raising
- Resources library
- An Ambassadors Scheme: A group of EEN experts on IP, tech transfer and innovation that provide basic IP training

The **Horizon Results Booster** is an initiative of the EC which supports projects eager to go beyond their Dissemination and Exploitation (D&E) obligations - steering research towards strong societal impact and concretizing the value of R&I activity for societal challenges. The Horizon Results Booster offers 3 types of services²:

- Portfolio Dissemination & Exploitation Strategy
- Tailor made support services to develop a business plan

¹ European IP Helpdesk & Enterprise Europe Network (2024). Intellectual Property (IP) Handbook: Providing IP Guidance through the EEN Client Journey. Luxembourg: Publications Office of the European Union

² European IP Helpdesk & Enterprise Europe Network (2024). Intellectual Property (IP) Handbook: Providing IP Guidance through the EEN Client Journey. Luxembourg: Publications Office of the European Union

- Assistance, coaching and mentoring for go-to-market activities

The **Enterprise Europe Network (EEN)**. The EEN is a large network that supports SMEs with their innovation and international growth ambitions. The European Commission launched the Enterprise Europe Network in 2008. It is funded through the Single Market Programme and implemented by the EC's European Innovation Council and SMEs Executive Agency (EISMEA). The main activities of the EEN for business, technology and R&D partnering are the following¹:

- Internationalisation advisory services. Identifying intellectual property assets of the company, IP due diligence, market analysis, IP cost/benefit analysis, IP valuation, IP audit, etc.
- Partnering opportunities database (POD)
- Brokerage (match-making) events, company missions, trade fairs. It helps find new business partners, build up business relationships and start cooperation
- Collaborative R&D&I projects

¹ European IP Helpdesk & Enterprise Europe Network (2024). Intellectual Property (IP) Handbook: Providing IP Guidance through the EEN Client Journey. Luxembourg: Publications Office of the European Union

6. Methodology

To facilitate the process described in the ‘Strategy’ chapter – ‘Implementation stage’ section, White Research developed a series of guidelines and templates to monitor and regularly update the definition of IP elements as well as of protection and exploitation strategies. It is important to note that the Innovation Management task, and thus its methodology, rely strongly on input from all partners in ReMuNet’s consortium, as developers and owners of the project’s results.

In the current, preliminary version of the IPR Management and Sustainability Plan, only part of the templates in the described methodology were fully used. As uncertainty about the final form and IP considerations of the project’s results remains, the aspects relating to the exploitation plans for each partner and each result will only be completed in more advanced stages of the project.

Nevertheless, already before the midpoint of the project (i.e., M18), we have implemented the described part of the described strategy in section 5 and the methodology presented below through iterative consultations with project partners. More specifically, to gather their expert input, the entire consortium was engaged in the discussions of this task in the following ways: (i) all partners were informed of the methodology via email and presentations in online internal calls; (ii) all partners were invited to two dedicated workshops, one during the consortium meeting of June 2024 in Helsinki and a second one online in September 2024; and (iii) selected partners were invited to an additional round of consultations, involving short bilateral online calls to discuss specific IP elements (BG or ERs) with their developers/owners.

6.1. Identification of Background IP

The first step towards the definition of all the relevant IP elements of the project is to identify the background knowledge or IP (BG) that ReMuNet partners brought to the project from external or previous activities. Our methodology to comprehensively identify all the BG contributed to the project relies on an iterative process. First, an initial mapping of BG is done when drafting the project’s Consortium Agreement. Subsequently, through the use of the offline template illustrated below, partners are asked to fill in the relevant information at different stages of the implementation phase. This iterative approach allows to update the list of BG by adding any new IP brought into the project by a given project partner.

The template below allows to compile data for all the main relevant elements related to the project’s BG in a standardised manner. Once the table is filled in, the compiled information will enable the understanding of the nature of the BG, its use within ReMuNet, and the different IPR considerations including protection and access rights, more specifically the conditions to use within and beyond the project by partners and/or third parties.

Table 2. Template to identify Background IP and their access rights

BG #	Description	Contributing partner(s)	Intended use in project	Type of IP protection	Access rights: Conditions to use within the project	Access rights: Conditions to use beyond the project
BG1						
BG2						
BG3						

BG4						
BG5						

The first column of the template assigns a number to each identified BG element, facilitating the mapping of relations between this BG and the project results that will be identified in the following steps. The second column of the template, a short description of the BG can be provided. In the third column, the name of the partner(s) who contribute this BG can be indicated, potentially distinguishing between primary and auxiliary contributors. The fourth column is intended determine how the BG will be used within the project, for instance its role within the activities or a specific task or WP to enable partners to perform certain activities or to help them achieve the task's goals. The fifth column allows partners to specify the relevant IP protection measures for the BG in terms of the instruments defined in section '4. Definitions of IP protection measures'. The last two columns allow project partners to indicate the conditions for the use of the BG within the project or beyond it, specifying whether there are any restrictions to use the BG and, if so, the conditions that apply to other project partners and/or third parties. Examples of access rights and conditions include 'free to use', 'free to use under certain conditions', 'subject to charges/fees', etc.

6.2. Identification of (Key) Exploitable Results and IPR protection measures and actions

6.2.1 Identification of (Key) Exploitable Results

A crucial aspect in the project's innovation management methodology is the identification of the project's exploitable results, an exercise which is conducted, once again, collaboratively by project partners with the guidance of structured templates and guidelines prepared by the Innovation Manager. The following templates were circulated offline, using several iterations in order to timely identify early results arising from project activities as well as to update, validate and extend the list of results in parallel with the project's developments throughout its implementation phase.

The first step consists in the identification, classification and description of project results with exploitable potential. In practice, project partners are asked to provide the following information using the table below:

- The type of result, namely whether the result is a main project result or a secondary result. This step allows for a prioritization between exploitable results (ERs) and key exploitable results (KERs), an important decision that will need to be validated, as it will affect the follow-up steps regarding exploitation and IPR management.
- The specific project activities that gave rise to the result, e.g. the specific tasks or WPs.
- Other ERs included within the result, in case the given result is a composite one that incorporates multiple project results.
- The sector of application of the result (e.g., the health or the transport sectors).
- A short but clear description of the result that has been achieved.

Table 3. Table to identify Exploitable Results and their characteristics

ER # and Name	Type of result	Related project activities	ERs included (if any)	Sector of application	Description
ER1: Name					
ER2: Name					

ER3					
ER4					
ER5					
ER6					

6.2.2 Identification of IPR ownership and relevant protection measures

Once the different project ERs have been identified and classified, we can proceed to conduct a deeper analysis of ownership and IPR aspects for the those ERs prioritised as main project results or KERs. To this end, the following table is used to identify the main elements required to engage in ownership and IPR management discussions and decisions. More specifically, the following new data can be compiled in a standardised and structure manner by using the additional template below:

- The names of contributing partners to the development of the KER, distinguishing between main contributor(s) and supporting ones. This identification will be useful to determine the owner(s) of the result.
- The (proposed) owner(s) of the KER. This decision will need to be taken in consensus among the different developing partners, with the guidance of WRE as Innovation Manager. Ownership decisions may be made at a later stage of the project, once the result is fully developed and the relevant discussions among concerned partners have taken place.
- Feasible types of IPR protection mechanisms (e.g., patents, copyright, etc.). Different types of protection mechanisms may apply to a specific result; once again, the final decision on the chosen mechanism will need to be done in agreement among the owners and with the guidance of the Innovation Manager (WRE).
- The geographical coverage and jurisdiction of choice. As explained in previous sections, certain protection measures allow the IPR owners to choose where to register the novel IP. Different measures also offer distinct ranges of geographical coverage. This decision will be important to define the practical post-project exploitation actions for a given result.
- Any related background IP that was used to develop the specific innovation or result. Here, a reference to a BG element identified in the list of BG IP can be introduced.
- The access rights to the result by other partners or third parties, differentiating between (i) conditions to use within the project (i.e., for the implementation of project activities) and conditions to exploit and disseminate the result, whether there are any usage restrictions or not (e.g., free to use, subject to charges like license fees, etc.).

Table 4. Template to identify IPR ownership conditions and protection measures of ERs

ER number	Key Exploitable Result (KER)	Developing Partner(s)	Proposed Owner(s)	Relevant IPR protection mechanism	Geographical coverage and jurisdiction for registration	Related BG#	Conditions for use	Conditions for dissemination and exploitation
ER1	<i>KER Name</i>							
ER2								
ER3								
ER4								

Special consideration must be given to jointly-owned results, given the additional complexity in the management of the IPR for these results. Therefore, the last step in the definition of IPR protection

measures for KERs concerns solely those KERs for which, using the previous table, it was decided that multiple partners would claim ownership of the IPR. When co-ownership of results applies, it is important to allocate the ownership shares among the involved partners. In addition, it is important to discuss any terms for post-project ownership or any potential IPR transfers among co-owners, as such agreements may facilitate the exploitation of the results. Examples of such agreements include the definition of which parties shall bear the related costs from IPR management, the transfer of ownership rights to another co-owner. Next, it is also important to define each co-owner's responsibilities regarding IP protection actions (e.g., filing an application for a patent) as well as the maintenance, monitoring and enforcement of such protection, all of which may entail non-negligible costs. Lastly, co-owners can also choose the applicable law and jurisdiction in case of disputes. The following table, along with the accompanying guidelines and examples provided by White Research, can be used to guide partners in this exercise, making sure that partners engage in the necessary discussions in the presence of jointly-owned results and that all relevant aspects discussed in this paragraph are addressed. Ultimately, the purpose of this template is to gather information that will be useful for partners when preparing their joint ownership agreements.

Table 5. Template to identify ownership and IPR protection conditions and actions for KERs

Jointly-owned IP (e.g., KER #)	Allocation of shares among joint owners	Terms for post-project ownership, IPR transfer, etc.	IP protection and maintenance responsibilities	IP monitoring and enforcement responsibilities	Governing jurisdiction and dispute resolution
KER1: Name					
KER2					
KER N					

It is the role of the Innovation Manager to consolidate this input and present the findings in a structured, clear and consistent way. When the input collection is done offline and data is provided individually by each partner, inconsistencies between their inputs are possible. Specifically for jointly developed results, uncertainties subject to further discussion are prone to arise. Therefore, such inconsistencies or uncertainties need to be identified and addressed in validation rounds with the relevant partners.

6.2.3 Specific IPR protection and pre-exploitation actions in the short run

Having identified the right owners and protection measures for each of the project's results, the next step is to define the most relevant immediate post-project actions that will be necessary to ensure that such protection is achieved and that the subsequent exploitation of the results is enabled. To this end, the following table aims to guide result owners with the definition of specific short-term actions related to IPR (e.g., to apply for the proper protection measures or to put into practice any agreements regarding joint ownership).

In addition, this template may be used, whenever relevant, to create a roadmap of the most important and immediate actions to ensure the exploitation readiness of the KER (e.g., further development, testing and/or validation, delineation of a business plan, or the license or transfer of IPR) and the compliance with open science mandates (e.g., dissemination measures such as uploading results in an adequate repository).

With the guidance of WRE and dedicated discussions whenever necessary, partners can use the following table to define any relevant actions as well as their related costs, responsible partners and the estimated time of implementation.

Table 6. Template to guide the definition of immediate actions for KER IPR protection

ER number	Key Exploitable Result (KER)	Action type	Action's description	Estimated costs (outside project budget)	Responsible partner(s)	Timeline
ER1	ReMuNet's platform	Testing, validation, and fine-tuning	The product will be validated via pilots with a sample of N end users across countries X and Y			
		IPR	Filing an application for patent registration at the EU patent office			
ER2						
ER3						

6.3. Identification of exploitation interests and actions

This section comprises a series of templates designed to identify the types of relevant exploitation interests for each key exploitable result and from each partner's perspective. It also presents a template to assess the value proposition offered by the project's KERs to its main stakeholders as well as a template to identify and monitor publications with exploitation potential.

6.3.1 Individual exploitation interests per partner and KER

Partners may have varying interests with regards to the exploitation of the same result. For example, research institutes are more prone to have an interest on using a project result to conduct further research, while private entities are more likely to be interested in exploiting the same results for commercial purposes.

With the above in mind, the following template provides an illustrative overview of the individual exploitation pathways envisioned by each partner for each of the KERs. Through this template, the Innovation Manager and consortium partners, collectively, can also obtain insights and spark discussions on where and how the consortium should focus towards the exploitation of each of the main project results.

Table 7. Template to define the exploitation interests per partner and result

	KER 1: Name	KER 2: Name	KER 3: Name	KER 4: Name	KER N: Name
	Exploitation interest/strategy	Exploitation interest/strategy	Exploitation interest/strategy	Exploitation interest/strategy	Exploitation interest/strategy
Partner 1					
Partner 2					
Partner 3					

In each column, the relevant partner provides the exploitation interest for each KER, in consultation with the result owners to ensure that the planned exploitation is aligned with the access rights to the result. To represent the information in a readable yet clear manner, partners were asked to indicate their envisioned exploitation interests by choosing from a pre-determined list of relevant types of exploitation and entering the respective acronyms in each cell. Guidelines were provided to specify how each type of exploitation interest is represented by each acronym.

Commercial exploitation. Although varying, all the exploitation pathways listed below can be considered to fall under the ‘commercial exploitation’ category. They include potential exploitation interests of a project’s results (during or after the end of a project) that have a commercial objective: they ultimately aim to gain or increase profits and/or economic (i.e., market-related) competitiveness of the partner(s) that are to exploit them. We can classify the types of commercial exploitation pathways into three categories:

- **C(M):** Commercial interest in Making or improving a product with the ultimate goal to sell it.
- **C(L):** Commercial interest in Licensing the exploitable result (IP thereof) to third parties.
- **C(S):** Commercial interest in providing a Service, such as consultancy based on the ER or the knowledge built through it.

Internal product, service, or process development (I). The “Internal” exploitation type concerns exploitation approaches that will be used to improve an organisation’s internal processes and/or products of any kind. We envisage the following internal exploitation types:

- The improvement of certain internal processes/products/services in an organisation.
- The use project results to increase their existing portfolio and improve existing products or services; for instance, tailoring advisory services related to the transport sector, etc.
- The use project results to enhance their knowledge and perform further research activities and/or leverage on them for pursuing further opportunities.

Further Research (R). The ‘research’ exploitation type concerns the exploitation approaches relevant for research activities that may not have a commercialisation potential but offer scientific exploitation of the ER. Through these types of exploitation, project partners aim to increase their chances to access new research projects, to use them for future publications, or to be able to identify novel research concepts. We envisage the following research exploitation paths:

- Use of exploitable results (especially publications, research deliverables and general technical know-how) for ongoing and future projects and research schemes undertaken by university researchers and research centres.
- Use of exploitable results to advance research endeavours under industry-academia-state collaboration, e.g. in the fields of transport and climate modelling.

Standardisation (S). The outputs of R&I intensive projects may also be used in standardisation activities, potentially being useful to develop new standards and ultimately helping bridge the gap between research and development of new technologies and their large-scale market up-take and deployment.

Other. The “Other” exploitation category includes types that do not belong to the commercial, research and internal processes nor to standardisation activities. They may entail exploitation types related to civil or humanitarian purposes, such as improving the well-being of people living around the studied transport corridors. Other purposes can be related to policy-making or advocacy, for instance with the goal to enable a healthcare regulatory environment that supports innovation. A further example are dissemination purposes, for example to increase a partner’s visibility within the transport sector. For the sake of this exercise, partners were asked to specify the concrete nature of the envisaged exploitation pathway when completing the template and selecting the “Other” category.

The list of categories was tailored to the most relevant uses identified for ReMuNet's results, resulting in the following:

- **C(M)** – Commercial: Making or improving a product to sell it.
- **C(L)** – Commercial: Licensing it to third parties.
- **C(S)** – Commercial: Providing a service, such as consultancy.
- **I** – Internal use (e.g. using the ER to improve products or organizational processes).
- **R** – Research (e.g. in new research projects or internal R&D activities).
- **S** – Standardization activities
- **O** – Other types of exploitation (here, partners were requested to specify which specific use they were planning to give to the ER; for instance, pathways to derive value from the ER include dissemination or marketing activities).
 - **O(D)**. This acronym refers to Other (Dissemination purposes). This category is the most relevant 'other' type of exploitation path for the ReMuNet (K)ERs. Therefore, to efficiently manage the space in the tables and enhance clarity, we also abbreviate it.

6.3.2 Individual post-project valorisation plans

To complement the individual exploitation plans of each project partner at the KER level, the table below allows partners to plot their plans for the post-project use of the overall outcomes of the project and the knowledge gained through its activities. Each partner is asked to identify the assets or outcomes of the project for which they hold the greater interest and to specify how they plan to, after the project, make (re-)use of them as well as of their general learnings.

Table 8. Template to describe the individual post-project valorisation plans of each partner

Individual post-project valorisation plans		
Partner organization name	Project assets of major interest	Description
WHITE RESEARCH	Project website, deliverables	...

6.3.3 Value offered by the KERs to cover the needs of the project's main stakeholders

Understanding how the project results cover the needs of the project's target stakeholders can be very useful to support the definition of exploitation strategies as well as business models and business plans, which aim to maximise the value proposition of the project's results. Therefore, the following table captures, in a structured way, the main needs of each target stakeholder group and, more importantly, how the different KERs contribute to deliver value to each of these stakeholders.

Table 9. Template to identify the needs of the project’s target stakeholders and the added value provided by each KER

ER number	Key Exploitable Result (KER)	Target stakeholder(s)	Main stakeholder needs	Value proposition offered by the KER: how does it cover and deliver the identified needs
ER1	ReMuNet’s platform	Transport companies	Improved access to reliable network info	Visualisation of disruptive events in real-time throughout the transport network.

7. ReMuNet's Background and Exploitable Results

7.1. Overview of Background IP

The project partners identified the Background IP that is to be used in ReMuNet in order to carry out the project's activities and achieve its objectives. This detailed identification is not presented in the present public version of the report, in order to avoid the disclosure of potentially commercially-sensitive information related to project partners.

As a summary, the project's industrial partners provide their expertise and resources to enable the successful implementation of the project's research endeavours and the development of its results. For instance, logistics stakeholders like PTV and 4PL Intermodal have made their 'server' software, containing different modules or services, accessible via a project-specific API to advance R&D in different tasks; for instance, to support the development of the intermodal route planning tool. Contargo provides information about their terminal network to help define the transport network reference model and conduct the modelling of disruptive events, among other uses. Similarly, MANSIO's software products and PoV's transport & order data are also used to develop ReMuNet's models and platform.

7.2. Identified (Key) Exploitable Results

This section presents all the Exploitable Results (ERs) developed in the context of ReMuNet, as identified by the project's consortium. After internal prioritisation discussions, we classified these results between Key Exploitation Results (KERs) and partial or secondary ERs.

These results are identified and defined below in order to provide a basis for the subsequent discussions of this report, which will build upon the understanding of these ERs to discuss the exploitation and valorisation strategies of each consortium partner and for each Key Exploitation Result.

These project ERs are built upon the data, knowledge and assets both (i) brought to the project by project partners (i.e., the Background IP identified in section 7.1), and (ii) developed throughout the course of ReMuNet's activities.

Since R&I projects are prone to produce a large number of ERs, it is sensible to conduct a prioritisation among the identified results. In order to pave the way for post-project exploitation and maximise the project's impact while also making an efficient use of the resources of ReMuNet's Innovation Management and exploitation planning task (T6.3), we focus the project's exploitation plan on the results that hold the greatest exploitation potential, impact and added value for the consortium partners as well as the project's stakeholders. Besides commercial, scientific and societal impact, technical maturity of the different project innovations was also considered for prioritisation. Moreover, the consortium's strategic priorities, comparative advantages and tolerable degrees of risk were also considered when selecting the results that shall be prioritised for an effective post-project exploitation.

In this context, it was concluded that the KERs of the project are the ones identified in the table below. Therefore, they will be the focus when designing the post-project exploitation strategies that are required for: (i) maximising ReMuNet's value propositions to the main target stakeholders groups, (ii) ensuring the sustainability of ReMuNet's work beyond the project, and (iii) helping

consortium partners envision individual or joint realistic strategies to valorise their innovations in their preferred way (e.g., in the market, in future research activities, through reputation building, via internal product development, etc.).

7.2.1. *Key Exploitable Results (KERs) of ReMuNet*

The KERs of ReMuNet were identified and validated by the consortium partners. In the Table below, we provide a description of each KER, together with the corresponding project WP under which they were created, and the partial or secondary ERs of which they are comprised or on which they rely (see Table 11 for the descriptions of the rest of the project's identified ERs).

Table 10. ReMuNet's Key Exploitable Results

KER Name	Description	Other ERs included	Related project activities
ER1: Standardized ontology of the European multimodal freight and logistics network	A standardized method to describe multimodal transport networks and a standard description of multimodal transport networks in Europe.		WP1
ER2: Typology, root cause analysis, analysis of (social) impacts of interacting disruptive events	Classification and analysis of relevant disruptive events for European transport networks on the basis of different dimensions such as geographical extent, duration, effects on infrastructure, effects on workforce, economic and environmental effects, etc.		WP1
ER3: Reference and simulation models replicating the infrastructure and its utilisation in real time	Reference model identifying nodes, hubs, transport modes, suprastructure, manufactures and shippers, etc. of the selected corridors, further used in models to simulate the transport network behaviour when facing disruptive events.	ER1, ER2	WP2
ER4: Multimodal route planning algorithm	Algorithm with the ability to calculate and allocate possible and efficient multimodal transport routes in the face of disruptive events.	ER2	WP2
ER5: ReMuNet collaborative platform for resilient route planning	Collaborative platform to connect relevant stakeholders and enable event-based synchromodal relay transport to manage disruptions.		WP3
ER6: Self-learning multimodal transport model	AI based model which has been trained and tested on a simulation environment for dynamic route planning in the face of disruptive events.		WP4
ER7: Unified data pool	Identification of required data sources and data processing protocols within the ReMuNet platform. Developing a standardized and seamless data integration to pull external data input via APIs and interfaces from multiple different sources.	ER1, ER2	WP3
ER8: Sustainable business models	New and financially sustainable business models for the implementation and monetization of the ReMuNet platform and its scaling up to other transport corridors.		WP3
ER9: Demonstrator	A demonstrator will be built, visualizing ReMuNet's outcome, but its format and content remain to be determined in later stages of the project.	ER3, ER4, ER7, ER5, ER10	WP6

ER10: Simulation environment for multimodal routing	Simulation environment allowing for disruption modelling and rerouting scenarios. It builds upon ER3, which is more based on the static network of terminals and infrastructure use, thus upgrading it by adding route operations	ER3, ER4	WP2
ER11: System architecture and data flow model for a decentralised multimodal rerouting and rebooking service	Comprehensive function-based system model supporting platform operators and digital logistics service providers develop a ReMuNet-like solution	ER7	WP2, WP3

7.2.2. *Other Exploitable Results (ERs) of ReMuNet*

Here, we provide a list of all the identified additional ERs that were generated within the project's activities. These ERs are presented in the table that follows, along with their description and the corresponding tasks or WPs under which they were or will be created.

Table 11. Description of the rest of ReMuNet's Exploitable Results

ER nr. and Name	Description	Related project activities
ER12: Intermodal transport handover protocol	A software solution for secure, traceable digital handover protocols for documenting the condition of the truck, trailer and load, and for transferring freight documents between road and rail freight transport service providers along the transport route.	WP3
ER13: National country sheets	Collection of key parameters related to intermodal transport, including an Excel file with filtering capabilities and a PDF file per Member State (17 in total).	WP1
ER14: Benchmark intermodal statistics	Catalogue of EU, national, associations methodologies and key data elements collected per entity.	WP1

8. IPR Management and Exploitation Plans for ReMuNet's Results

Building upon the partner input gathered through the templates of section '6. Methodology' and the KERs defined in the previous section, the present section delves into IPR ownership and management procedures, such as protection, the definition of access rights and exploitation interests and pathways. The information presented in the tables of this section arose from an iterative process that comprised multiple rounds of review and validation from partners.

It must be noted that, at this preliminary stage, a substantial part of the decisions regarding IPR protection and exploitation remain either to be determined or subject to modifications during the second half of the project's duration, as the underlying KERs become more defined and, ultimately, developed in the context of the respective project activities.

To assign ownership to each KER, a starting point was the identified role and contribution of each partner to the realisation of each project activity. From that, partners expressed ownership claims, which were collectively reviewed and validated. This process allows for the proactive identification of potential conflicts related to the ownership of the IPR behind key exploitable results.

8.1. ER1: Standardized ontology of the European multimodal freight and logistics network

Table 12. IPR management and exploitation plan for ER1

ER1: Standardized ontology of the European multimodal freight and logistics network			
Developing partners	HANKEN, FIR	Related BG	N/A
Owner(s)	HANKEN	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	Open source license - <i>specific type TBD</i>	Chosen jurisdiction for registration and geographical coverage	<i>TBD</i>
Conditions for use	Free to use by partners and EU		
Conditions for dissemination and exploitation	Citing the relevant research article/paper		
Exploitation interests and potential	The ontology is already available on the website. HANKEN will also publish open source articles on the basis of ER1		

8.2. ER2: Typology, root cause analysis, analysis of (social) impacts of interacting disruptive events

Table 13. IPR management and exploitation plan for ER2

ER2: Typology, root cause analysis, analysis of (social) impacts of interacting disruptive events			
Developing partners	HANKEN	Related BG	N/A
Owner(s)	HANKEN	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	Open source license - <i>specific type TBD</i>	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	Free to use by partners and EU		
Conditions for dissemination and exploitation	Citing the relevant research article/paper		
Exploitation interests and potential	<i>To be determined</i>		

8.3. ER3: Reference and simulation models replicating the infrastructure and its utilisation in real time

Table 14. IPR management and exploitation plan for ER3

ER3: Reference and simulation models replicating the infrastructure and its utilisation in real time			
Developing partners	PTV, FHA (others TBD)	Related BG	BG1
Owner(s)	TBD	Joint ownership share allocation	TBD
Chosen IPR protection mechanism	Copyright (TBD)	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	Free to use for research purposes		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.4. ER4: Multimodal route planning algorithm

Table 15. IPR management and exploitation plan for ER4

ER4: Multimodal route planning algorithm			
Developing partners	PTV, MAN, FIR, and others TBD	Related BG	BG1
Owner(s)	PTV	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	Copyright (TBD)	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	TBD		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.5. ER5: ReMuNet collaborative platform for resilient route planning

Table 16. IPR management and exploitation plan for ER5

ER5: ReMuNet collaborative platform for resilient route planning			
Developing partners	FIR, others TBD	Related BG	N/A
Owner(s)	FIR, others TBD	Joint ownership share allocation	TBD
Chosen IPR protection mechanism	TBD	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	TBD		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.6. ER6: Self-learning multimodal transport model

Table 17. IPR management and exploitation plan for ER6

ER6: Self-learning multimodal transport model			
Developing partners	FHA	Related BG	
Owner(s)	FHA	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	Open source (specific license TBD)	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	Free to use by partners and EU		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.7. ER7: Unified data pool

Table 18. IPR management and exploitation plan for ER7

ER7: Unified data pool			
Developing partners	PTV, CON, INT, VEDIA, MAN, UIRR (others TBD)	Related BG	BG4, potentially new data
Owner(s)	PTV, CON, INT, VEDIA, MAN, UIRR (others TBD)	Joint ownership share allocation	TBD
Chosen IPR protection mechanism	TBD	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	TBD		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.8. ER8: Sustainable business models

Table 19. IPR management and exploitation plan for ER8

ER8: Sustainable business models			
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Developing partners	FIR	Related BG	N/A
Owner(s)	FIR	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	Open source license	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	Possible free use by certain entities		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.9. ER9: Demonstrator

Table 20. IPR management and exploitation plan for ER9

ER9: Demonstrator			
Developing partners	FIR	Related BG	N/A
Owner(s)	FIR	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	Open source license (subject to the conditions specified below)	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	No restrictive conditions apply to using the demonstrator, as long as the underlying data is not manipulated or visible		
Conditions for dissemination and exploitation	The underlying data should not be shared with third parties. Conditions for exploitation remain TBD.		
Exploitation interests and potential	TBD		

8.10. ER10: Simulation environment for multimodal routing

Table 21. IPR management and exploitation plan for ER10

ER10: Simulation environment for multimodal routing			
Developing partners	FIR, PTV, INT	Related BG	BG1
Owner(s)	PTV	Joint ownership share allocation	N/A

Chosen IPR protection mechanism	Copyright	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	TBD		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

8.11. ER11: System architecture and data flow model for a decentralised multimodal rerouting and rebooking service

Table 22. IPR management and exploitation plan for ER11

ER11: System architecture and data flow model for a decentralised multimodal rerouting and rebooking service			
Developing partners	FIR, PTV, INT	Related BG	BG2
Owner(s)	INT	Joint ownership share allocation	N/A
Chosen IPR protection mechanism	TBD	Chosen jurisdiction for registration and geographical coverage	TBD
Conditions for use	TBD		
Conditions for dissemination and exploitation	TBD		
Exploitation interests and potential	TBD		

9. Common Exploitation Strategy for ReMuNet's Results

9.1. Value proposition of the ReMuNet KERs to the project's main stakeholders

This section provides a stakeholder mapping for the main target groups that stand to benefit from the project's outcomes. For each Exploitable Result of ReMuNet, we identify the current needs of these target stakeholders, related to the goals of the project. In addition, we discuss how each ER brings added value to the identified target stakeholders by means of covering their needs.

Overall, most results bring added value, primarily, to multimodal transport industry actors, but ReMuNet's results will also provide useful for national and EU policy-makers and researchers, who will benefit from the ability to freely access and reuse of several ReMuNet tools and data.

Table 23. Value proposition of each ReMuNet Exploitable Result

ER nr. and name	Target stakeholder(s)	Main stakeholder needs	Value proposition offered by the ER
ER1: Standardized ontology of the European multimodal freight and logistics network	Policy-makers, logistics sector (freight forwards, terminal operators, transport operators, etc.), infrastructure managers	Unified standards for infrastructure; knowledge of infrastructure capacities and demand	A standardised methodology to describe multimodal transport networks ensuring more efficient communication and operational stakeholder interconnectivity. Ultimately, this standardised approach enhances operational efficiency, communication, and stakeholder connectivity, contributing to a more resilient and interconnected transportation ecosystem.
ER2: Typology, root cause analysis, analysis of (social) impacts of interacting disruptive events	Policy-makers, logistics sector (freight forwards, terminal operators, transport operators, etc.), infrastructure managers	Enhanced management of disruptive events, including being able to anticipate their impact and thus increasing the capacity to react to such events	Thorough classification of disruptive events and their effects, providing a better understanding of potential reactions to disruptive events in order to prevent them from occurring or mitigate their effects. Analysis of effects of disruptive events on the European freight transport network and resulting societal impact - improvement of societal resilience, consumer awareness; intersectionality of disruptions
ER3: Reference and simulation models replicating the infrastructure and its utilisation in real time	Policy-makers, logistics sector (freight forwards, terminal operators, transport operators, etc.), infrastructure managers	Clear overview of available infrastructure and the real-time effects caused by its use or potential disruptive events	By mapping relevant elements of selected corridors, the reference model can provide a representation of a reference or ideal state of the transport network and allow its comparison with an adapted network, e.g. before and after the use of other ReMuNet results and models. The reference model serves to identify nodes, hubs, transport modes, special suprastructure, most important manufactures and shippers, etc. within a given corridor.
ER4: Multimodal route planning algorithm	Transport industry	Optimised and resilient route planning	An advanced algorithm capable of calculating multimodal route alternatives and managing capacity utilisation in the face of disruptive events. It leverages real-time data to dynamically adjust and synchronodally plan alternative routes, ensuring optimal efficiency and resilience. Additionally, the algorithm incorporates capacity management strategies to optimise resource utilisation and mitigate congestion in the transportation network. This involves dynamically allocating available capacity across different modes of transportation based on demand fluctuations and operational constraints. Overall, the integration of these capabilities enables the algorithm to enhance flexibility, reliability, and responsiveness in multimodal transportation operations, thereby improving supply chain resilience.
ER5: ReMuNet collaborative	Transport industry	Enhanced operational agility and resilience.	This collaborative platform fosters connectivity among logistics stakeholders, empowering them to effectively navigate disruptions through digital logistics

platform for resilient route planning		Enhanced collaboration and cooperation within the logistics ecosystem.	and network management tools. By seamlessly connecting transport actors, the platform facilitates the exchange of critical information and promotes collaborative efforts to manage disruptions efficiently. Through data-sharing mechanisms, logistics operators can access real-time updates on disruptions and transport statuses and leverage advanced analytics to anticipate and respond proactively to challenges. The platform's integrated digital solutions empower operators to explore alternative route planning information, utilising sophisticated algorithms to optimise transportation routes. Moreover, the platform serves as an orchestrator of event-based synchronodal relay transportation, dynamically coordinating the movement of goods across various modes of transport to minimise delays and maximise efficiency.
ER6: Self-learning multimodal transport model	Route Planners	Self-Learning Model which can dynamically adapt to disruptive events with new routing proposal.	This adaptive model enables the network to swiftly respond to disruptions by dynamically adjusting routes, modes of transport, and resource allocations in real-time. Using reinforced learning to model and evaluate alternative courses of action helps improve the adaptability and resilience of the European multimodal logistics network. By employing AI, the system can continuously adapt its decision-making processes to changing conditions, thereby enhancing its effectiveness in transport orchestration. FhA has many years of experience and extensive knowledge in the field of reinforcement learning (RL) applied to controlling complex systems. The optimization of production orders on the shop floor is one classic field of application. Currently, the transferability of the solution to the control of energy communities is being investigated in other projects. The possibilities for optimizing and controlling multimodal transport networks are being studied in this project. Lessons learned and further potential can be exploited in future research projects.
ER7: Unified data pool	Transport industry, as well as researchers and policy-makers	Data integration and interoperable interfaces; accessibility to data	Creating a unified data pool by integrating all relevant stakeholders via interfaces and a wide variety of anonymous planning data will create the necessary base for decision making. Integrating external data input via APIs and interfaces from multiple different sources will enable participatory planning.
ER8: Sustainable business models	Transport industry	New and viable business models to sustainably implement ReMuNet services	Business models for ReMuNet platform operators will help implement the ReMuNet platform and to scale it to further corridors. To this end, the business models will be adapted to various possible actors (e.g., industry association, government agency, public-private partnerships) and define the right incentives for scaling the ReMuNet concept and strategies to leverage positive network

			effects. The business models will also include a monetization strategy, a cost model, and for the exchange of data and services.
ER9: Demonstrator	Transport industry, research (TBD for the public/authorities depending on the final format)	<i>TBD</i>	<i>TBD (based on the actual format and content of the demonstrator, once it is developed at a later stage)</i>
ER10: Simulation environment for multimodal routing	Truck drivers, train drivers, terminal operators	Technological interoperability	By establishing uniform data standards, formats and automated processes, this methodology streamlines data exchange, enabling real-time decision-making and resource optimisation.
ER11: System architecture and data flow model for a decentralised multimodal rerouting and rebooking service	All intermodal stakeholders	Overview of national rules and measures related to intermodal transport	By collecting several key parameters related to intermodal transport, the country sheets will provide an overview of rules and measures for 17 EU Member States
ER12: Intermodal transport handover protocol	All intermodal stakeholders / EU officers	Overview of current methodologies and data collected at EU, national and associations level	By creating a catalogue at EU, national, and supranational associations' levels, ReMuNet will provide an overview of relevant current methodologies and key data elements to transport stakeholders and EU policymakers.
ER13: National country sheets	Route planners and TMS providers	Test environment for transport route planning in the face of disruptive events	ReMuNet's simulation environment for the project's reference transport corridors will allow for disruption modelling and rerouting scenarios. The reference model for multimodal transport networks will be modelled into simulation models that model the cause-effect mechanisms for disruptive events in the transport network. The simulation environment will provide a simulation implementation that is computationally efficient, in order to enable creating vast amounts of training data and evaluations to optimise algorithms. In addition, it will be modular to provide flexibility for the integration of new routes, transport modes, and disruption scenarios. Lastly, it will be validated in testing scenarios to ensure a realistic transport system behaviour.
ER14: Benchmark intermodal statistics	All intermodal stakeholders, EU officers and policy-makers, researchers	Function-based blueprint for intermodal services which ensures data sovereignty and stakeholder collaboration	Comprehensive function-based system model supporting platform operators and digital logistics service providers develop a ReMuNet-like solution. By following a decentralised data space approach, ReMuNet's system architecture and data flow model for multimodal rerouting will ensure data sovereignty and foster stakeholder collaboration.

9.2. Alignment with the ReMuNet's business models

At this preliminary stage of the IPR Management and Sustainability Plan, it is too early to discuss specific business models for ReMuNet's main assets. As part of the final version, D6.6, which is due in M36, this section will provide an alignment between the identified exploitation and IPR management plans of the project's main assets and the findings of the dedicated business modelling deliverables of WP3.

Under Work Package 3, complementary work will be performed to develop a sustainable business model for ReMuNet's platform. The relevant deliverables of WP3 will thus provide, from a business perspective, detailed strategic recommendations for exploiting ReMuNet's main results, focusing on enabling a financially-viable implementation of the operator platform, and laying the foundation for scaling the project's results to additional corridors. Using a platform approach, the business models will be defined for distinct potential operators and for various operational scenarios. They will also discuss a monetization strategy, a cost model, and governance structures for data and service exchange.

Altogether, the work on Innovation Management and business modelling will support the relevant ReMuNet partners in having a better overview and guidance on how to successfully exploit the project's results and maximise their impact, both from a commercial/financial and an IPR perspective.

10. Conclusions and Next Steps

The present deliverable constitutes the preliminary version of IPR Management and Sustainability Plan, and as such, it establishes a structured Innovation Management methodology and strategy to guide the IPR management and the exploitation of the project's Background IP and results throughout the project's lifetime and beyond, seeking to ensure the exploitation and dissemination of ReMuNet's results.

The present deliverable provides an initial definition of ReMuNet's exploitable results, together with a discussion of the value they provide to their target stakeholder groups, as well as a preliminary discussion of the general terms of (re-)use and IPR provisions per asset. Before this discussion, the report presents the relevant underlying information needed for the reader of this document, as well as the consortium partners, to understand the approach and the terms used throughout the document and the related Innovation Management task in ReMuNet (T6.3). More specifically, it provides an overview of relevant Innovation Management concepts and a clear explanation of the Innovation Management methodology.

At this stage of the project, by M18, 14 Exploitable Results were identified, defined, and classified among ERs and KERs. Through discussions involving the entire consortium as well as bilateral talks with the developing parties of each result, a preliminary identification of IPR ownership and intended IP protection measures for each KER has been done. A discussion of how each ReMuNet result covers the needs of its target stakeholders, and the value it adds to them – i.e., their value proposition – has also been provided. As the implementation of ReMuNet's activities is work in progress and the project has only reached its halfway point, the current listing of ERs is subject to modifications as new developments arise from the project's research and innovation activities. For the same reason, the identified IPR conditions and characteristics (e.g., ownership, envisioned IPR mechanisms, etc.) are also subject to change as partners evolve in their continuous evaluations and discussions of the most appropriate strategies to protect the project's IP.

It must be noted that, at this preliminary stage, a substantial part of the decisions regarding IPR protection and exploitation remain either to be determined or subject to modifications during the second half of the project's duration, along which the underlying KERs will become more defined and, ultimately, developed, in the context of the respective project activities. The present version of ReMuNet's IPR Management and Sustainability Plan will be updated by the final version (V2), due by the end of the project (M36), and will include a final identification of the project's developed results and a careful consideration of their overall and individual (i.e., per partner) strategies for their protection and exploitation.

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The project

ReMuNet identifies and signals disruptive events and assesses their impact on multimodal transport corridors. It reacts quickly and seamlessly upon disruptive events in real-time. It supports TMS providers to improve route planning resilience. ReMuNet communicates alternative, pre-defined, multimodal transport routes to logistics operators and subsequently to truck drivers, locomotive drivers and barge captains. Through this, it enables a faster and adaptive multimodal network response. ReMuNet orchestrates route utilization, suggests transshipment points and optimizes capacity allocation, minimizing damage and shortening the recovery time. What is ReMuNet's core objective? As trailblazer for the Physical Internet, ReMuNet pursues the vision to enable and incentivize synchro-modal relay transport on European rail, road, and inland waterways to increase the holistic network resilience. It significantly reduces emissions and boosts freight transport corridor efficiency in case of disruptive events. stakeholders to ensure Europe-wide practicability and acceptance.

Coordinator: FORSCHUNGSINSTITUT FUER RATIONALISIERUNG (FIR)

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	PTV PLANUNG TRANSPORT VERKEHR GmbH
	4PL INTERMODAL GMBH
	MANSIO GMBH
	FRAUNHOFER AUSTRIA RESEARCH GMBH
	HAFEN WIEN GMBH
	WHITE RESEARCH SRL
	UNION INTERNATIONALE POUR LE TRANSPORT COMBINE RAIL-ROUTE SC

	CONTARGO GMBH & CO KG	CON
	VEDIAFI OY	VED
	RODE KORS I DANMARK (DANISH RED CROSS)	DRC
	ILMATIETEEN LAITOS	FMI
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