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**COMMISSION STAFF WORKING DOCUMENT**

**IMPACT ASSESSMENT REPORT**

*Accompanying the document*

**Proposal for a COUNCIL REGULATION establishing the Joint Undertakings under  
Horizon Europe**

**European Partnership for Transforming Europe's Rail System**

{COM(2021) 87 final} - {SEC(2021) 100 final} - {SWD(2021) 38 final}

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**1. LEAD DG, DECIDE PLANNING REFERENCES**

Co-Lead DG: Directorate-General for Mobility and Transport (MOVE), Directorate General Research and Innovation (RTD)

Decide number: PLAN/2019/5398

**2. ORGANISATION AND TIMING**

Institutionalised partnerships are foreseen in Articles 185 and 187 of the Treaty on the Functioning of the European Union (TFEU). The preliminary agreement on Horizon Europe contained a list of possible areas for institutionalised partnerships based on Article 185 and 187. For each of these areas the Commission considered 12 potential institutionalised partnerships. Their set up involves new EU legislation and the establishment of dedicated implementing structures and therefore an impact assessment for each of these initiatives.

Following political validation in June 2019, the impact assessment process started with the publication of inception impact assessments for each initiative in August 2019.

An inter-service steering group (ISSG) on research and innovation partnerships under Horizon Europe was set up in May 2019 and held 4 meetings before submission of the Staff Working Document to the Regulatory Scrutiny Board (7 May 2019, 19 June 2019, 5 December 2019, 20 January 2020). The ISSG consisted of representatives of the Secretariat-General, Directorate-General for Budget, Directorate-General for Research and Innovation, Directorate-General for Communications Networks, Content and Technology, Directorate-General for Mobility and Transport, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Directorate-General for Energy, Directorate-General for Environment, Directorate-General for Climate Action, and the Legal Service.

An online public stakeholder consultation was launched between September and November 2019, gathering 1635 replies for all 12 initiatives.

**3. CONSULTATION OF THE RSB**

Two upstream meetings with the Regulatory Scrutiny Board of were held on 10 July 2019 and 30 September 2019.

In accordance with the feedback received from the Regulatory Scrutiny Board on 12.06.2020, the Staff Working Document has been revised as presented in Figure 1. The impact assessment was endorsed by the Inter Service Steering Group on 20.01.2020.

**4. EVIDENCE, SOURCES AND QUALITY**

To ensure a high level of coherence and comparability of analysis for all candidate initiatives, an external study was procured to feed into the impact assessments of the 12 candidate

institutionalised partnerships<sup>1</sup>. It consisted of an horizontal analysis and individual thematic analyses for each of the initiatives under review.

For all initiatives, the evidence used includes desk research partly covering the main impacts and lessons learned from previous partnerships. A range of quantitative and qualitative data sources complement the evidence base, including evaluations; foresight studies; statistical analyses of Framework Programmes application and participation data and Community Innovation Survey data; analyses of science, technology and innovation indicators; reviews of academic literature; sectoral competitiveness studies and expert hearings. The analyses included a portfolio analysis, a stakeholder and social network analysis in order to profile the actors involved as well as their co-operation patterns, and an assessment of the partnerships' outputs (bibliometrics and patent analysis). A cost modelling exercise was performed in order to feed into the efficiency assessments of the partnership options. Public consultations (open and targeted) supported the comparative assessment of the policy options. For each initiative up to 50 relevant stakeholders were interviewed by the external contractor (policymakers, business including SMEs and business associations, research institutes and universities, and civil organisations, among others). In addition, the analysis was informed by the results of the Open Public Consultation (Sep – Nov 2019), the consultation of the Member States through the Strategic Programme Committee and the online feedback received on the Inception Impact Assessments of the set of candidate Institutionalised European Partnerships.

A more detailed description of the methodology and evidence base used, completed by thematic specific methodologies, is provided in Annexes 4 and 6.

*Figure 1 Modifications to the draft Staff Working Document based on comments received from the Regulatory Scrutiny Board*

<b>Comments from the Regulatory Scrutiny Board</b>	<b>Actions taken for the Staff Working Document</b>
The report should provide more detail on the current partnership, its objectives and its functioning (membership, financing, research focus). It should include more evidence from the evaluation of the partnership and it should better explain how the new partnership will address the weaknesses identified.	<p>More details on the current partnership and the lessons learned from the interim evaluation of S2R JU have been included in Box 2 (Support for the field in the previous Framework Programmes – key strengths &amp; weaknesses identified) in section 3.2 on EU relative positioning in the field. Moreover, an explanation of the leverage generated by S2R JU has been added to section 4.2.2 on the uncoordinated and limited participation in R&amp;I.</p> <p>The differences between the current and future Partnership have been highlighted in section 7.2 (description of the policy options).</p> <p>Explanations on how the future partnership will address the shortcomings of the current</p>

<sup>1</sup> Technopolis Group, 2020, forthcoming.

	one have been added in section 8 on impacts, coherence and tabular comparison of the options.
The report should analyse stakeholder input on the issues of most relevance to the decision on the future partnership. It should differentiate views of stakeholder groups and explain the views of beneficiaries. It should explain how the new partnership would address stakeholders' concerns.	Blue boxes presenting the stakeholder views have been added to sections 4.2.1 (Fragmentation), 4.3 (How the problems will evolve) and 5.1 (5.1. Subsidiarity: Necessity of EU action). Furthermore, the stakeholder views summarised in blue boxes in section 8.1 (Effectiveness) and 8.3 (Coherence) as well as in Annex 1.3 have been revised accordingly, differentiating between various stakeholder groups
The report should better explain the barriers the EU rail sector integration has faced and why the new partnership would be better placed to address these. The report should focus more on how the new partnership would obtain the necessary stakeholder commitment and collaboration from Member States to overcome these barriers. This should include the role and prospects of Member State support for the subsequent uptake of common solutions.	<p>Section 4.2.1 on fragmentation as one of the problem drivers has been thoroughly revised, in order to better present the various aspects related to fragmentation and the related challenges. Moreover, section 6.4.1 on the type and composition of the actors to be involved has been revised accordingly.</p> <p>The specific objectives of the initiative (section 6.2) have been revised in order to make them more operational, and this is reflected now also in the intervention logic.</p> <p>A comparison of possible stakeholders' commitment and Member States collaboration has been added in Table 14, section 8.4 (tabular comparison of the options).</p>
The report should better explain the reasons for the changed focus in the research agenda. It should justify the focus on digitalisation, automation and the freight sector. It should explain how the partnership will achieve the necessary changes in membership to serve the changed focus. Overall, the revised governance structure should be more clearly set out and the role of SMEs in the project clarified.	<p>Section 6.4.2 on the types and activities needed has been revised in order to better explain the changed focus in the research agenda. This is also reflected in the section 6.4.1 on the type and composition of the actors to be involved. Further, with regard to freight, the lessons learnt from the interim evaluation have been expanded (Box 2). A paragraph on freight has been added to section 3.2 (EU relative positioning in the field) and the need for R&amp;I to help freight cope with challenges is now reflected in section 4.3 (on how the problem will evolve).</p> <p>Section 8.4 on the preferred option has been expanded, with additional information,</p>

	referring to more open and transparent processes in the definition of the Programme which will enable wider participation of stakeholders to meet the identified technical and policy objectives. Dedicated paragraphs on the enhanced participation of SMEs and start-ups have been added in section 8.4 on the preferred option and in 6.4.2 on the type and range of activities needed.
The Board notes the estimated costs and benefits of the preferred option in this initiative, as summarised in the attached quantification tables. The table should indicate more clearly who will bear the costs involved.	The EC contribution has been added in the table in Annex 3.2.

## **Annex 2                      Stakeholder Consultation**

### **1.    OVERVIEW FOR ALL CANDIDATE INSTITUTIONALISED EUROPEAN PARTNERSHIPS**

#### **1.1.    Introduction**

In line with the Better Regulation Guidelines,<sup>2</sup> the stakeholders were widely consulted as part of the impact assessment process of the 12 candidates for institutionalised partnerships, including national authorities, the EU research community, industry, EU institutions and bodies, and others. These inputs were collected through different channels:

- A feedback phase on the inception impact assessments of the candidate initiatives in August 2019, gathering 350 replies for all 12 initiatives on the “Have your say” web portal during a period of 3 weeks;
- A structured consultation of Member States performed by the EC services over 2019 through the Shadow Strategic Configuration of the Programme Committee of Horizon Europe (in line with the Article 4a of the Specific Programme of Horizon Europe). This resulted in 44 possible candidates for European Partnerships identified as part of the first draft Orientations Document towards the Strategic Plan for Horizon Europe (2021-2024), taking into account the areas for possible institutionalised partnerships defined in the Regulation.
- An online public stakeholder consultation administered by the EC, based on a structured questionnaire, open between September and November 2019, gathering 1635 replies for all 12 initiatives;
- A targeted consultation run by the external study contractors with a total of 608 interviews performed as part of the thematic studies by the different study teams between August 2019 and January 2020.

#### **1.2.    Horizontal results of the Open Public Consultation**

The consultation was open to everyone via the EU Survey online system.<sup>3</sup> The survey contained two main parts to collect views on general issues related to European partnerships (in Part 1) and specific responses related to one or more of the 12 candidate initiatives (as selected by a participant). The survey was open from 11 September till 12 November 2019. The consultation was available in English, German and French and advertised widely through the European Commission’s online channels as well as via various stakeholder organisations.

##### *1.2.1.    Profile of respondents*

In total, 1635 respondents filled in the questionnaire of the open public consultation. Among them, 272 respondents (16.64%) were identified to have responded to the consultation as part of a campaign (coordinated responses). Based on the Better Regulation Guidelines, the groups of respondents where at least 10 respondents provided coordinated answers were labelled as ‘campaigns’, segregated and analysed separately and from other responses. In total 11

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<sup>2</sup> [https://ec.europa.eu/info/files/better-regulation-guidelines-stakeholder-consultation\\_en](https://ec.europa.eu/info/files/better-regulation-guidelines-stakeholder-consultation_en)

<sup>3</sup> <https://ec.europa.eu/eusurvey/runner/ConsultationPartnershipsHorizonEurope>



campaigns were identified, the largest of them includes 57 respondents<sup>44</sup>. In addition, 162 respondents in the consultation also display similarities in responses but in groups smaller than 10 respondents. Hence, these respondents were not labelled as campaigns and therefore were not excluded from the general analysis.

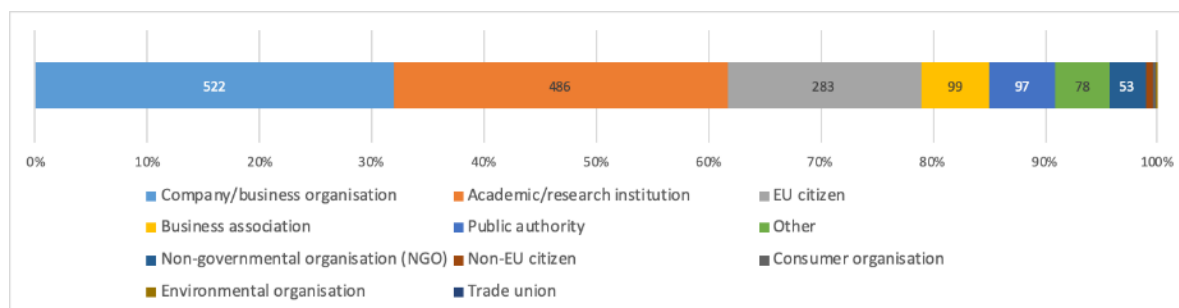
**Table 1: Country of origin of respondents (N=1635)**

Country	Number of respondents	Percentage of respondents
Germany	254	15.54%
Italy	221	13.52%
France	175	10.70%
Spain	173	10.58%
Belgium	140	8.56%
The Netherlands	86	5.26%
Austria; United Kingdom	61	3.73%
Finland	49	3.00%
Sweden	48	2.94%
Poland	45	2.75%
Portugal	32	1.96%
Switzerland	28	1.71%
Czechia	24	1.47%
Greece	23	1.41%
Norway; Romania	22	1.35%
Denmark	20	1.22%
Turkey	19	1.16%
Hungary	14	0.86%
Ireland	12	0.73%
United States	11	0.67%
Estonia; Slovakia; Slovenia	10	0.61%
Bulgaria; Latvia	9	0.55%
Bosnia and Herzegovina	7	0.43%
Lithuania	4	0.24%
Canada; Croatia; Israel	3	0.18%
China; Ghana; Iceland; Japan; Luxembourg; Morocco	2	0.12%
Bhutan; Botswana; Cyprus; Iran; Malta; Mexico; Moldova; Mongolia; Palestine; Russia; Serbia; South Africa; Tunisia; Ukraine; Uruguay	1	0.06%

As shown in Figure 2, the three biggest **categories of respondents** are representatives of companies and business organisations (522 respondents or 31.9%), academic and research institutions (486 respondents or 29.7%) and EU citizens (283 respondents or 17.3%). Among the group of respondents that are part of campaigns, most respondents are provided by the same groups of stakeholders, namely company and business organisations (121 respondents or 44.5%), academic and research institutions (54 respondents or 19.8%) and EU citizens (42 respondents or 15.4%).

<sup>44</sup> The candidate Institutionalised Partnership Clean Hydrogen has the highest number of campaigns, namely 5. A few initiatives, such as Innovative SMEs, Smart Networks and Systems, were not targeted by campaigns. Some campaign respondents decided to provide opinions about several partnerships.

**Figure 2 Type of respondents (N=1635) - For all candidate initiatives**



Among all consultation respondents, 1303 (79.69%) have been **involved in the on-going research and innovation framework programme** Horizon 2020 or the preceding Framework Programme 7, while 332 respondents (20.31%) were not. In the group of campaign respondents, the share of those who were involved in these programmes is higher (245 respondents out of 272 or 90.07%) than in the group of non-campaign respondents (1058 out of 1363 or 77.62%). When respondents that participated in the Horizon 2020 or in the preceding Framework Programme 7 were asked to indicate in which capacity they were involved in these programmes, the majority stated they were a beneficiary (1033 respondents) or applicant (852 respondents). The main stakeholder categories, e.g. companies/business organisation, academic/research institutions, etc., show a similar distribution across the capacities in which they ‘have been involved in Horizon 2020 or in the Framework Programme 7’ as the overall population of consultation respondents.

Among those who have been involved in Horizon 2020 or the preceding Framework Programme 7, 1035 respondents (79.43%) are/were **involved in a partnership**. The share of respondents from campaigns that are/were involved in a partnership is higher than for non-campaign respondents, 89.80% versus 77.03% respectively. The list of partnerships under Horizon 2020 or its predecessor Framework Programme 7 together with the numbers, percentages of participants is presented in Table 4, the table also show the key stakeholder categories for each partnership. Most consultation respondents participated in the following partnerships: Fuel Cells and Hydrogen 2 (FCH2) Joint Undertaking, Clean Sky 2 Joint Undertaking, European Metrology Programme for Innovation and Research (EMPIR) and in Bio-Based Industries Joint Undertaking. The comparison between the non-campaign and campaign groups of respondents shows that the overall distribution is quite similar. However, there are some differences. For the campaign group almost a half of respondents is/was involved in the Fuel Cells and Hydrogen 2 (FCH2) Joint Undertaking, a higher share of campaign respondents is/was participating in Clean Sky 2 Joint Undertaking and in Single European Sky Air Traffic Management Research (SESAR) Joint Undertaking.

When respondents were asked in which **role(s) they participate(d) in a partnership(s)**, over 40% indicated that they act(ed) as partner/member/beneficiary in a partnership. The second largest group of respondents stated that they applied for funding under a partnership. The roles selected by non-campaign and campaign respondents are similar.

Table 4: Partnerships in which consultation respondents participated (N=1035)

Name of the partnership	Number and % of respondents from both groups (n=1035)	Number and % of respondents from a non-campaign group (n=815)	Academic/research institutions	Business associations	Company/business organisations	Company/business organisations	EU citizens	NGOs	Public authority
Fuel Cells and Hydrogen 2 (FCH2) Joint Undertaking	354 (33.33%)	247 (30.31%)	97	9	37	43	41	8	5
Clean Sky 2 Joint Undertaking	195 (18.84%)	145 (17.79%)	57	2	10	27	37	1	7
European Metrology Programme for Innovation and Research (EMPIR)	150 (14.49%)	124 (15.21%)	64	0	13	9	14	2	19
Bio-Based Industries Joint Undertaking	142 (13.72%)	122 (14.97%)	39	8	20	27	14	1	6
Shift2Rail Joint Undertaking	124 (11.98%)	101 (12.40%)	31	7	5	31	14	3	7
Electronic Components and Systems for European Leadership (ECSEL) Joint Undertaking	111 (10.72%)	88 (10.80%)	42	2	7	20	12	0	5
Single European Sky Air Traffic Management Research (SESAR) Joint Undertaking	66 (6.38%)	46 (5.64%)	10	3	3	20	3	2	3
5G (5G PPP)	53 (5.12%)	47 (5.77%)	20	1	6	14	5	0	1
Eurostars-2 (supporting research-performing small and medium-sized enterprises)	44 (4.25%)	40 (4.91%)	17	0	6	1	7	0	6
Innovative Medicines Initiative 2 (IMI2) Joint Undertaking	37 (3.57%)	35 (4.29%)	18	2	3	3	2	4	3
Partnership for Research and Innovation in the Mediterranean Area (PRIMA)	28 (2.71%)	26 (3.19%)	15	0	3	1	2	0	2
European and Developing Countries Clinical Trials Partnership	25 (2.42%)	24 (2.94%)	12	0	1	2	3	3	2
Ambient Assisted Living (AAL 2)	22 (2.13%)	21 (2.58%)	11	2	1	1	3	0	3
European High-Performance Computing Joint Undertaking (EuroHPC)	22 (2.13%)	18 (2.21%)	6	0	2	3	5	0	2

For the remaining of the consultation, respondents could provide their views on each/several of the candidate initiatives. The majority of respondents (31.4%) provided their views on the Clean Hydrogen candidate partnership. More than 45% of respondents from the campaigns selected this partnership. Around 15% provided their views for European Metrology, Clean Aviation and Circular Bio-based Europe. The share of respondents in the campaign group that chose to provide views on the Clean Aviation candidate partnership is of 20%. The smallest number of respondents provided opinions on the candidate initiative ‘EU-Africa research partnership on health security to tackle infectious diseases – Global Health’.

*Table 5: Candidate Institutionalised Partnerships for which consultation respondents provide responses (N=1613)*

Name of the candidate Institutionalised European partnership	Number and % of respondents from both groups (n=1613)	Number and % of respondents from a non-campaign group (n=1341)
Clean Hydrogen	506 (31.37%)	382 (28.49%)
European Metrology	265 (16.43%)	225 (16.78%)
Clean Aviation	246 (15.25%)	191 (14.24%)
Circular bio-based Europe	242 (15%)	215 (16.03%)
Transforming Europe’s rail system	184 (11.41%)	151 (11.26%)
Key Digital Technologies	182 (11.28%)	162 (12.08%)
Innovative SMEs	111 (6.88%)	110 (8.20%)
Innovative Health Initiative	110 (6.82%)	108 (8.05%)
Smart Networks and Services	109 (6.76%)	107 (7.98%)
Safe and Automated Road Transport	108 (6.70%)	102 (7.61%)
Integrated Air Traffic Management	93 (5.77%)	66 (4.92%)
EU-Africa research partnership on health security to tackle infectious diseases – Global Health	49 (3.04%)	47 (3.50%)

### *1.2.2. Characteristics of future candidate European Partnerships*

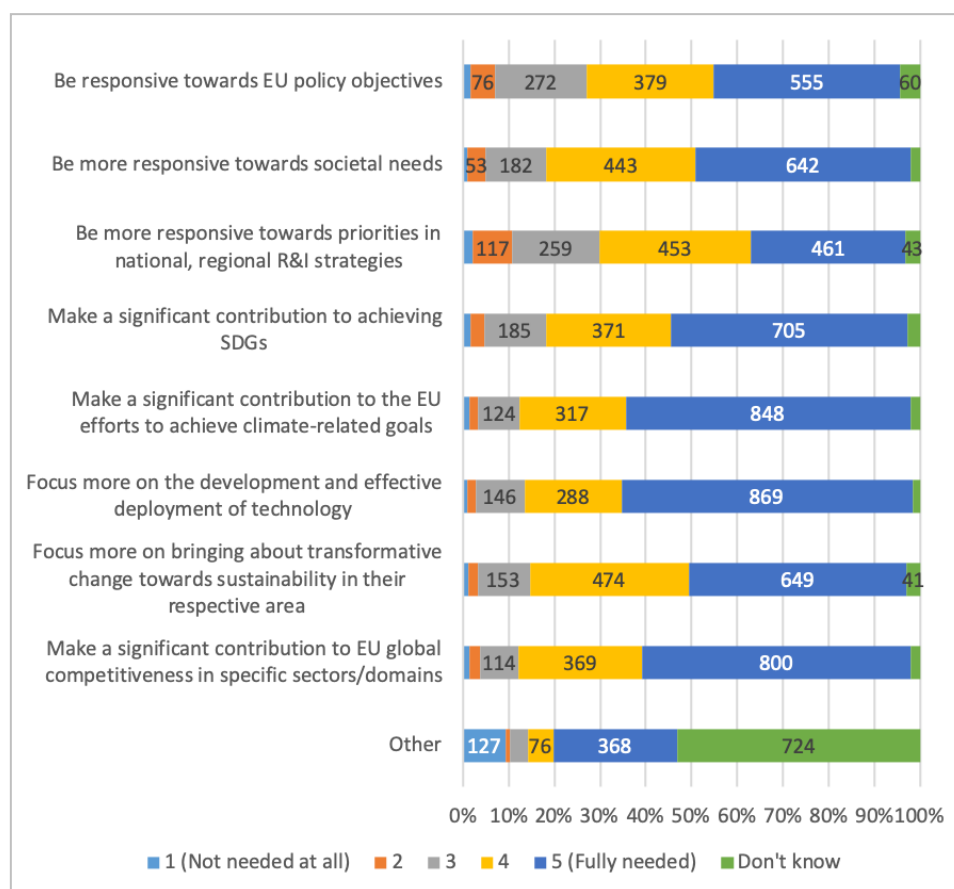
Respondents were asked to assess what areas, objectives, aspects need to be in the **focus of the future European Partnerships** under Horizon Europe and to what extent. According to Figure 6, a great number of respondents consider that a significant contribution by the future European Partnerships is ‘fully needed’ to achieve climate-related goals, to the development and effective deployment of technology and to EU global competitiveness in specific sectors/domains. Overall, respondents’ views reflect that many aspects require attention of the Partnerships. The least attention should be paid to responding towards priorities of national, regional R&D strategies, including smart specialisation strategies, according to respondents.

Overall, only minor differences can be found between the main stakeholder categories. Academic/research institutions value the responsiveness towards EU policy objectives and focus on development and effective deployment of technology a little less than other respondents. Business associations, however, find that the future European Partnerships under Horizon Europe should focus a little bit more on the development and effective deployment of

technology than other respondents. Furthermore, business associations, large companies as well as SMEs value the role of the future European Partnerships for significant contributions to EU global competitiveness in specific sectors domains a little higher than other respondents. Finally, both NGOs and Public authorities put a little more emphasis on the role of the future European Partnerships for significant contributions to achieving the UN SDGs. The views of citizens (249, or 18.3%) do not reflect significant differences with other types of respondents. However, respondents that are/were directly involved in a partnership under Horizon 2020 or its predecessor Framework Programme 7 assign a higher importance of the future European Partnerships to be more responsive towards EU policy objectives and to make a significant contribution to achieving the UN's Sustainable Development Goals.

A qualitative analysis of the “other” answers highlights the importance of collaboration and integration of relevant stakeholders to tackle main societal challenges and to contribute to policy goals against which fragmentation of funding and research efforts across Europe should be avoided. Additionally, several respondents suggested that faster development and testing of technologies, acceleration of industrial innovation projects, science transfer and market uptake are needed. Next to that, many respondents provided answers related to the hydrogen and the energy transition, which corresponds to the high number of respondents that provided answers to the candidate initiative on this topic.

**Figure 6: To what extent do you think that the future European Partnerships under Horizon Europe need to (N=1363) (non-campaign replies) For all candidate initiatives**



### *1.2.3. Main advantages and disadvantages of Institutionalised European Partnerships*

An open question asked to outline the main advantages and disadvantages of participation in an Institutionalised European Partnership (as a partner) under Horizon Europe (1551 respondents). The advantages mentioned focus on the development of technology, overall collaboration between industry and research institutions, and the long-term commitment. Disadvantages mentioned are mainly administrative burdens. An overview is provided below.

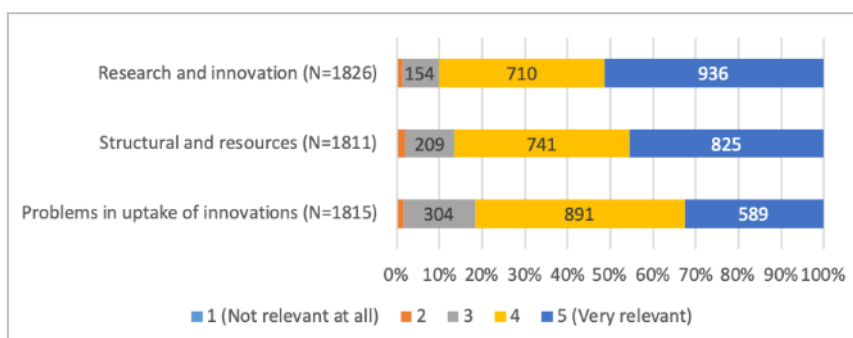
**Advantages mentioned:** Long term commitment, stability, and visibility in financial, legal, and strategic terms; Participation of wide range of relevant stakeholders in an ecosystem (large/small business, academics, researchers, experts, etc.); Complementarity with other (policy) initiatives at all levels EU, national, regional; Efficient and effective coordination and management; High leverage of (public) funds; Some innovative field require high levels of international coordination/standardisation (at EU/global level); Ability to scale up technology (in terms of TRL) through collaboration; Networking between members; Direct communication with EU and national authorities

**Disadvantages mentioned:** Slow processes; System complexity; Continuous openness to new players should be better supported as new participants often bring in new ideas/technologies that are important for innovation; Lower funding percentage compared to regular Horizon Europe projects; Cash contributions; Administrative burdens; Potential for IPR constraints.

### *1.2.4. Relevance of EU level to address problems in Partnerships' areas*

Respondents were asked to rate the **relevance of research and innovation efforts at EU level efforts to address specific problems in the area of partnerships**. Research and innovation related problems were rated as most relevant across all candidate initiatives, followed by structural and resources problems and problems in the uptake of innovations. Overall, all three areas were deemed (very) relevant across the partnerships, as more than 80% of respondents found these challenges (very) relevant. Only minor differences were found between stakeholder categories. Research and innovation problems were found slightly more relevant by academic/research institutions, yet slight less relevant by large companies and SMEs. Structural and resource problems were indicated as slightly more relevant by NGOs, but slightly less by academic/research institutions. While both NGOs and public authorities find slightly more relevant to address problems in uptake of innovation than other respondents. The views of citizens are not differing significantly. Respondents that are/were directly involved in a current/preceding partnership find, however, the need to address problems related to the uptake of innovations slightly more relevant than other respondents.

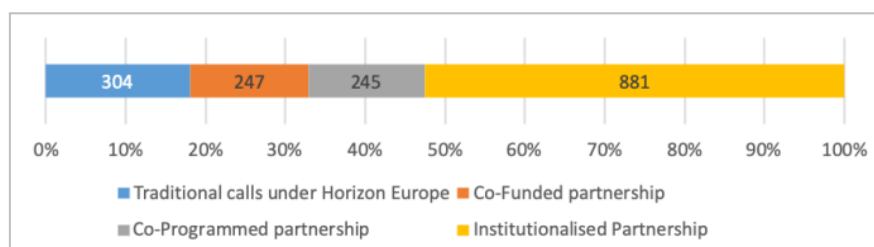
**Figure 9: To what extent do you think this is relevant for research and innovation efforts at EU level to address the following problems in relation to the candidate partnership in question? (non-campaign replies) Aggregation of responses of all candidate initiatives**



### 1.2.5. Horizon Europe mode of intervention to address problems

Respondents were asked to indicate how these challenges could be addressed through **Horizon Europe intervention**. Just over 50% of all respondents indicated that institutionalised partnerships were the best fitting intervention, with relatively strong differences between stakeholder categories. The use of Institutionalised Partnership was indicated more by business associations and large companies, but less by academic/research institutions and SMEs. While academic/research institutions valued traditional calls more often, this was not the case for business associations, large companies and public authorities. Public authorities indicated a co-programmed intervention more often than other respondents. Citizens indicated slightly less often that institutionalised partnerships were the best fitting intervention. Respondents that are/were directly involved in a current/preceding partnership, selected the institutionalised partnership intervention in far higher numbers (nearly 70%).

**Figure 10: In your view, how should the specific challenges described above be addressed through Horizon Europe intervention? (non-campaign replies) For all candidate initiatives**



When asked to reflect on their answers, respondents that pointed to the need for using institutionalised partnership mentioned the long-term commitment of collaboration, a common and ambitious R&I strategy as well as the overall collaboration between industry and research institutions. Others shared positive experiences with other modes of interventions:

- Traditional calls, because of their flexibility and integration of a wide range of actors, as long as the evaluation panels do not deviate from the policy focus. This was mentioned by 94 participants, including companies (25), academics (26) and EU citizens (25).
- Co-funded partnership, as a mechanism to ensure that all participants take the effort seriously, while allowing business partnerships to develop. This approach was deemed suitable based on previous experiences with ERANETs. This was raised by 84 participants, 36 of them academic respondents, 18 companies and 16 EU citizens.



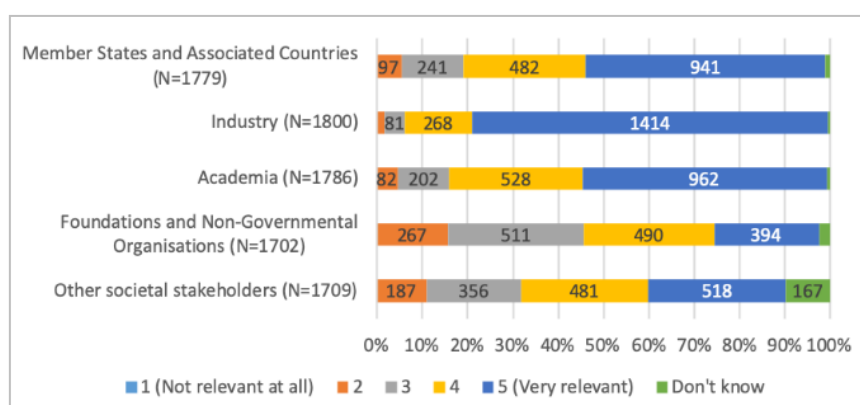
- Co-programmed partnerships, to tackle the need to promote and engage more intensively with the private sector. This was mentioned by 97 participants, most of them companies (34), followed by academics (22), business associations (15) and EU citizens (11).

#### 1.2.6. *Relevance of a set of elements and activities to ensure that the proposed European Partnership would meet its objectives*

##### **Setting joint long-term agendas**

Respondents were asked how relevant it is for the proposed European Partnerships to meet their objectives to have a strong involvement of specific stakeholder groups in setting joint long-term agenda. All respondents see stakeholders from industry as the most relevant, followed by academia and governments. The involvement of foundations and NGOs as well as other societal stakeholders were, however, still found to be (very) relevant by more than 50% of the respondents. Most respondents indicated the stakeholder group they belong to themselves or that represent them as relevant to involve.

**Figure 11: In your view, how relevant are the following elements and activities to ensure that the proposed European Partnership would meet its objectives - Setting joint long-term agenda with strong involvement of: (non-campaign replies) For all candidate initiatives**



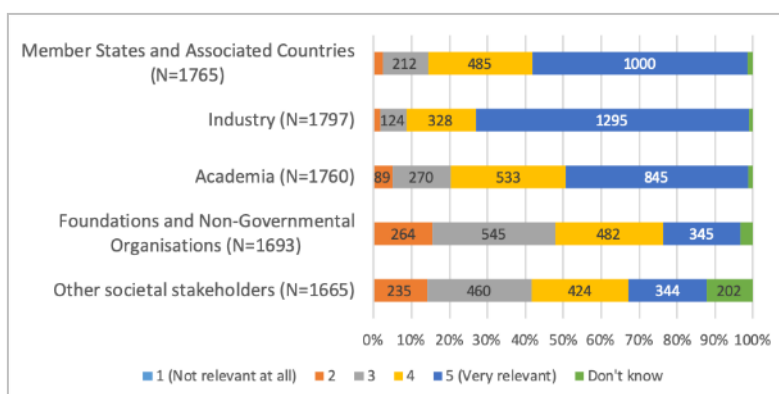
##### **Pooling and leveraging resources through coordination, alignment and integration with stakeholders**

Respondents were asked how relevant it is for the proposed European Partnership to meet its objectives to pool and leverage resources (financial, infrastructure, in-kind expertise, etc.) through coordination, alignment and integration with specific groups of stakeholders. Respondents see stakeholders from industry as the most relevant, followed by academia and governments (Member States and Associated Countries). The involvement of foundations and NGOs as well as other societal stakeholders are also still found to be (very) relevant for more than 50% of the respondents. Similarly as described for the question on setting joint long-term agendas, most stakeholder categories valued their own involvement higher than other respondents – although also here differences between stakeholder categories were minor.

**Figure 12: In your view, how relevant are the following elements and activities to ensure that the proposed European Partnership would meet its objectives – Pooling and leveraging**



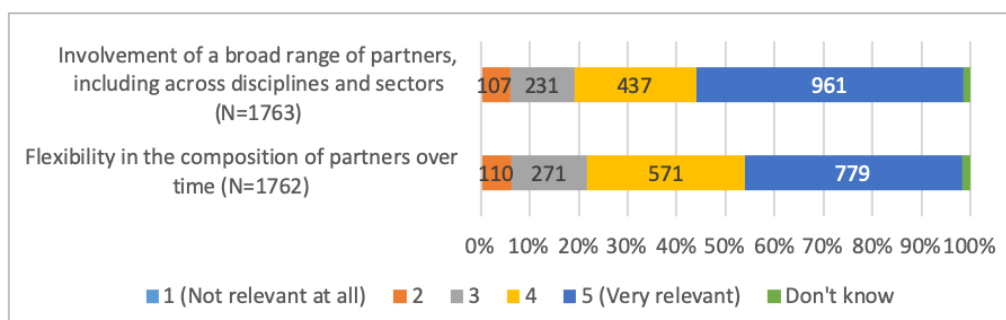
*resources (financial, infrastructure, in-kind expertise, etc.) through coordination, alignment and integration with: (non-campaign replies) For all candidate initiatives*



### **Composition of the partnerships**

Regarding the composition of the partnership most respondents indicated that for the proposed European Partnership to meet its objectives the composition of partners needs to be flexible over time and that a broad range of partners, including across disciplines and sectors, should be involved (see Figure 13). When comparing stakeholder groups only minor differences were found. Academic/research institutions and public authorities found the involvement of a broad range of partners and flexibility in the composition of partners over time slightly more relevant than other respondents, while large companies found both less relevant. SMEs mainly found the flexibility in the composition of partners over time less relevant than other respondents, while no significant differences were found regarding the involvement of a broad range of partners. Citizens provided a similar response to non-citizens. Respondents that are/were directly involved in a current/preceding partnership, when compared to respondents not involved in a current/preceding partnership, indicated a slightly lower relevance of the involvement of a broad range of partners and flexibility in the composition of partners over time.

**Figure 13: In your view, how relevant are the following elements and activities to ensure that the proposed European Partnership would meet its objectives – Partnership composition (non-campaign replies) Aggregation of responses of all candidate initiatives**

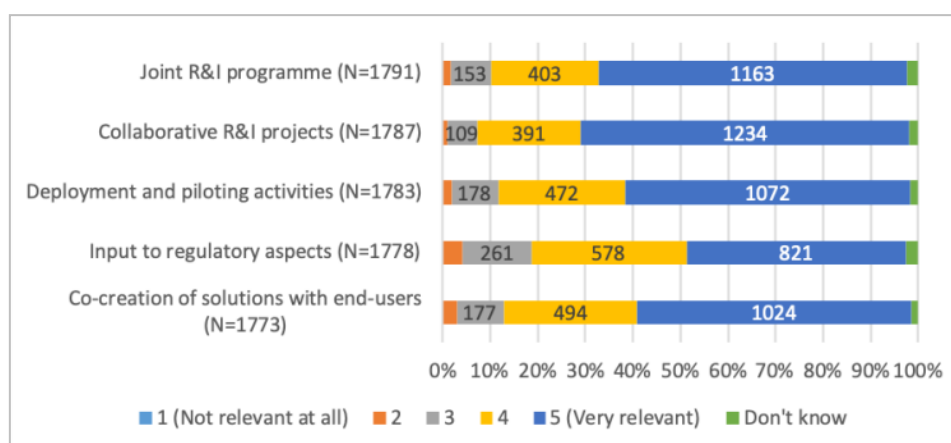


### **Implementation of activities**

Most respondents indicated that implementing activities like a joint R&I programme, collaborative R&I projects, deployment and piloting activities, providing input to regulatory

aspects and the co-creation of solutions with end-users are all (very) relevant for the partnerships to be able to meet its objectives. Minor differences were found between the main stakeholder categories, the differences found were in line with their profile. As such, academic/research institutions found joint R&I programme & collaborative R&I projects slightly more relevant and deployment and piloting activities, input to regulatory aspects and co-creation with end-users slightly less relevant than other respondents. For SMEs an opposite pattern is shown. Large companies, however, also found collaborative R&I projects slightly more relevant than other respondents, as well as input to regulatory aspects. The views of citizens are similar to non-citizens. Respondents that are/were directly involved in a current/preceding partnership, when compared to respondents not involved in a current/preceding partnership, show a slightly higher relevance across all activities.

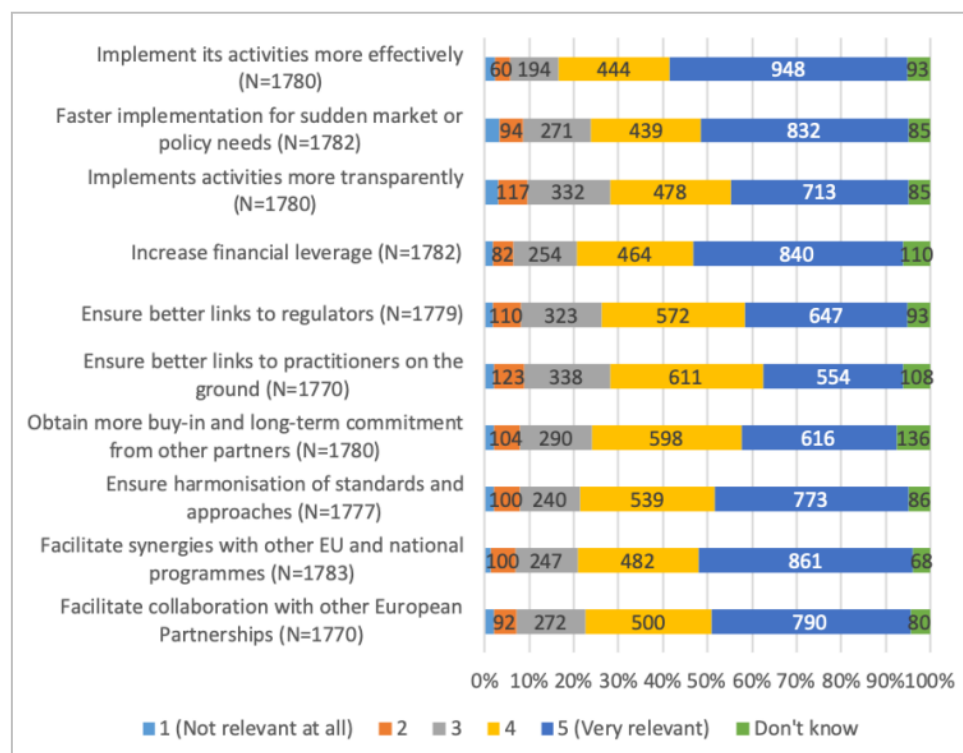
**Figure 14: In your view, how relevant are the following elements and activities to ensure that the proposed European Partnership would meet its objectives – Implementing the following activities (non-campaign replies) For all candidate initiatives**



#### 1.2.7. Relevance of setting up a legal structure (funding body) for the candidate European Partnerships to achieve improvements

Respondents were asked to reflect on the relevance of setting up a legal structure (funding body) for achieving a set of improvements, as shown in the Figure below. In general, 70%-80% of respondents find a legal structure (very) relevant for these activities. It was found most relevant for implementing activities in a more effective way and least relevant for ensuring a better link to practitioners on the ground, however differences are small.

**Figure 15: In your view, how relevant is to set up a specific legal structure (funding body) for the candidate European Partnership to achieve the following? (non-campaign replies)**  
**Aggregation of responses of all candidate initiatives**



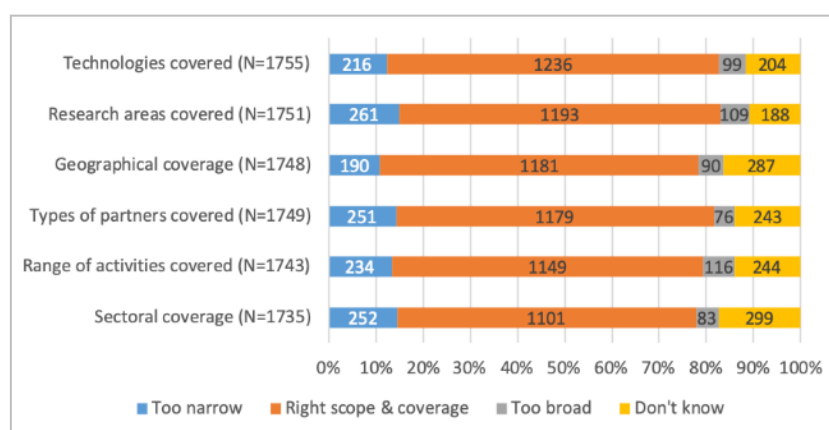
When comparing stakeholder categories there are only minor differences. Academic/research institutions indicated a slightly lower relevance for transparency, better links to regulators as well as obtaining the buy-in and long-term commitment of other partners. SMEs also indicated a lower relevance regarding obtaining the buy-in and long-term commitment of other partners. Large companies showed a slightly higher relevance for implementing activities effectively, ensure better links to regulators, obtaining the buy-in and long-term commitment of other partners, synergies with other EU/MS programmes and collaboration with other EU partnerships. NGOs find it slightly more relevant to implement activities faster for sudden market or policy needs. Public authorities, however, find it slightly less relevant to facilitate collaboration with other European Partnerships than other respondents. The views of citizens show a slightly lower relevance for a legal structure in relation to implementing activities in an effective way. Respondents that are/were directly involved in a current/preceding partnership indicated a higher relevance across all elements presented.

#### *1.2.8. Scope and coverage of the candidate European Partnerships based on their inception impact assessments*

Consulted on the scope and coverage for the partnerships, based on their inception impact assessments, the large majority feels like the scope and coverage initially proposed in the inception impact assessments is correct. However, about 11% to 15% of the respondents indicated the scope and coverage to be too narrow. About 11%-17% of respondents answered “Don’t know”. Overall, differences between the main stakeholder categories were found to be minor. Academic/research institutions indicated slightly more often that the research area was

“too narrow” then other respondents. SMEs on the other hand indicated slightly more often that the research area and the geographical coverage were “too broad”. NGOs and public authorities, however, found the geographical coverage slightly more often “too narrow”. Large companies found the range of activities slightly more often “too broad” and the sectoral focus slightly more often “too narrow” when compared to other respondents. The views of citizens are the same as for other respondents. Respondents that are/were directly involved in a current/preceding partnership more often indicated that the candidate institutionalised European Partnership have the “right scope & coverage”.

**Figure 16: What is your view on the scope and coverage proposed for this candidate institutionalised European Partnership, based on its inception impact assessment? (non-campaign replies) Aggregation of responses of all candidate initiatives**



#### 1.2.9. Scope for rationalisation and alignment of candidate European Partnerships with other initiatives

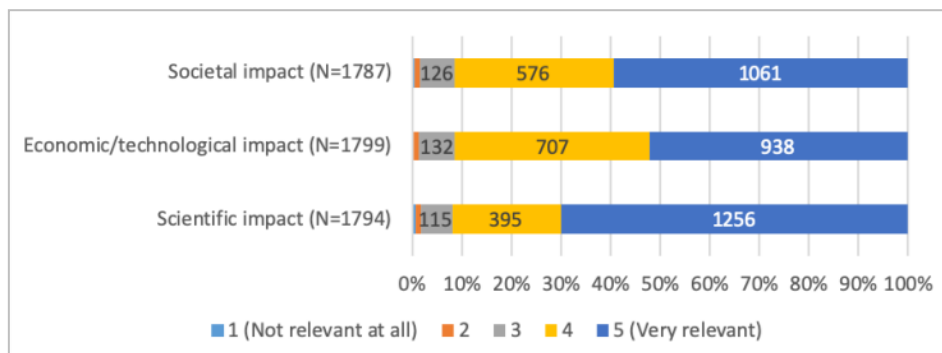
When asked whether it would be possible to rationalise a specific candidate European Institutionalised Partnership and its activities, and/or to better link with other comparable initiatives, nearly two thirds of respondents answered “Yes” (1000, or 62%), while over one third answered “No” (609, or 39%). Nearly no differences were found between stakeholder categories, only large companies and SMEs indicated slightly more often “Yes” in comparison to other respondents. The views of citizens are the same as for other respondents. Respondents that are/were directly involved in a current/preceding partnership, indicated “No” more often, the balance is about 50/50 between “Yes” and “No” for this group.

#### 1.2.10. Relevance of European Partnerships to deliver targeted scientific, economic/technological and societal impacts

Finally, respondents were asked to rate the relevance of partnership specific impacts in three main areas: Societal; Economic/technological; and Scientific impacts. All three areas were deemed (very) relevant across the candidate partnerships. Scientific impact was indicated as the most relevant impact, more than 90% of respondents indicated that this as (very) relevant. Only minor difference between stakeholder groups were found. Academic/research institutions found scientific impacts slightly more relevant, while large companies found economic and technological impacts slightly more relevant than other respondents. NGOs found societal impact slightly more relevant, while SMEs found this slightly less important.

Citizens did not a significantly different view when compared to other respondents. Respondents that are/were directly involved in a current/preceding partnership find all impacts slightly more relevant than other respondents.

**Figure 17: In your view, how relevant is it for the candidate European Institutionalised Partnership to deliver on the following impacts? (non-campaign replies) Aggregation of responses of all candidate initiatives**



### **1.3. Stakeholder consultation results for this specific initiative**

#### *1.3.1. Scope of the consultation*

Transforming Europe's Rail System (TERS) have been identified as one of the Commission's research and innovation initiatives under the Horizon Europe 'Climate, Energy and Mobility' cluster (Pillar II-Cluster 5).

The Commission conducted a series of stakeholder consultations with various stakeholder groups of different levels (e.g. Member States, R&I funding beneficiaries, industry associations, citizens, etc.) to seek views on EU Research and Innovation (R&I), and on the proposed TERS Partnership. In particular, the consultation activities focused on the need for, the scope and coverage, the type and the planned focus of this partnership.

#### *1.3.2. Whom has the Commission consulted*

The Commission consulted a wide range of stakeholders (e.g. public authorities, companies, business organisations, academia, research organisations and end-users) to anticipate a broad involvement of interested participants in the partnership. The consultation activities included but were not limited to those which applied for and/or received funding from the current S2R JU. These targeted stakeholders were complemented by the identification of additional relevant stakeholders to be consulted, based on an external study undertaken to feed into the impact assessment for each of the potential institutionalised European Partnerships.

In summary, the following type of stakeholders have been consulted:

- The industrial community, which includes large companies, SMEs and Start-ups, material suppliers and equipment manufacturers;
- The operating community, including railway undertakings and infrastructure managers;
- The research community, consisting of academic/research institutions such as universities, public government-funded organisations, independent organisations or private research centres.
- Public authorities, such as ministries and national bodies for research, EU institutions and bodies.
- EU citizens responding on their own behalf.
- Interested independent authorities and platforms.

#### *1.3.3. How has the Commission consulted?*

The Commission launched a structured consultation of Member States through the Shadow Strategic Configuration of the Programme Committee Horizon Europe, which provided early input<sup>5</sup> into the preparatory work and resulted in 44 possible candidates for European Partnerships, taking into account the identified areas for possible institutionalised partnerships.

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<sup>5</sup> European Partnerships under Horizon Europe: results of the structured consultation of Member States (Report)

In addition, an open public consultation that covered all 12 potential institutionalised partnerships based on Articles 185 and 187 TFEU was launched. This consultation collected input from a broad range of stakeholders, across Europe and associated countries, on both the overall approach and the individual candidates for institutionalised partnerships.

Furthermore, a combination of written consultation tools and direct interactions with stakeholders were put in place, seeking input, views, ideas and experiences. The identified option in the impact assessment largely builds on the outcome of these consultations with stakeholders.

#### *1.3.4. Feedback to the inception impact assessment on candidate initiatives for Institutionalised Partnerships*

Following the publication of the inception impact assessment in July 2019, for the initiative “Transforming Europe’s Rail System” 46 individual feedbacks were collected, mainly from companies and business organisations from a significant number of EU Member States.<sup>6</sup> Among the elements mentioned were:

- The importance of R&I in enhancing the role of rail in an integrated and sustainable European transport system, and the potential for rail to be more competitive through easier planning of multimodal journeys, better management of service disruption and higher quality on-board service;
- The need to reinforce Europe’s technological leadership in rail (an issue highlighted by both business and academic/research organisations);
- The need for EU action to address industry fragmentation currently limiting the level of R&I in the rail sector and the critical need to increase market take-up of new products and services;
- The key role of the rail sector in supporting EU societal objectives, in particular action to limit the impact of climate change;
- Strong endorsement of rail’s potential contribution to broader scientific, technological and economic development across Europe;
- Strong support for an institutionalised partnership capable of developing a long-term strategy for both fundamental research and market-focused innovation in the rail sector.

#### *1.3.5. Structured consultation of the Member States on European partnership*

A structured consultation of Member States through the Shadow Strategic Configuration of the Programme Committee Horizon Europe in May/June 2019 provided early input into the preparatory work for the candidate initiatives.

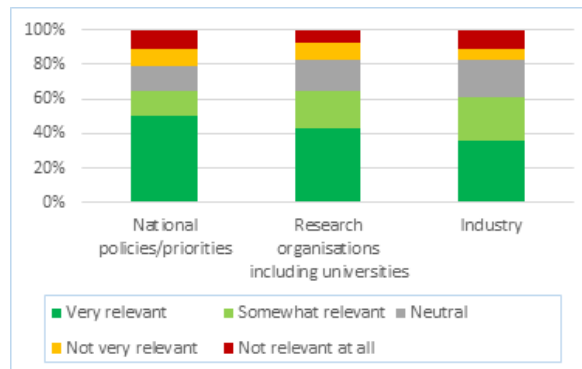
For the initiative “Transforming Europe’s Rail System”, the feedback from countries suggests that the proposed Partnership is to a large extent relevant, with 64% considering it relevant for their national policies and priorities and for their research organisations, including

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<sup>6</sup> Feedback on inception impact assessment to be found on [https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2019-4980251/feedback\\_en?p\\_id=5722806](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2019-4980251/feedback_en?p_id=5722806)

universities, and slightly less (61%) consider it very relevant or somewhat relevant for their industry.

**Figure 1: Relevance of the European Partnership for Transforming Europe’s rail system in the national context**



18 countries reported to have relevant national or regional R&I strategies, plans or programmes in place in support of the proposed Partnership. National economic, sectoral strategies and/or plan with a strong emphasis on research and/or innovation (57%) and R&I strategies or plans (54%) were identified most frequently. Countries reported to a lesser extent to having dedicated R&I funding programmes or instruments (32%) and regional R&I and/or smart specialisation strategies (25%). 5 countries reported other policies/ programmes.

Countries from Central and Eastern Europe stressed the need to focus more on deployment and piloting to transform the results of the partnership into real world solutions, and in this context also to ensure synergies with related policies, and investments at national and EU level (e.g. CEF, Cohesion Funds). Other comments suggested the need to adjust the scope of the proposed partnership and focus more on integrating alternative energy solutions (hydrogen, batteries), digitalisation of the existing system, robotisation for maintenance, ensuring a holistic approach to the railways system including infrastructure and maintenance, and developing user-centred innovations.

The majority of countries (57%) were undecided concerning their interest to participate as partner. 8 countries expressed an interest to join as a partner, and 3 countries expressed no national interest to participate.

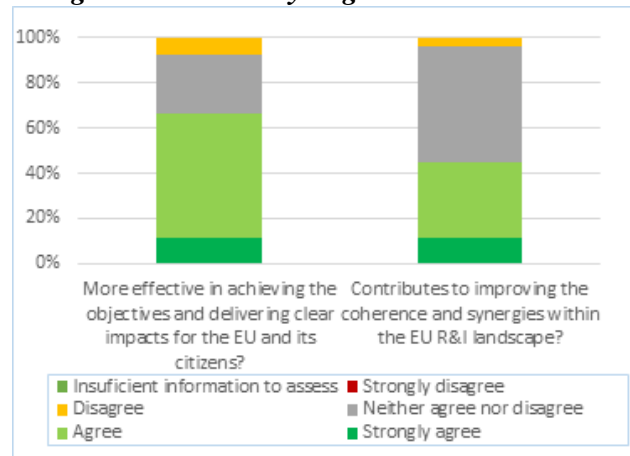
The majority of the countries (86%) expressed interest in having access to results produced in the context of the partnership.

### **Feedback on objectives and impacts**

There was good agreement (60%) on the use of partnership approach for Transforming Europe’s Rail System, whilst quarter of respondents remained neutral. The majority of delegations (65%) agreed that the partnership would be effective in achieving the objectives and delivering clear impacts for the EU and its citizens, but to a lesser degree (43%) that it would contribute to improving the coherence and synergies within the EU R&I landscape.



**Figure 2: Agreement on arguments for a Partnership for Transforming Europe's rail system in delivering impacts, improving coherence and synergies**



### Views on partners, contributions and implementation

Slightly more than half (54%) of the responses agreed on the type and composition of partners, whilst 25% remained neutral and 2 countries disagreed. Additional comments suggest several countries wish to see an increased role of Member States, as well as openness towards new and smaller partners.

Most countries (64%) would need more information on the contributions and level of commitments expected from partners. Additional comments highlight the need to ensure synergies with Cohesion Funds and CEF for exploitation and uptake of innovation.

46% of countries wished for more details to make an informed decision on the proposal to implement the proposed partnership based on the Article 187 TFEU, 36% agree and 18% disagree. It was thus, suggested to analyse whether the objectives of this proposal could be reached with alternative implementation modes, notably the co-programmed model; if not, then countries wish to see a considerable reform in the set-up of the JU. The feedback stressed the need to allocate Union funding through open calls for proposals (subject to comitology).

In addition to the structured consultation, on 25 November 2019, DG MOVE organised a dedicated workshop to discuss mobility partnerships with Member States. During the workshop, Member States expressed the view that additional benefit for countries in participating in partnerships is that it provides access to an extensive network of key research actors and industrial players in the mobility sector to either create or make use of emerging technologies. Moreover, they highlighted the need to ensure better information exchange between partnerships roadmaps and relevant Member State programmes and enable synergies with other EU and national programmes, notably with Cohesion Funds for innovation development and demonstration, and CEF for deployment and market uptake.

### 1.3.6. Targeted consultation of stakeholders

A targeted consultations with businesses, research organisations and other partners addressed different aspects of the Partnership on Transforming Europe's rail system.

**Table 1: Number of interviews per stakeholder category**

Stakeholder category	Number	Share (%)
Associations	9	18%
European body – regulatory agency	1	2%
Freight operators/supply chain	4	8%
Infrastructure manager	5	10%
Member States' transport authorities	4	8%
Passenger operators	7	14%
Research and technologies organisations	5	10%
Research and technology organisation (non-rail)	1	2%
Third party industry suppliers	7	14%
Universities/academic bodies	5	10%
Urban passenger operators	2	4%
<b>TOTAL</b>	<b>50</b>	<b>100%</b>

### **Key results from the targeted consultation**

#### **Objectives**

Stakeholders generally indicated that they agree on the S2R JU objectives. There is a consensus that the current objectives remain valid for the future.

Several stakeholders noted the need for stronger deployment efforts, and focus on users. In particular, several interviewees highlighted that inter-modality and door-to-door mobility are key objectives for rail development, and this calls for innovations which are attractive to rail users.

Additional objectives that stakeholders proposed to be included more prominently are:

- Supporting the European rail industry competitiveness in global markets;
- Accelerating innovation deployment; and
- Reducing innovation time to market.

Moreover, some stakeholders (both members and non-members of the S2R JU) proposed a stronger focus on specific themes, in particular:

- Urban rail transport;
- Rail freight transport;
- Rail service level;
- Energy consumption.

Most stakeholders (especially members of S2R JU) indicated that the Joint Undertaking instrument allows better achievement of objectives; the main reasons they reported are:

- Creating an over-reaching picture in rail research, which would not be possible with the Horizon Europe Programme alone and by single research projects;
- Fostering cooperation in the rail sector;
- The legal certainty that the Joint Undertaking brings to members and innovation investors, as a condition for industry players to invest;
- Facilitating technology and operational harmonisation across Europe;
- Accelerating the sector transformation, also to compete on global markets;
- Allowing longer term cooperation among research stakeholders to move to higher TRL levels;
- Being an independent party for business players.

Some stakeholders also highlighted that moving from the current Joint Undertaking cooperation instrument to a co-programmed partnership (or to the Horizon Programme alone) would delay rail research, slow down innovation processes and have negative impacts on the rail industry.

### **Membership and openness**

Generally, members and non-members of S2R JU consider that more flexibility is needed to engage stakeholders based on research needs' development. Several stakeholders proposed the development of mega-projects in which members and non-members cooperate, and which could have flexibility in engaging partners as the projects develop. On the other hand, two stakeholders indicated that bigger projects increase management workload and do not necessarily deliver improved impacts.

Some stakeholders noted that the funding also needs to cover prototypes and industrial projects, and this justifies that more budget needs to be available. Some stakeholders (especially members of S2R JU) noted the geographical imbalance of membership, but also that this reflects the current rail industry geographic balance and the related dominant position of some Member States. They indicated that open calls can enhance more geographical balance. Several interviewees commented that the urban sector is poorly represented in the current member composition, although they noted that it may be constrained by funding from participating into a Joint Undertaking.

Specific stakeholders' proposals on types of members to include, or to include more prominently, are:

- Verification and certification bodies (to ensure that innovations are usable on national rail networks and compatible with interoperability standards);
- National authorities in order to understand the technologies employed locally;
- Infrastructure managers and railway undertakings, to allow more focus on rail operational and service aspects, and to improve the balance of membership between suppliers and users;
- Rail freight nodes (including ports and terminals), which are users of innovation and an important component of logistics chains.

Both members and non-members of S2R JU noted that the rail Partnership should be more open and flexible and that it is difficult for non-members to join through open calls.

With specific reference to the involvement of universities, stakeholders generally indicated that they have an important role in supporting industrial innovation in bringing a long-term perspective to research activities.

A common point for almost all stakeholders, other than rail providers and manufacturers, was the balance between “blue sky research” and research focused on members' priorities. In particular, research stakeholders noted that business players tend to consider innovation in the shorter term, while universities look at innovation on a longer timescale.

Concerning openness, several stakeholders (in particular most of the S2R Ju members or other stakeholders engaged in S2R JU activities) indicated that in Shift2Rail, research activities in open call projects are not aligned with the research priority of members. Generally, stakeholders noted that a closer cooperation between members and non-members is needed in the future.

Concerning the partnership dimension, the main suggestion was to increase the number of core members to 15-20 and to engage additional stakeholders on a project or research basis.

### **Leverage effect**

Generally, stakeholders indicated that Shift2Rail has the capacity to leverage private investments and to allow the coordination of investments in risky fields, thanks to the Join Undertaking contractual obligations. Shift2Rail members wished a push to higher TRL and more deployment and market up-take of rail innovations. They also indicated that an important component of this would be that research is accompanied by solid business cases to roll out innovation.

### **Key Performance Indicators (KPI)**

Stakeholders indicated that KPIs refer to the Shift2Rail objectives and are still valid for the future. Suggestions for KPI improvements concerned:

- Defining the baseline values;
- Defining KPI assumptions and framework;
- Defining KPI more specifically;

- Including KPI on:
  - bringing R&I results to the market;
  - regulatory harmonisation issues (e.g. cross-border services with different standards);
  - rail freight transport;
  - rail hubs;
  - data sharing;
  - rail attractiveness to passengers, with reference to satisfaction, experience and comfort; and
  - noise and energy topics.
- Including more focus on coordination with other transport modes and transport decarbonisation.

### **Costs and benefits**

Interviewees indicated the following benefits of the Joint Undertaking cooperation instrument compared to an EU Research & Innovation programme alone or a co-programme partnership:

- More focused calls compared to FP7 and Horizon 2020;
- Long-term vision;
- More visibility compared to other cooperation instruments;
- Legal certainty;
- Reduced fragmentation in research investments/results, avoiding duplication of effort;
- Joint EU approach to solving the rail industry technical problems;
- Wider scale demonstrators and higher TRL;
- Management transparency (compared to projects funded under general Horizon 2020 calls).

On the other hand, interviewees also indicated the following areas of improvement in relation to the current Shift2Rail Joint Undertaking:

- The budget should be higher, and as a consequence many projects have low TRL;
- There could be more flexibility to allocate funding to “blue sky research”;
- The multiannual action plan should be flexible and suited to changes.
- Innovation Programmes should be more connected.
- More visibility of activities and research results across IPs is needed.
- A higher level of cooperation between the EC and Members States is needed.

Critical elements raised by stakeholders concerned:

- The usability of results in the national contexts;

- Confidentiality of project results, which limit their diffusion;
- Limited contribution from some partners of open call projects;
- Implementation of R&I outputs;
- A high degree of bureaucratisation, with complicated rules of cooperation;
- Communication and presentation of research results;

One stakeholder involved in S2 JU activities and projects indicated that project implementation would be better in a co-programmed partnership because member and non-member projects are insufficiently coordinated.

### **Need for a rail EU partnership**

There is a general agreement that an EU partnership for rail is needed in the future. Most stakeholders suggested follow-up of Shift2Rail to complement, continue and deploy previous and ongoing activities and to complete the transformation of the rail sector. Stakeholders mentioned the following advantages of the Shift2Rail Joint Undertaking:

- Shift2Rail brought more clarity than single projects and brought together research and business players.
- European support under Horizon Europe alone would not address the issue of industry fragmentation;
- In the JU, all sector representatives are around the table (EC, Member States, Infrastructure Managers, rail operators, rail suppliers, etc.).
- Other types of partnerships can contribute to generating “silos” in research and isolated groups of stakeholders.
- The JU cooperation instrument is essential to public sector entities, which have specific investment rules requiring a demonstration of investment returns and legal certainty.
- It brings competing companies into R&I cooperation and innovation investment risk sharing.
- The Shift2Rail brand helps selling EU rail R&I results internationally.

Several stakeholders also suggested changes and improvements to the current partnership with reference mainly to openness, membership composition; and integration between call for members and call for non-members.

### **Research needs**

Stakeholders proposed the following priority topics in rail research:

- Digitalisation and digital transformation of the sector;
- IT/augmented reality/digitalisation in signalling and remote control;
- Multimodality and rail last mile integration,;
- Artificial intelligence and robotics for maintenance;

- 5G, data (including Internet of Things), data management and cybersecurity;
- Rail freight terminals, including automatic coupling and single wagon development, supply chain data exchange;
- Automation on mainlines and computer-based controls; Automatic Train Operations;
- Decarbonisation and low carbon technologies;
- Rail capacity improvement;
- New materials (e.g. carbon fibre);
- New methods of maintenance/asset management;
- Noise;
- Safety and security.

Some stakeholders indicated that a stronger partnership between ERRAC and JU is needed. On the other hand, some indicated that the future cooperation instrument could be a light partnership (not a JU) working with ERRAC.

### **Contribution to EU policies**

Stakeholders indicated that the future partnership could focus on:

- Increasing rail efficiency and attractiveness to users to achieve modal shift;
- Promoting the rail sector to policy makers and in particular informing European policies by bringing the industry knowledge, technical evidence and expertise; and
- Projects delivering competitive deployment of products and services.

### **Governance/organisation**

Concerning governance, JU members identified the following main areas of improvement:

- The Governing Board should have more focus on strategic topics.
- The Governing Board is very broad, and the number of members could be reduced.
- The Scientific Committee could be more involved and have more influence, also involving representatives of the industry.

Concerning organisation, different non-members of S2R JU highlighted that a stronger national presence is needed (either in terms of communication or contact points) and that this would allow promoting and marketing research results. Better coordination with Member States was also suggested.

### **EU added-value**

All the stakeholders called for EU action in rail research and innovation. Moreover, some stakeholders indicated that JU is an instrument to support the EU rail industry's competitiveness at global level.

Further benefits of the EU actions that stakeholders indicated were:

- Making funds available;

- Tackling topics (e.g. interoperability, ERTMS) which have an EU dimension and cannot only be tackled at national level;
- Sustaining rail as the greenest transport mode and helping rail to innovate;
- Coordinating rail research to avoid research developing in parallel by single stakeholders or groups of stakeholders (e.g. EU as a catalyst to efficiently deliver rail research), and
- Bringing together competitors in rail innovation (especially in a fragmented sector like rail).

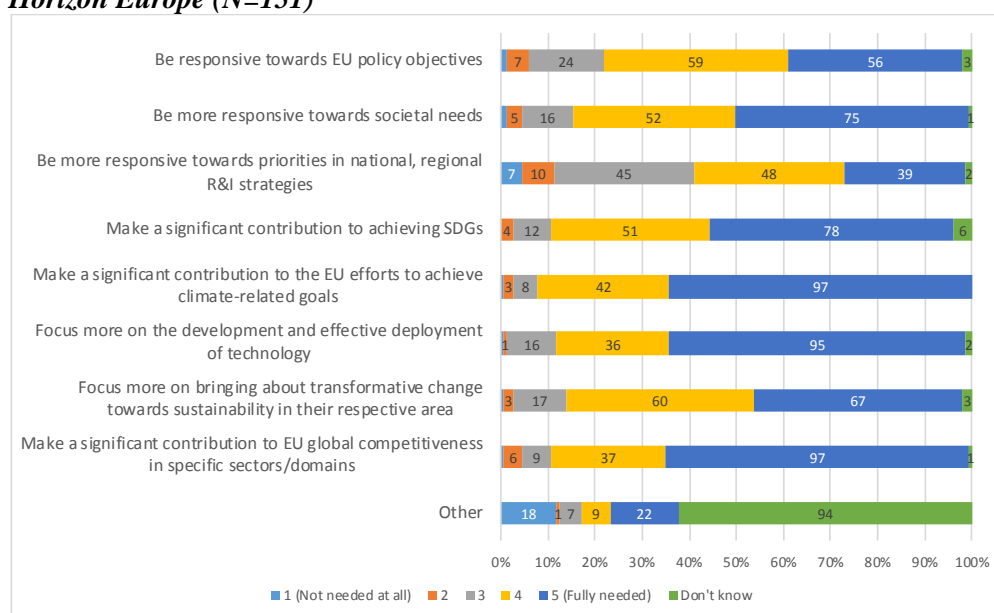
### 1.3.7. Open Public Consultation

#### Profile of respondents

151 respondents answered the consultation for the Transforming Europe's rail system Partnership or part of it. Of these respondents, 32 (21.19%) were citizens. The largest group of respondents were businesses with 62 (41.06%) respondents. There were 29 respondents from academic and research institutions (19.21%) and 14 from business associations (9.27%). 7 respondents were from public authorities (4.64%). The remaining respondents were from NGO's (2, 1.32%), consumer organisations (1, 0.66%) and other (4, 2.65%). Over two-thirds of respondents, namely 106 (70.20%), have been involved in the on-going research and innovation framework programme, of which 85 respondents (80.19%) were directly involved in a partnership under Horizon 2020 or its predecessor Framework Programme 7.

#### Needs of future candidate European Partnerships

**Figure 3: Views of the respondents in regard to the needs of future European Partnerships under Horizon Europe (N=151)**



The majority of respondents indicated the need of the future Partnership to make a significant contribution to the EU efforts to achieve climate-related goals (97, 64.24%) and focus more

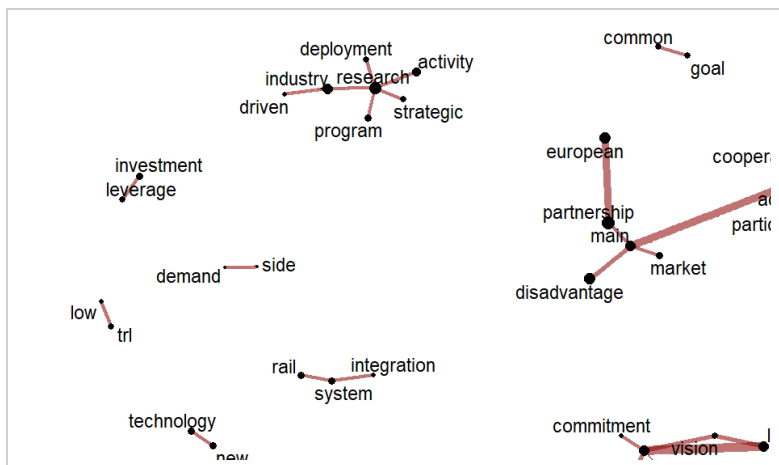


on the development and effective deployment of technology (95, 62.91%). Both companies and academic institutions highlighted the importance of ensuring the competitiveness of the European rail industry at the global level while focusing on societal objectives and demonstrating the practical benefits of rail-related R&I to a wide audience.

EU citizens identified a range of other needs, including encouraging joint ventures and the participation of SMEs and communicating the key role of the EU in implementing the partnership.

### Main advantages and disadvantages of Institutionalised European Partnerships

**Figure 4: Assessment of open answers with advantages and disadvantages of participation in an Institutionalised European Partnership, 30 most common co-occurring keywords (N=129)**



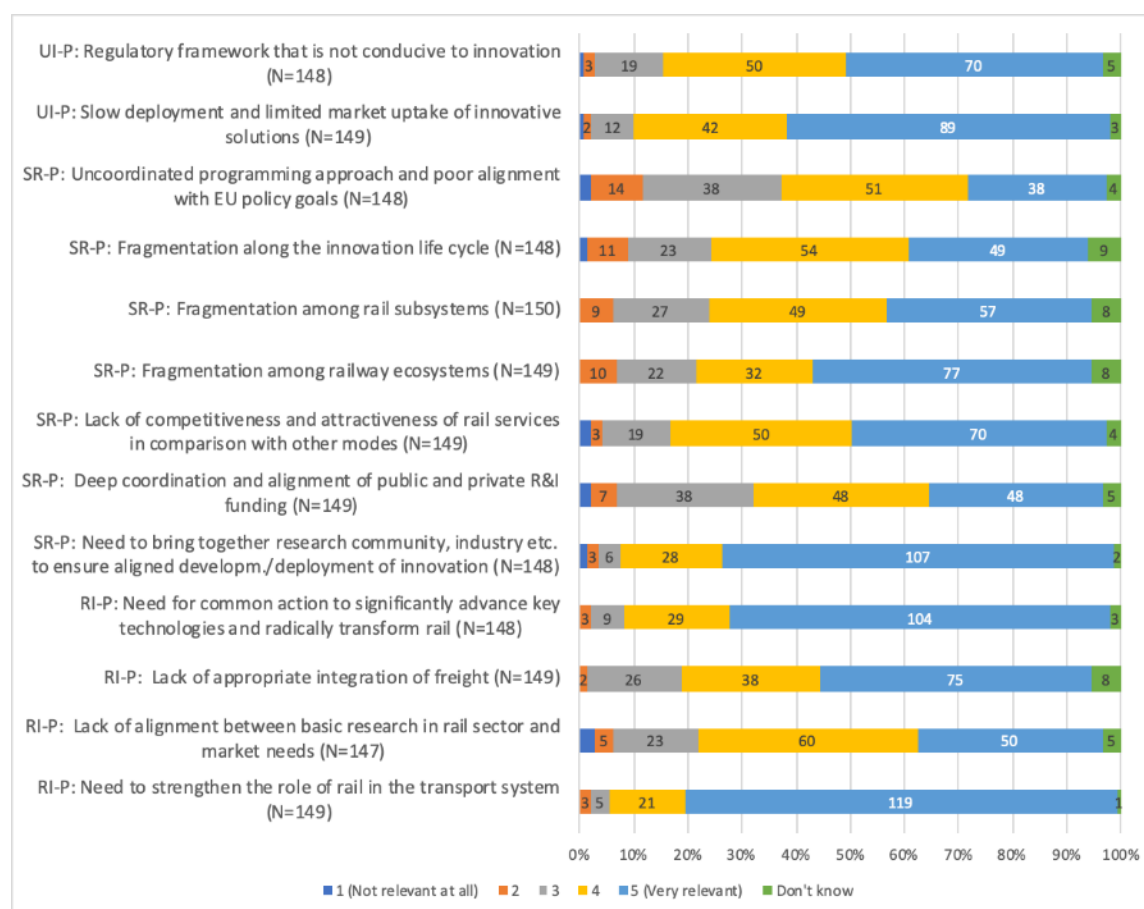
Companies of all sizes emphasised the advantages of collaboration, including between organisations that compete with one another, and effective coordination of R&I activity. They also identified optimal management of projects, the ability to develop a long-term vision and continuity, stability and visibility of projects as important benefits of participation in an institutionalised partnership.

Academic institutions noted the benefits of building relationships with the rail industry and of pursuing research with practical application to the sector. However, they also noted that some research activities are best conducted in collaboration with a single partner rather than a large number of organisations.

EU citizens highlighted a number of advantages of an institutionalised partnership, including collaborative working to develop a standardised platform for innovation, dedicated funding and the ability to develop a long-term strategy. At the same time, they noted some disadvantages, including the risk of establishing an industry-driven ‘closed shop’ and undue focus on projects with high technology readiness levels (and the associated neglect of more fundamental research).

## Relevance of EU level efforts to address problems in relation to the Transforming Europe's Rail System initiative

**Figure 5: Views of respondents on relevance of research and innovation efforts at the EU level to address problems in relation to rail systems**

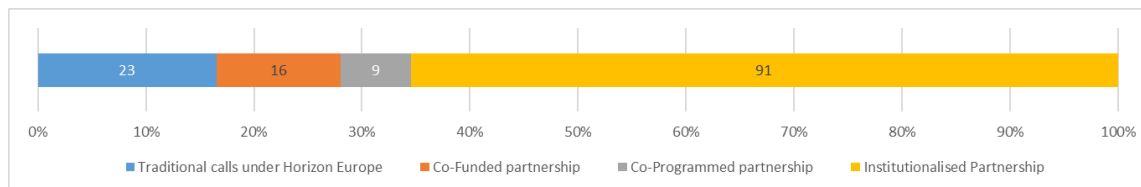


With regard to the uptake in innovation problems, 89 respondents indicated that they view research and innovation efforts at EU level to address the slow deployment and limited market uptake of innovative solutions as very relevant (59.73%). The problem that was viewed as most relevant to be addressed at EU level, was the need to bring together rail research community, supply industry and operators/infrastructure managers, to ensure aligned development and development of innovation.

No statistical differences were found between the views of citizens and other respondents for most problems. Citizens, however, found the research and innovations problem related to the need to strengthen the role of rail in the transport system more relevant and the structural and resource problem related to the fragmentation along the innovation life cycle less.

## Horizon Europe mode of intervention to address problems

**Figure 6: Assessment of Horizon Europe intervention**



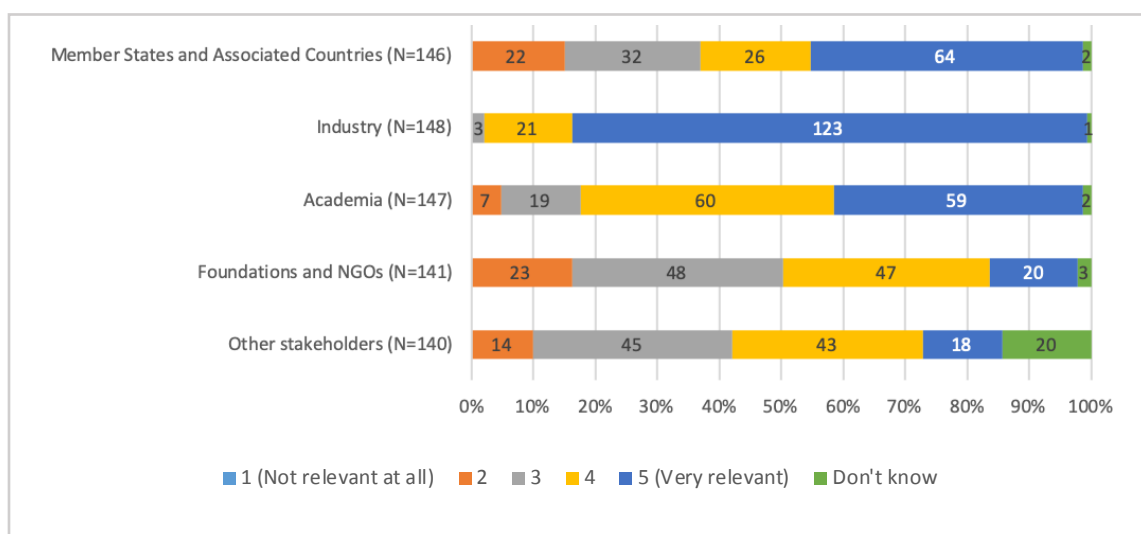
Just over 65% of respondents indicated that institutionalised partnerships were the best fitting intervention to address rail challenges and transform the European rail system. People who stated that an institutionalised partnership was the best fitting answer, mentioned the entire product development cycle, long term commitment and market uptake. Respondents who did not select institutionalised partnership as their preferred intervention (N=43) mentioned traditional calls, rail innovation, public and private rail sector and bound funding.

In their open responses, stakeholders gave a number of reasons for supporting an institutionalised partnership as the most effective way of addressing the challenges posed by R&I in the rail sector:

- A number of respondents, including companies, business associations and public authorities, noted that, based on recent experience, only an institutionalised partnership could ensure the level of coordination needed to enable collaboration across a wide range of partner organisations, and that such a partnership would provide the governance and funding framework required to secure their participation.
- EU citizens highlighted the potential for an institutionalised partnership to support the decarbonisation agenda through engagement with national governments and with other EU initiatives focused on exploitation of clean forms of energy.
- However, there was some support for co-financing from at least one academic institution because it would encourage R&I activities focused on the interests of rail users.

## Relevance of a set of elements and activities to ensure that the proposed European Partnership would meet its objectives

*Figure 7: Views of respondents on relevance of actors in setting a joint long-term agenda*

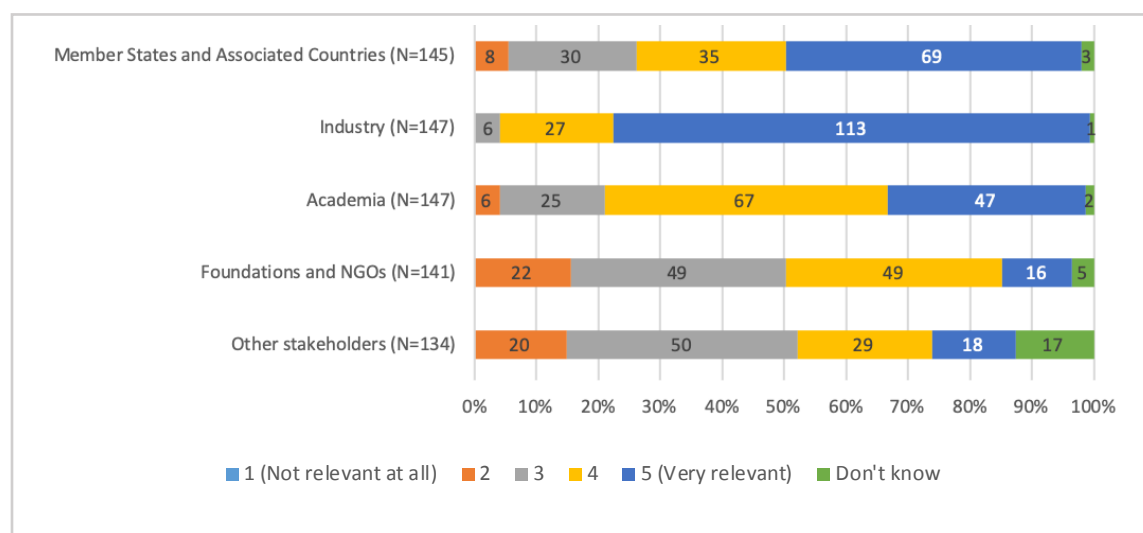


The highest amount of respondents indicated that the involvement of industry is very relevant (123 respondents or 83.11%).

Citizens, as compared to other respondents, found government (Member States and Associated Countries) and foundations and NGOs slightly more relevant. Respondents that are/were involved in a current/preceding partnership (Horizon 2020 or Framework Programme 7) found industry more relevant.

### Relevance of elements and activities in pooling and leveraging resources

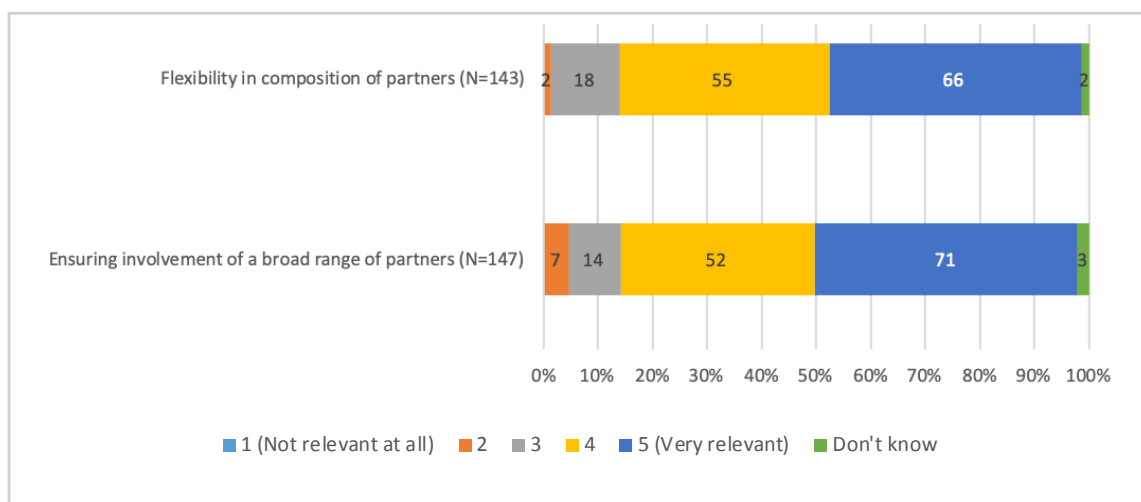
**Figure 8: Views of respondents on relevance of actors for pooling and leveraging resources**



With respect to the relevance of actors in pooling and leveraging resources (such as financial, infrastructure, in-kind expertise etc.), to meet Partnership objectives, 113 respondents (76.87%) indicated that industry was very relevant, which is much larger than for any of the other stakeholders. No respondents indicated that any of the categories was not relevant at all. Citizens, as compared to other respondents, found foundations and NGOs slightly more relevant.

### Relevance of elements and activities for the partnership composition

**Figure 9: Views of respondents on relevance of partnership composition elements**

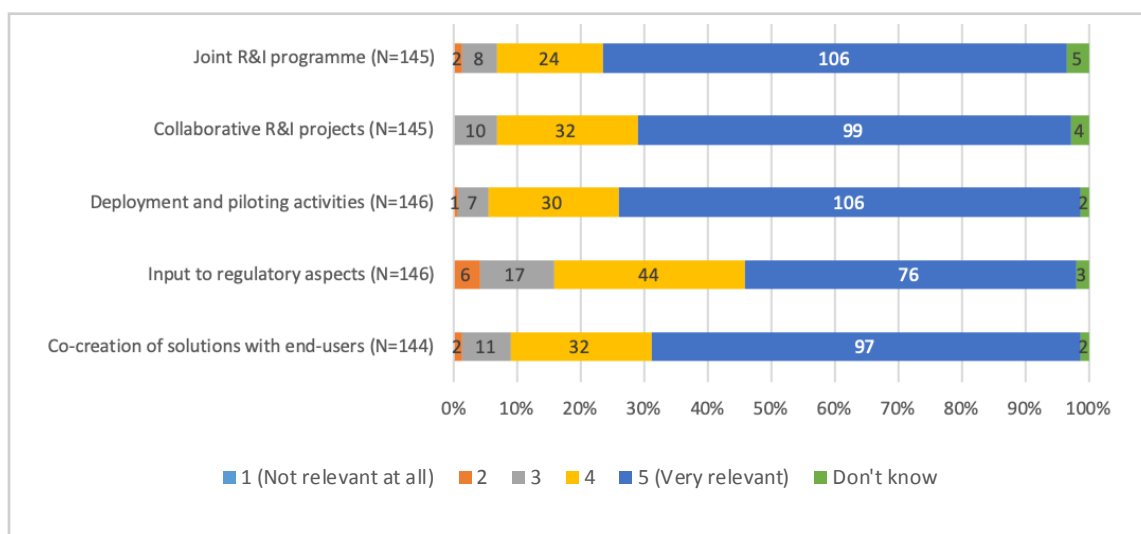


Ensuring involvement of a broad range of partners has slightly more ‘very relevant’ answers (71, 48.30%) than the flexibility in the composition of partners (66, 46.15%). Interestingly 84.62% of respondents have given flexibility either a score of 4 or 5 (very relevant) which is slightly higher than the 83.67% who have given the broad range of partners a score of 4 or 5 (very relevant).

No statistical differences were found between the views of citizens and other respondents.

### Relevance of implementation of activities

**Figure 10: Views of respondents on relevance of implementation of the following activities**

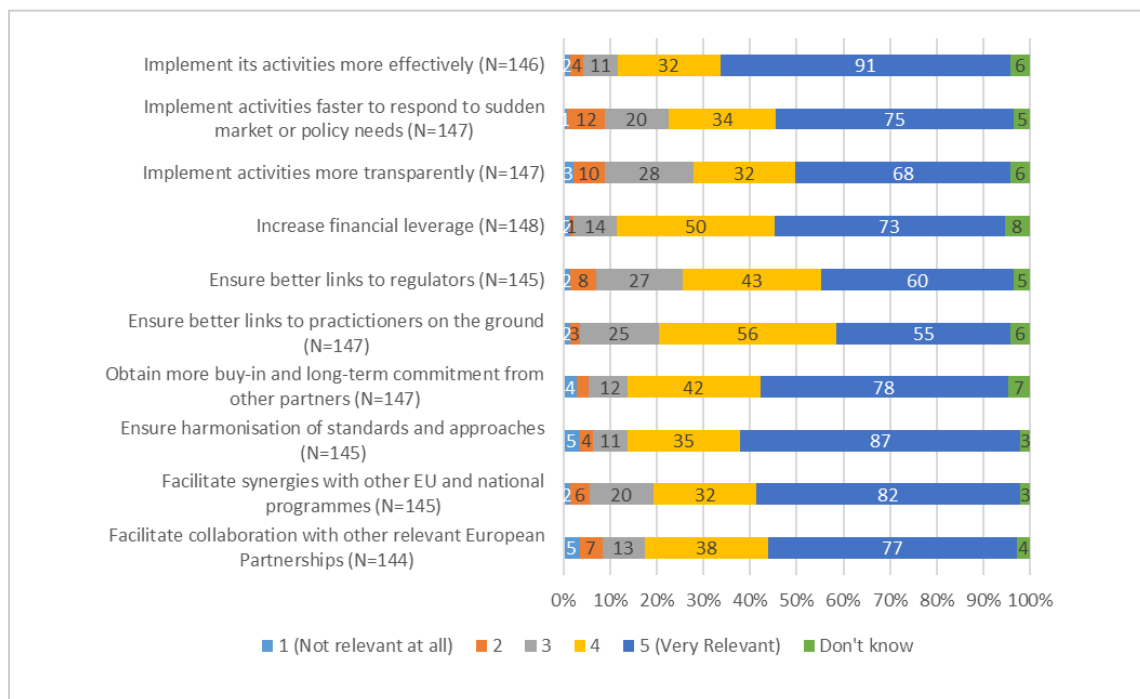


Out of 145 respondents, 106 (73.10%) indicated that deployment and piloting activities and a Joint R&I programme are very relevant to ensure that the Partnership would meet its objectives. For all the other options, the majority (over 50%) of all respondents have indicated that these are very relevant.

No statistical differences were found between the views of citizens and other respondents.

## Relevance of setting up a legal structure (funding body) for the candidate European Partnerships to achieve improvements

**Figure 11: Views of respondents on relevance of a specific legal structure**

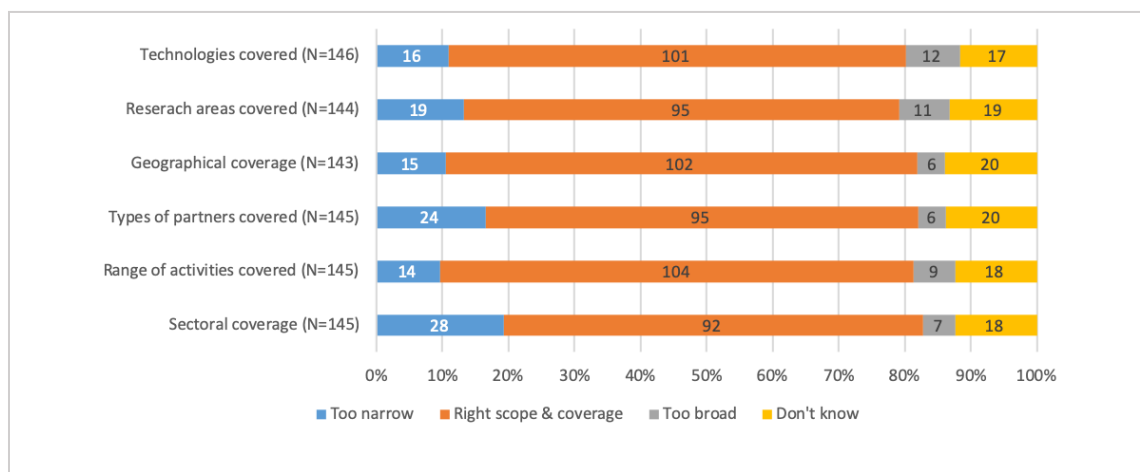


Respondents indicated that it was very relevant to set up a specific legal structure for the partnership to achieve a more effective implementation of activities (91, 62.33%) and to ensure harmonisation of standards and approaches (87, 60.00%).

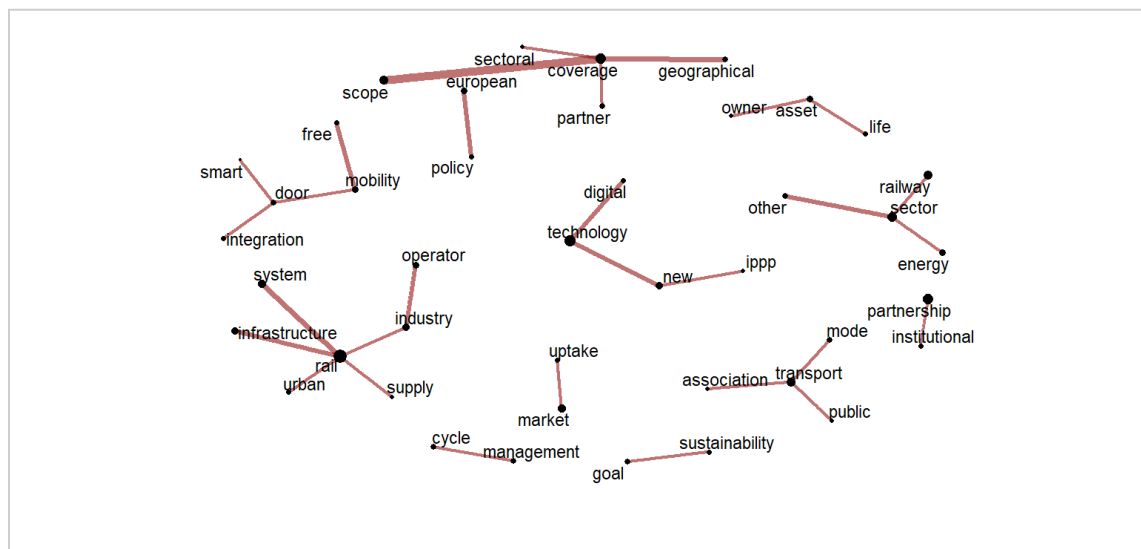
Respondents involved in a current or preceding partnership found a legal structure more relevant than other respondents when it concerned a faster to response to sudden market or policy needs as well as synergies with other programmes and collaboration with other partnerships.

## Scope and coverage of the candidate European Partnerships based on their inception impact assessments

**Figure 12: Views of respondents on the scope and coverage proposed for the Transforming Europe's Rail System Partnership**



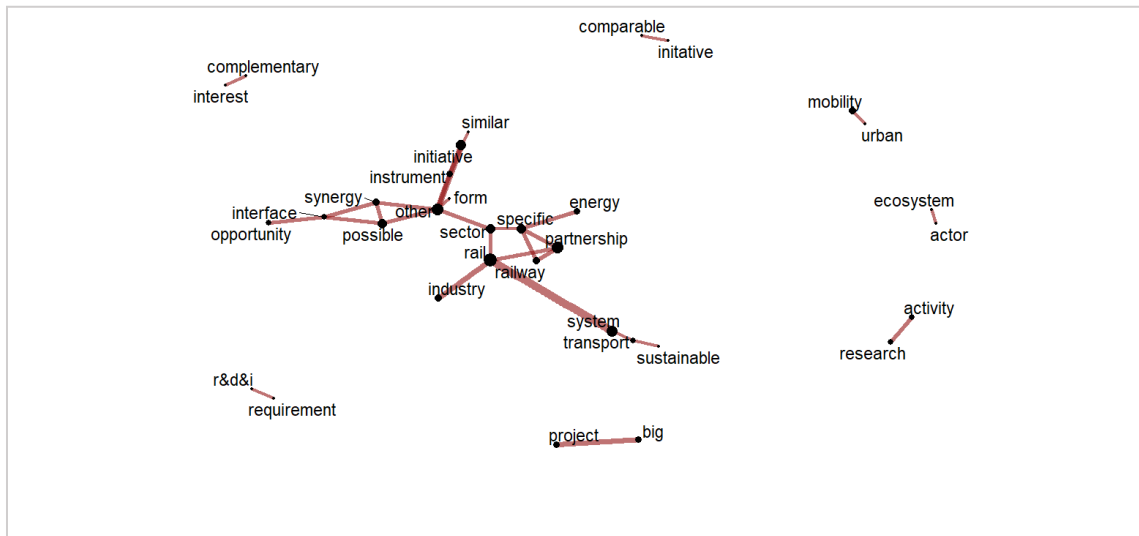
The clear majority of the respondents have indicated that the partnership has the right scope and coverage across all areas. The respondents who have indicated that the scope and coverage are not right, have indicated that it was too narrow more often than they viewed it as too broad.



95 respondents (68.84%) indicated that it would be possible to rationalise the candidate European Institutionalised Partnership and its activities, and/or to better link it with other comparable initiatives. Respondents mentioned links with energy mobility and the future of energy as well as digital industry and comparable partnerships and joint undertakings in transport.

EU citizens as well as other organisations similarly supported greater coordination of the activities of different initiatives while stopping short of endorsing substantial rationalisation of institutions.

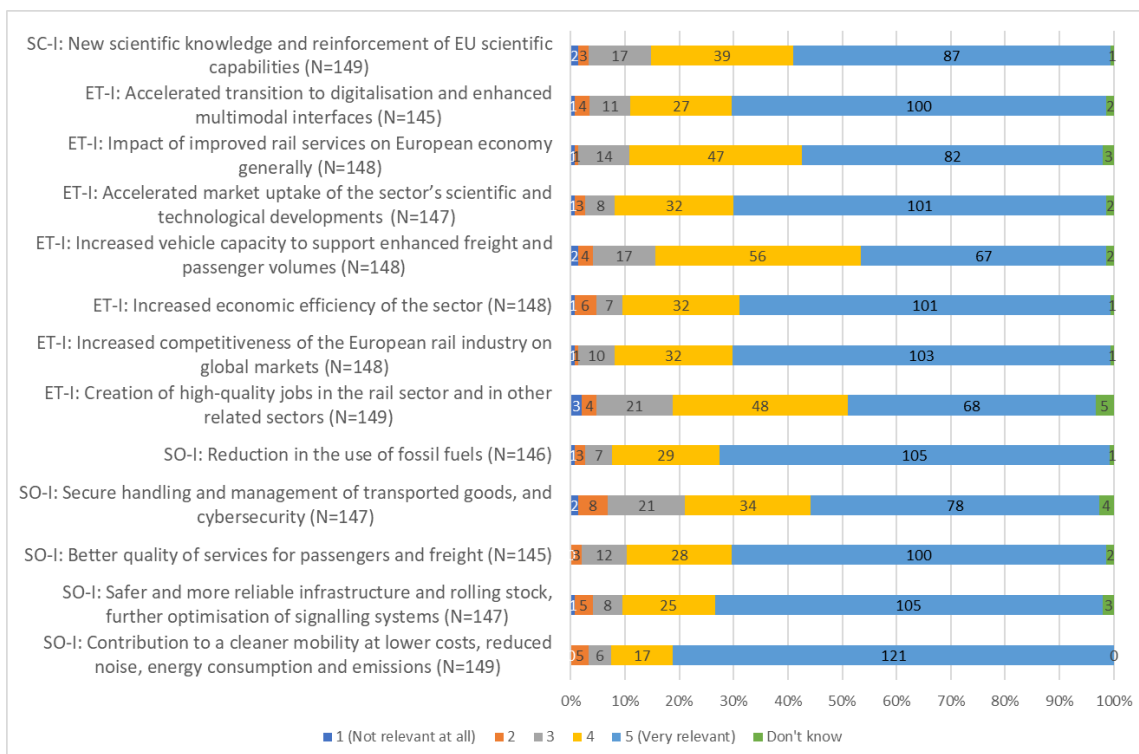
**Figure 14: Assessment of open answers on the question why other comparable initiatives are not suitable to be linked, 30 most common co-occurring keywords (N=21)**



Some respondents argued that both a rationalisation of partnerships and more links with other initiatives would be counter-productive. However, even among respondents expressing doubts about the potential for synergy and links with other initiatives, most indicated that some interaction with partnerships focused on carbon reduction as well as with initiatives concerned with transport would be beneficial.

## Relevance of European Partnerships to deliver targeted scientific, economic/technological and societal impacts

**Figure 15: Views of respondents on the relevance of the candidate European Institutionalised Partnership to various impacts**





Among presented societal impact categories, a higher number of respondents, namely 121 out of 149 (81.21%), indicated that the Partnership would be ‘very relevant’ for contributing to a cleaner mobility at lower costs, reduced noise, energy consumption and emissions. Among economic/technological impacts, several categories were considered as ‘very relevant’ by around 70% of respondents. In contrast, the lowest number of respondents (namely, 67 and 68 respectively) suggest that the candidate Partnership would have a significant impact on increase of vehicle capacity to support enhanced freight and passenger volume, and on creation of high-quality jobs in the rail sector and in other related sectors. The only listed scientific impact category (“new scientific knowledge and reinforcement of EU scientific capabilities”) received the highest score (5 ‘very relevant’) by 87 out of 149 respondents (58.39%).

No statistical differences were found between the views of citizens and other respondents.

## Summary of campaign results

**Table 2: Overview of responses of campaign participants (N=29)**

Question category	Summary of responses
Research and innovation problems	All answer categories are considered either ‘very relevant’ or ‘relevant’. Among categories, the lowest score was given to “lack of alignment between basic research in rail sector and market needs”.
Structural and resource problems	Most categories are considered either ‘very relevant’ or ‘relevant’ by consultation respondents. The lowest score (on average, 3) is given to the following categories: “deep coordination and alignment of public and private R&I funding” and “uncoordinated programming approach and poor alignment with EU policy goals”.
Problems in uptake of digital innovations	The categories “slow deployment and limited market uptake of innovative solutions” received a high score (either 4 or 5). The other category (“regulatory framework that is not conducive to innovation) received mixed scores – ranging from 2 to 5.
Preferred Horizon Europe intervention	Institutionalised Partnership was selected by all respondents.  When respondents were asked to explain their choice, all of them used different versions of the following quote: “Partnership supports bringing together supply Industry, operators, infrastructure managers and research centers and foster long-term commitments of all actors to ensure aligned specifications, development and deployment of innovations. Institutionalised Partnership covers product development cycles, prevents fragmentation among rail ecosystems and accelerates innovations”.
Relevance of actors for setting joint long-term agenda	Most answer categories received an average score (namely, 3) on the scale of 1 to 5. However, industry is considered ‘very relevant’ by the majority of respondents.
Relevance of actors for pooling and leveraging resources	Most answer categories received an average score (namely, 3) on the scale of 1 to 5. However, industry is considered ‘very relevant’ by the majority of respondents.
Partnership composition	Respondents consider the listed elements of partnership composition to be ‘relevant’ (score 4).
Implementation of activities	Almost all respondents rated all listed activities ‘very relevant’.

Question category	Summary of responses
Relevance of the legal structure	Across all categories, respondents indicated that the legal structure would be relevant. Almost all respondents consider that the legal structure would be 'very relevant' to implement activities of the Partnership more effectively, to implement activities faster to respond to sudden market or policy needs, to facilitate synergies with other EU and national programmes, to facilitate collaboration with other relevant European Partnerships, and to obtain more buy-in and long-term commitment from other partners.
Scope and coverage of the candidate Partnership	<p>All respondents considered that listed components of the candidate Partnership have right scope and coverage, with the exception of sectoral coverage. In that answer category, almost a third of respondents indicated that the scope and coverage are too narrow.</p> <p>Respondents were offered an opportunity to provide comments on the proposed scope and coverage of the Institutionalised Partnership. All of them included the following quote: <i>"Programme of the rail iPPP shall be aligned with the vision of the rail sector presented: ERRAC 2050 and ERRAC 2030 R&amp;I priorities. Key research areas: Assets for Automatic and Autonomous Operations, Rail Digitalisation, Maintenance of the future (including required equipment), Smart Integration for Door to Door Mobility, Multi-Modality, Environmental Sustainability and Carbon Free Mobility, Rail Freight, Network &amp; Asset Management. Deployment shall also be included to speed up market uptake"</i>.</p>
Rationalisation of the candidate Partnership and linking to other initiatives	<p>The majority of respondents (18, or 64.29%) consider that it would be possible to rationalise the candidate Partnership and its activities, and/or to better link it with other comparable initiatives.</p> <p>Respondents were asked to explain their answer. Regardless of their answer choice, all of them inserted a following quote: <i>"We do not consider possible nor sensible to rationalise further the proposed candidates for Institutionalised Partnerships. The competitiveness and industrial leadership of Europe would be, otherwise, hampered. However, we support ensuring better coordination between the different proposed initiatives. In particular, in the case of rail, coordination with the other initiatives falling within Clusters "Climate, Energy, Mobility" and "Digital, Industry and Space" would be important"</i>.</p>
Societal impact	Majority of respondents considered that the candidate Partnership would be 'very relevant' to deliver on the listed societal impact.
Economic/technological impact	Most respondents consider that the candidate Partnership would be "very relevant for the following impacts: "increased competitiveness of the European rail industry on global markets", "increased economic efficiency of the sector", "accelerated market uptake of the sector's scientific and technological developments" and "accelerated transition to digitalisation and enhanced multimodal interfaces". Other categories, on average, received a score of 4.
Scientific impact	Most respondents consider that the candidate Partnership is 'very relevant' and 'relevant' for delivering on listed scientific impacts.

## Annex 3

## Who Is Affected And How?

### 1. PRACTICAL IMPLICATIONS OF THE INITIATIVE

The proposed Transforming Europe's Rail System Partnership will focus on a limited number of priorities designed to address emerging challenges of the rail sector, such as automation, digitalisation, decarbonisation and the need to increase the attractiveness of rail freight and its integration into digital multimodal mobility and logistics chains. It will also satisfy Horizon Europe's more demanding societal, economic and technological impact criteria and address the European Union's Green Deal objectives aimed at achieving climate neutrality by 2050. The following stakeholder groups are affected by the proposed initiative, as explained below:

- The private sector, in particular rail suppliers (including SMEs), operators and infrastructure managers, will contribute to the definition of the Programme, making significant commitments for its implementation. The private sector will benefit from a well-defined legal and financial framework, with partners contributing resources in accordance with legally binding requirements relating to the proportion of EU and partner funds, set out in a Council Regulation;
- European universities and research-based organisations will play a pivotal role to increase the scientific knowledge base and contribute to accelerate the development of rail innovations through collaboration with private enterprises;
- Civil society will benefit from the positive impact of rail innovation for passenger and freight transport as well as from the contribution of rail to tackle climate change. The proposed Transforming Europe's Rail System Partnership will enable rail to support the realisation of a people-centred economy in which EU citizens have access to an increasing range of employment, education and leisure opportunities through efficient, attractive and affordable public transport services;
- The support of Member States will be instrumental for the implementation of the programme and the achievement of its objectives (e.g. Green Deal targets). The proposed Transforming Europe's Rail System Partnership will provide a relevant scientific and technology evidence base as well as innovative solutions to make rail a significant part of the solution for the climate challenge and support Member States' efforts to decarbonise transport.

### 2. SUMMARY OF COSTS AND BENEFITS

<i>I. Overview of Benefits (total for all provisions) – Preferred Option</i>		
<i>Description</i>	<i>Amount</i>	<i>Comments</i>
<i>Direct benefits</i>		
Sustainable cost efficient mobility	Increased attractiveness, accessibility and services for rail passenger and freight through new concepts of operations enabled and system	The increase of the efficiency and reduction of costs will make travelling by rail more accessible to everyone and hence increase its

	integrated approach by breakthrough innovation	social inclusiveness.
More competitive rail industry	The transfer of innovative solutions to the market will boost the competitiveness of European suppliers involved in the partnership. The European rail industry will maintain its market leadership at global level by 2050	Development of solutions with broad support across EU—up to 75% market uptake by 2030
Rail system transformation	Integrated approach enabling the delivery of EU policy objectives and the technical integration of rail innovations in the overall mobility digital eco-system for all modes of transport.	The Partnership will be part of a whole-system approach to investment, cutting across the various interfaces, which recognises the long-lived nature of railway assets.
<b>Indirect benefits</b>		
Transport decarbonisation	Modal shift from more carbon intensive modes to rail will make a significant contribution to transport decarbonisation. In addition, the programme will help further reducing rail's carbon footprint.	Contribution to European Green Deal objectives (e.g. shift substantial part of the 75% of inland freight carried today by road to rail and inland waterways).
Increased quality of life	Increasing rail attractiveness would result in integrated journeys with rail at the core of mobility and transport (high speed, regional and urban, freight) through a climate neutral concept of operations and based on a circular economy system.	This includes the positive impact of reduced emissions (e.g. expected CO2 reduction between 2.5 and 4 million tonnes in 2031).

(1) Estimates are relative to the baseline for the preferred option as a whole (i.e. the impact of individual actions/obligations of the preferred option are aggregated together); (2) Please indicate which stakeholder group is the main recipient of the benefit in the comment section;(3) For reductions in regulatory costs, please describe details as to how the saving arises (e.g. reductions in compliance costs, administrative costs, regulatory charges, enforcement costs, etc.; see section 6 of the attached guidance).

<b>II. Overview of costs – Preferred option</b>							
		Citizens/Consumers		Businesses		Administrations	
		One-off	Recurrent	One-off	Recurrent	One-off	Recurrent
<b>Management/ Administrative costs</b>	Direct costs						Yearly running costs other than Personnel: EUR 1.2 million (baseline 2019 AAR – Title 2) – 50% EC

	Indirect costs						
<b>Personnel costs</b>	Direct costs						Yearly running costs for Personnel: EUR 2.3 million (baseline 2019 AAR – Title 1 – 24 FTE [5 TA + 16 CA + 3 SNEs]) – 50% EC
	Indirect costs						

(1) Estimates to be provided with respect to the baseline; (2) costs are provided for each identifiable action/obligation of the preferred option otherwise for all retained options when no preferred option is specified; (3) If relevant and available, please present information on costs according to the standard typology of costs (compliance costs, regulatory charges, hassle costs, administrative costs, enforcement costs, indirect costs; see section 6 of the attached guidance).

### REFIT Cost savings table

Not applicable for the proposed Transforming Europe's Rail System Partnership. The initiative will benefit from the existing organisation/structure (e.g. the Programme Office) already in place for the S2R 2 JU. There are no additional regulatory costs associated, and no specific simplification measures apply in this case.

## Annex 4                      Analytical Methods

The methodology for each impact assessment is based on the Commission Better Regulation Guidelines<sup>7</sup> to evaluate and compare options with regards to their **efficiency, effectiveness and coherence**. This is complemented by integrating the **conditions and selection criteria for European Partnerships**, as well as requirements for setting up Institutionalised Partnerships.<sup>8</sup>

### 1. OVERVIEW OF THE METHODOLOGIES EMPLOYED

In terms of **methods and evidence used**, the set of impact assessments for all candidate Institutionalised European Partnerships draw on an external study covering all initiatives in parallel to ensure a high level of coherence and comparability of analysis<sup>9</sup> (Technopolis Group, 2020).

All impact assessment mobilised a mix of qualitative and quantitative data collection and analysis methods. These methods range from desk research and interviews to the analysis of the responses to the Open Consultation, stakeholder analysis and composition/portfolio analysis, bibliometrics/patent analysis and social network analysis, and a cost-effectiveness analysis.

The first step in the impact assessment studies consisted in the definition of the context and the problems that the candidate partnerships are expected to solve in the medium term or long run. The main data source in this respect was desk research. This includes grey and academic literature to identify the main challenges in the scientific and technologic fields and in the economic sectors relevant for the candidate partnerships, as well as the review of official documentations on the policy context for each initiative.

In the assessment of the problems to address, the lessons to be learned from past and ongoing partnerships were taken into account, especially from relevant midterm or ex-post evaluations.

The description of the context of the candidate institutionalised European Partnerships required a good understanding of the corresponding research and innovation systems and their outputs already measured. Data on past and ongoing Horizon 2020 projects, including the ones implemented through Partnerships, served as basis for descriptive statistic of the numbers of projects and their respective levels of funding, the type of organisations participating (e.g. universities, RTOs, large enterprises, SMEs, public administrations, NGOs, etc.) and how the funding was distributed across them. Special attention was given to analysing the participating countries (and groups of countries, such as EU, Associated Countries, EU13 or EU15) and industrial sectors, where relevant. The sectoral analysis required enriching the eCORDA data received from the European Commission services with

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<sup>7</sup> European Commission (2017), Better Regulation Guidelines (SWD (2017) 350)

<sup>8</sup> A pivotal element of the present analysis is the so-called two-step 'necessity test' for European Partnerships, used to establish: step 1) the need for a partnership approach in the first place, followed by step 2) a justification for the form of Institutionalised Partnership. The necessity test is described in Annex 6. This impact assessment focuses on the second step of the test.

<sup>9</sup> Technopolis Group (2020), Impact Assessment Study for Institutionalised European Partnerships under Horizon Europe

sector information extracted from ORBIS, using the NACE codification up to level 2. These data enabled the identification of the main and, where possible, emerging actors in the relevant systems, i.e. the organisations, countries and sectors that would need to be involved (further) in a new initiative.

A Social Network Analysis was performed by the contractors using the same data. It consisted in mapping the collaboration between the participants in the projects funded under the ongoing R&I partnerships. This analysis revealed which actors – broken down per type of stakeholders or per industrial sector – collaborate the most often together, and those that are therefore the most central to the relevant research and innovation systems.

The data provided finally served a bibliometric analysis run by the contractor aimed at measuring the outputs (patents and scientific publications) of the currently EU-funded research and innovation projects. A complementary analysis of the Scopus data enabled to determine the position and excellence of the European Union on the international scene, and identify who its main competitors are, and whether the European research and innovation is leading, following or lagging behind.

A cost modelling exercise was performed in order to feed into the efficiency assessments of the partnership options.

The conclusions drawn from the data analysis were confronted to the views of experts and stakeholders collected via three means:

- The comments to the inception impact assessments of the individual candidate institutionalised European Partnerships;
- The open public consultation organised by the European Commission from September to November 2019;
- The interviews (up to 50) conducted by each impact assessment study team conducted between August 2019 and January 2020 (policymakers, business including SMEs and business associations, research institutes and universities, and civil organisations, among others).

The views of stakeholders (and experts) were particularly important for determining the basic functionalities (see further below) that the future partnerships need to demonstrate to achieve their objectives as well as their most anticipated scientific, economic and technological, and societal impacts. The interviews allowed more flexibility to ask the respondents to reflect about the different types of European Partnerships. Furthermore, as a method for targeted consultation, it was used to get insights from the actors that both the Study Teams and the European Commission were deemed the most relevant. For the comparative assessment of impacts, the external contractors confronted the outcomes of the different stakeholder consultation exercises to each other with a view of increasing the validity of their conclusions, in line with the principles of triangulation.

Annex 2 includes also the main outcomes of the stakeholder consultation exercises.

## 2. METHOD FOR ASSESSING THE EFFECTIVENESS, EFFICIENCY AND COHERENCE OF EACH OPTION - THE USE OF FUNCTIONALITIES

Given the focus of the impact assessment on comparing different forms of implementation, the Better Regulation framework has been adapted to introduce “key functionalities needed” – so as to link the intended objectives of the candidate European Partnerships and what would be crucial to achieve them in terms of implementation. The identification of “key functionalities needed” for each initiative as an additional step in the impact assessment is based on the distinguishing factors between the different options (see Section 2.2.1 in the main body of the impact assessment). In practical terms, each option is assessed on the basis of the degree to which it would allow for the key needed functionalities to be covered, as regards e.g. the type and composition of actors that can be involved (‘openness’), the range of activities that can be performed (including additionality and level of integration), the level of directionality and integration of R&I strategies; the possibilities offered for coherence and synergies with other components of Horizon Europe, including other Partnerships (internal coherence), and the coherence with the wider policy environments, including with the relevant regulatory and standardisation framework (external coherence). This approach guides the identification of discarded options. It also allows for a structured comparison of the options as regards their effectiveness, efficiency and coherence, and also against a set of other key selection criteria for European Partnerships (openness, transparency, directionality).

*Figure 3 Overview of key functionalities of each form of implementation of European Partnerships*

Baseline: Horizon Europe calls	Option 1: Co-programmed	Option 2: Co-funded	Option 3.1: Institutionalised Article 185	Option 3.2: Institutionalised Article 187
<b>Type and composition of actors (including openness and roles)</b>				
<u>Partners:</u> N.A., no common set of actors that engage in planning and implementation <u>Priority setting:</u> open to all, part of Horizon Europe Strategic planning <u>Participation in R&amp;I activities:</u> fully open in line with standard Horizon Europe rules	<u>Partners:</u> Suitable for all types: private and/or public partners, foundations <u>Priority setting:</u> Driven by partners, open stakeholder consultation, MS in comitology <u>Participation in R&amp;I activities:</u> fully open in line with standard Horizon Europe rules	<u>Partners:</u> core of national funding bodies or governmental research organisations <u>Priority setting:</u> Driven by partners, open stakeholder consultation <u>Participation in R&amp;I activities:</u> limited, according to national rules of partner countries	<u>Partners:</u> National funding bodies or governmental research organisation <u>Priority setting:</u> Driven by partners, open stakeholder consultation <u>Participation in R&amp;I activities:</u> fully open in line with standard Horizon Europe rules, but possible derogations	<u>Partners:</u> Suitable for all types: private and/or public partners, foundations <u>Priority setting:</u> Driven by partners, open stakeholder consultation <u>Participation in R&amp;I activities:</u> fully open in line with standard Horizon Europe rules, but possible derogations
<b>Type and range of activities (including additionality and level of integration)</b>				
<u>Activities:</u> Horizon Europe standards that allow broad range of individual actions <u>Additionality:</u> no additional activities and investments outside the funded	<u>Activities:</u> Horizon Europe standard actions that allow broad range of individual actions, support to market, regulatory or policy/ societal uptake <u>Additionality:</u>	<u>Activities:</u> Broad, according to rules/programmes of participating States, State-aid rules, support to regulatory or policy/ societal uptake	<u>Activities:</u> Horizon Europe standards that allow broad range of individual actions, support to regulatory or policy/societal uptake, possibility to systemic approach	<u>Activities:</u> Horizon Europe standards that allow broad range of individual actions, support to regulatory or policy/societal uptake, possibility to systemic approach



Baseline: Horizon Europe calls	Option 1: Co-programmed	Option 2: Co-funded	Option 3.1: Institutionalised Article 185	Option 3.2: Institutionalised Article 187
projects <u>Limitations:</u> No systemic approach beyond individual actions	Activities/investments of partners, National funding <u>Limitations:</u> Limited systemic approach beyond individual actions.	<u>Additionality:</u> National funding <u>Limitations:</u> Scale and scope depend on the participating programmes, often smaller in scale	<u>Additionality:</u> National funding	(portfolios of projects, scaling up of results, synergies with other funds. <u>Additionality:</u> Activities/investments of partners/ national funding
<b>Directionality</b>				
<u>Priority setting:</u> Strategic Plan and annual work programmes, covering max. 4 years. <u>Limitations:</u> Fully taking into account existing or to be developed SRIA/ roadmap	<u>Priority setting:</u> Strategic R&I agenda/ roadmap agreed between partners and COM, covering usually 7 years, including allocation of Union contribution Input to FP annual work programme drafted by partners, finalised by COM (comitology) Objectives and commitments are set in the contractual arrangement.	<u>Priority setting:</u> Strategic R&I agenda/ roadmap agreed between partners and COM, covering usually 7 years, including allocation of Union contribution Annual work programme drafted by partners, approved by COM Objectives and commitments are set in the Grant Agreement.	<u>Priority setting:</u> Strategic R&I agenda/ roadmap agreed between partners and COM, covering usually 7 years, including allocation of Union contribution Annual work programme drafted by partners, approved by COM Objectives and commitments are set in the legal base.	<u>Priority setting:</u> Strategic R&I agenda/ roadmap agreed between partners and COM, covering usually 7 years, including allocation of Union contribution Annual work programme drafted by partners, approved by COM (veto-right in governance) Objectives and commitments are set in the legal base.
<b>Coherence: internal (Horizon Europe) and external (other Union programmes, national programmes, industrial strategies)</b>				
<u>Internal:</u> Between different parts of the Annual Work programme can be ensured by COM <u>External:</u> Limited for other Union programmes, no synergies with national/regional programmes and activities	<u>Internal:</u> Coherence among partnerships and with different parts of the Annual Work programme of the FP can be ensured by partners and COM <u>External:</u> Limited synergies with other Union programmes and industrial strategies If MS participate, with national/ regional programmes and activities	<u>Internal:</u> Coherence among partnerships and with different parts of the Annual Work programme of the FP can be ensured by partners and COM <u>External:</u> Synergies with national/ regional programmes and activities	<u>Internal:</u> Coherence among partnerships and with different parts of the Annual Work programme of the FP can be ensured by partners and COM <u>External:</u> Synergies with national/ regional programmes and activities	<u>Internal:</u> Coherence among partnerships and with different parts of the Annual Work programme of the FP can be ensured by partners and COM <u>External:</u> Synergies with other Union programmes and industrial strategies If MS participate, with national/ regional programmes and activities

In line with the Better Regulation Framework, the assessment of the effectiveness, efficiency and coherence of each option is made in comparison to the baseline. Therefore, for each of the above criteria, the performance of using traditional calls under Horizon Europe is first estimated and scored 0 to serve as a reference point. When relevant, this estimation also includes the costs/benefits of discontinuing existing implementation structures. The policy options are then scored compared to the baseline with a + and – system along a two-point

scale, to indicate limited (+ or -) or high (++ or --) additional/lower performance compared to the baseline. When a policy option is scored 0, this means that its impact is expected to be roughly equal to the baseline option.

On the basis of the evidence collected, the intervention logic of each initiative and the key functionalities needed, the impact assessments first evaluate the **effectiveness** of the various policy options to deliver on their objectives. To be in line with the Horizon Europe impact framework, the fulfilment of the specific objectives of the initiative is translated into ‘expected impacts’ - how success would look like -, differentiating between scientific, economic/ technological, and societal (including environmental) impacts. Each impact assessment considers to which extent the different policy options provides the ‘key functionalities needed’ to achieve the intended objectives. The effectiveness assessment does not use a compound score but shows how the options would deliver on the different types of expected impacts. This is done to increase transparency and accuracy in the assessment of options<sup>10</sup>.

A similar approach is followed to evaluate the coherence of options with the overarching objectives of the EU’s R&I policy, and distinguishes between **internal** and **external coherence**. Specifically, internal coherence covers the consistency of the activities that could be implemented with the rest of Horizon Europe, including European Partnerships (any type). External coherence refers to the potential for synergies and/or complementarities (including risks of overlaps/gaps) of the initiative with its external environment, including with other programmes under the MFF 2021-27, but also the framework conditions at European, national or regional level (incl. regulatory aspects, standardisation).

To compare the expected costs and benefits of each option (**efficiency**), the thematic impact assessments broadly follow a cost-effectiveness approach<sup>11</sup> to establish to which extent the intended objectives can be achieved for a given cost. A preliminary step in this process is to obtain a measure of the expected costs of the policy options, to be used in the thematic assessments. As the options correspond to different implementation modes, relevant cost categories generally include the costs of setting-up and running an initiative. For instance, set-up costs includes items such as the preparation of a European Partnership proposal and the preparation of an implementation structure. The running costs include the annual work programme preparation costs. Where a Partnership already exists, discontinuation costs and cost-savings are also taken into account<sup>12</sup>. The table below provides an overview of the cost categories used in the impact assessment and a qualitative scoring of their intensity when compared to the baseline option (traditional calls). Providing a monetised value for these average static costs would have been misleading, because of the different features and needs

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<sup>10</sup> In the thematic impact assessments, scores are justified in a detailed manner to avoid arbitrariness and spurious accuracy. A qualitative or even quantitative explanation is provided of why certain scores were given to specific impacts, and why one option scores better or worse than others.

<sup>11</sup> For further details, see Better Regulation Toolbox # 57.

<sup>12</sup> Discontinuation costs will bear winding down and social discontinuation costs and vary depending on e.g. the number of full-time-equivalent (FTEs) staff concerned, the type of contract (staff category and duration) and applicable rules on termination (e.g. contracts under Belgian law or other). If buildings are being rented, the cost of rental termination also apply. As rental contracts are normally tied to the expected duration of the current initiatives, these termination costs are likely to be very limited. In parallel, there would also be financial cost-savings related to the closing of the structure, related to operations, staff and coordination costs in particular. This is developed further in the individual efficiency assessments.

of each candidate initiative.<sup>13</sup> The table shows the overall administrative, operational and coordination costs of the various options. These costs are then put into context in the impact assessments to reflect the expected co-financing rates and the total budget available for each of the policy options, assuming a common Union contribution (cost-efficiency):

- The costs related to the baseline scenario (traditional calls under Horizon Europe) are predominantly the costs of implementing the respective Union contribution via calls and project, managed by the executive agencies (around 4%, efficiency of 96% for the overall investment).
- For a Co-Programmed partnership the costs of preparation and implementation increase only marginally compared to the baseline (<1%),<sup>14</sup> but lead to an additional R&I investment of at least the same amount than the Union contribution<sup>15</sup> (efficiency of 98% for the overall investment).
- For a Co-Funded partnership the additional R&I investment by Member States accounts for 2,3 times the Union contribution<sup>16</sup>. The additional costs compared to the baseline of preparing and implementing the partnership, including the management of the Union contribution implemented by the national programmes, can be estimated at 6% of the Union contribution (efficiency of 98% related to the overall investment).<sup>17</sup>
- For an Article 185 initiative the additional R&I investment by Member States is equal to the Union contribution<sup>18</sup>. The additional costs compared to the baseline of preparing and implementing the partnership, including the management of the Union contribution implemented by the dedicated implementation structure, can be estimated at 7% of the Union contribution (efficiency of 96% related to the overall investment).
- For an Article 187 initiative the additional R&I investment by partners is equal to the Union contribution<sup>19</sup>. The additional costs compared to the baseline of preparing and implementing the partnership, including the management of the Union contribution implemented by the dedicated implementation structure, can be estimated at 9% of the Union contribution (efficiency of 94% related to the overall investment).

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<sup>13</sup> A complete presentation of the methodology developed to assess costs as well as the sources used is described in the external study supporting this impact assessment (Technopolis Group, 2020).

<sup>14</sup> Specifically, some additional set-up costs linked for example to the creation of a strategic research and innovation agenda (SRIA) and additional running costs linked with the partners role in the creation of the annual work programmes and the Commission's additional supervisory responsibilities. A CPP will have lower overall costs than each of the other types of European Partnership, as it will function with a smaller governance and implementation structure than will be required for a Co-Funded Partnership or an Institutionalised Partnership and – related to this – its calls will be operated through the existing HEU agencies and RDI infrastructure and systems.

<sup>15</sup> Minimum contributions from partners equal to the Union contribution.

<sup>16</sup> Based on the default funding rate for programme co-fund actions of 30%, partners contribute with 70% of the total investment.

<sup>17</sup> These costs reflect set-up costs and additional running costs for partners, and the Commission, of the distributed, multi-agency implementation model.

<sup>18</sup> Based on the minimum requirement in the legal basis that partners contribute at least 50% of the budget.

<sup>19</sup> Based on the minimum requirement in the legal basis that partners contribute at least 50% of the budget.

Figure 4 - Intensity of additional costs compared with Horizon Europe Calls (for Partners, stakeholders, public and EU)

Cost items	Baseline: traditional calls	Option 1: Co- programmed	Option 2 Co-funded	Option 3a - Art. 185	Option 3b -Art. 187
Preparation and set-up costs					
Preparation of a partnership proposal (partners and EC)	0	↑↑			
Set-up of a dedicated implementation structure	0			Existing: ↑ New: ↑↑	Existing: ↑↑ New: ↑↑↑
Preparation of the SRIA / roadmap	0	↑↑			
Ex-ante Impact Assessment for partnership	0			↑↑↑	
Preparation of EC proposal and negotiation	0			↑↑↑	
Running costs (Annual cycle of implementation)					
Annual Work Programme preparation	0	↑			
Call and project implementation	0	0 In case of MS contributions: ↑	↑	↑	↑
Cost to applicants	Comparable, unless there are strong arguments of major differences in oversubscription				
Partners costs not covered by the above	0	↑	0	↑	↑
Additional EC costs (e.g. supervision)	0	↑	↑	↑	↑↑
Winding down costs					
EC	0				↑↑↑
Partners	0	↑	0	↑	↑

Notes: 0: no additional costs, as compared with the baseline; ↑: minor additional costs, as compared with the baseline; ↑↑: medium additional costs, as compared with the baseline; ↑↑↑: higher costs, as compared with the baseline.

The cost categories estimated for the common model are then used to develop a scorecard analysis and further refine the assessment of options for each of the 12 candidate Institutionalised Partnerships. Specifically, the scores related to the set-up and implementation costs are used in the thematic impact assessments to consider the scale of the expected benefits and thereby allow a simple “value for money” analysis (**cost-effectiveness**)<sup>20</sup>. In carrying out the scoring of options, the results of fieldwork, desk research and stakeholder consultation undertaken and taken into account.

### 3. METHOD FOR IDENTIFYING THE PREFERRED OPTION – THE SCORECARD ANALYSIS

For the **identification of the preferred option**, a scorecard analysis is used to build a hierarchy of the options by individual criterion and overall in order to identify a single preferred policy option or in case of an inconclusive comparison of options, a number of ‘retained’ options or hybrid. This exercise supports the systematic appraisal of alternative options across multiple types of monetary, non-monetary and qualitative dimensions. It also allows for easy visualisation of the pros and cons of each option. Each option is attributed a score of the adjudged performance against each criterion with the three broad appraisal dimensions of effectiveness, efficiency and coherence.

This scorecard approach also relies on a standard cost model developed for the external study supporting the impact assessment, as illustrated in **Error! Reference source not found..** These costs essentially refer to the administrative, operational and coordination costs of the

<sup>20</sup> More details on the methodology can be found in Annex 4.

various options. The figure shows how the scoring of costs range from a value of 0, in case an option does not entail any additional costs compared to the baseline (traditional calls), to a score of (-) for options introducing limited additional costs relative to the baseline and a score of (- -) when substantial additional costs are expected in comparison with the baseline. Should the costs of a policy option be lower than those of the baseline, (+) and (+ +) are used.

**Figure 5: Matrix on ‘overall costs’ and ‘adjusted cost scoring’**

	Baseline: Horizon Europe calls	Option 1: Co-programmed	Option 2: Co-funded	Option 3: Institutionalised
Administrative, operational and coordination costs	0	(-)	(- -)	(- -)
Administrative, operational and coordination costs adjusted per expected co-funding (i.e. cost-efficiency)	0	0	(-)	(-)

Notes: Score 0 = same costs as for the baseline; score (-) = limited additional costs compared to baseline; score (- -) = substantial additional costs compared to baseline.

The **baseline (regular calls)** has the lowest administrative, operational and coordination costs. This is based on two facts: firstly, that Horizon Europe traditional calls will not entail any additional one-off costs to be set up or discontinued at the end, where each of the other policy options will require at least some additional set-up and phasing out costs; and secondly, that Horizon Europe will not require any additional running costs, where each of the other policy options will involve additional efforts by the Commission and partners in the carrying out of necessary additional tasks (e.g. preparing annual work programmes).

A **co-programmed partnership** (Option 1 - CPP) will entail slightly higher overall costs as compared with the baseline. There will be some additional set-up costs linked for example with the creation of a strategic research and innovation agenda (SRIA) and additional running costs linked with the partners role in the creation of the annual work programmes and the Commission’s additional supervisory responsibilities. A CPP will have lower overall costs than each of the other types of European Partnership, as it will function with a smaller governance and implementation structure than will be required for a Co-Funded Partnership or an Institutionalised Partnership and – related to this – its calls will be operated through the existing HEU agencies and RDI infrastructure and systems.

The **Co-Funded Partnership** (Option 2 – CFP) has been **scored (- -)** on overall cost. This reflects the additional set-up costs of this policy option and the substantial additional running costs for partners, and the Commission, of the distributed, multi-agency implementation model.

The **Institutionalised Partnership** (Option 3 - IP) has been **scored (- -)** on overall cost. This reflects the substantial additional set-up costs of this policy option – and in particular the high costs associated with preparing the Commission proposal and negotiating that through to a legal document – and the substantial additional running costs for the Commission associated with the supervision of this dedicated implementation model.

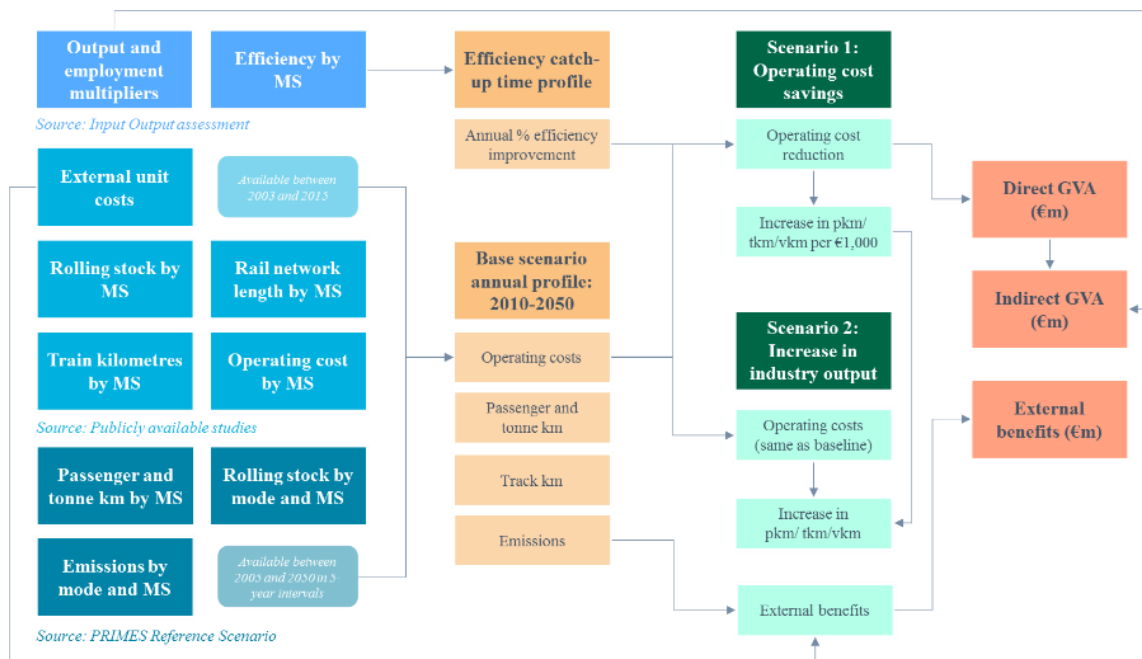
It is considered that while there is a clear gradation in the overall costs of the policy options, the cost differentials are less marked when one takes into account the expected co-financing rates and the total budget available for each of the policy options, assuming a common Union contribution. From this perspective, there are only one or two percentage points that split the most cost-efficient policy options – the baseline (traditional calls) and the Co-Programmed policy options – and the least cost-efficient – the Institutionalised Partnership option. A score

of 0 is therefore assigned for **cost-efficiency** to the Co-Programmed option and a score of (-) for the Co-Funded and the Institutionalised Partnership policy options<sup>21</sup>.

#### 4. OVERVIEW OF THE MODELLING FRAMEWORK DEVELOPED FOR THE ASSESSMENT OF IMPACTS OF THE CANDIDATE INSTITUTIONALISED PARTNERSHIPS FOR TRANSFORMING EUROPE'S RAIL SYSTEM

A number of economic/technological impacts have been estimated using a model developed for a 'Study on the Cost and Contribution of the Rail Sector', undertaken by Steer on behalf of the European Commission in 2015. The design of the model is illustrated in the figure below.

**Figure 5: Illustration of the modelling framework**



Source: Steer

The model uses the following inputs:

- An efficiency score for each of the Member States in the base year and a profile of how efficiency changes over time;
- Metrics measuring the scale of the current network (track kilometres), current operations (train kilometres), current fleet (number of vehicles) and operating costs for each Member State, as well as external cost unit rates; and
- Inputs from the PRIMES Reference Scenario, including activity (passenger and tonne kilometres), fleet composition and emissions for all modes and Member States up to 2050.

As originally specified, the model assesses two different scenarios by Member State:

<sup>21</sup> The baseline (traditional calls) is scored 0, as explained above.

- One where the Member State railway industry becomes more efficient and the gains in efficiency are fully reflected through savings in operating costs passed on to passengers and freight customers; and
- One where the efficiency gains are fully reinvested in the railway industry, which results in increases in passenger and tonne kilometres.

However, it is possible to adapt the model to investigate the effect of different combinations of transport cost savings and investment.

The model has been used to calculate the external impacts of efficiency gains on traffic levels, mode share, employment and environmental emissions. It can also be used to generate estimates of impact on the economy, measured in terms of Gross Value Added (GVA).

The S2R JU release 2.0 KPI results showing the potential improvement in industry life cycle costs have been used to provide an assumption for the improvement in efficiency under the baseline. The model was then used to estimate the impact of the policy options based on assumptions of further progress towards meeting the KPI target in each case. These assumptions were informed by consideration of both the level of efficiency gains potentially achievable due to R&I activity under each option and the extent of market take-up in each case.

The following table provides an indication of matrix of assumptions used. As described in *Section 6* of the main report, the assumed potential for reductions in life cycle costs were combined with the market take-up value to generate a single value for the assumed efficiency savings to be input into the model.

**Table 2: Key efficiency assumptions used in the impact assessment**

Option	Potential reduction in life cycle costs by 2030 (assuming 100% market take-up)	Market take-up of R&I outputs	Commentary
<b>Traditional open calls</b>	Passenger: 16.5% reduction Freight: 26% reduction	25 - 33%	Cost reductions indicated by S2R JU KPI release 2.0 (averaged in the case of passenger) – assumed to be captured in baseline.  Range of market take-up observed prior to establishment of the S2R JU, as reported by Foster Rail and previous studies.
<b>Co-programmed partnership</b>	Passenger: 25% reduction Freight: 35% reduction	45 - 60%	Assumes some further progress towards targets and a higher rate of market take-up than under the baseline. However, given that several aspects of the problem would persist under the baseline, we have assumed that the improvements are limited.
<b>Article 187 partnership</b>	Passenger: 50% reduction Freight: 50% reduction	50 - 75%	Assumes KPI targets for current JU are met.  Market take-up reflects stakeholder views on

			potential under an institutional partnership.
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Source: Steer review of sources identified in the table

The model was used to generate estimates of changes in traffic levels and modal shift against the baseline on the assumption that 50% of efficiency improvements are passed on to rail passengers and freight customers in the form of, respectively, lower fares and lower freight rates, and that 50% are captured in the form of released funds for additional investment.



# 1. Can the Union act? What is the legal basis and competence of the Unions' intended action?

## 1.1 Which article(s) of the Treaty are used to support the legislative proposal or policy initiative?

This proposal is based on (1) Article 185 TFEU which stipulates that in implementing the multiannual framework programme, the Union may make provision, in agreement with the Member States concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes; and (2) Article 187 TFEU according to which the Union may set up joint undertakings or any other structure necessary for the efficient execution of Union research, technological development and demonstration programmes (both Articles are under Title XIX of the TFEU - Research and Technological Development and Space).

The proposal aims to implement Article 8 of the Commission proposal for Horizon Europe - the future EU research and innovation (R&I) programme for 2021-2027, according to which, *“European Partnerships shall be established for addressing European or global challenges only in cases where they will more effectively achieve objectives of Horizon Europe than the Union alone and when compared to other forms of support of the Framework programme”*. The Horizon Europe proposal has received the political agreement of the Council and the European Parliament.

## 1.2 Is the Union competence represented by this Treaty article exclusive, shared or supporting in nature?

Research is a shared competence between the EU and its Member States according to the TFEU. Article 4 (3) specifies that in the areas of research, technological development and space, the European Union can carry out specific activities, including defining and implementing programmes, without prejudice to the Member States' freedom to act in the same areas.

*Subsidiarity does not apply for policy areas where the Union has **exclusive** competence as defined in Article 3 TFEU<sup>22</sup>. It is the specific legal basis which determines whether the proposal falls under the subsidiarity control mechanism. Article 4 TFEU<sup>23</sup> sets out the areas where competence is shared between the Union and the Member States. Article 6 TFEU<sup>24</sup> sets out the areas for which the Unions has competence only to support the actions of the Member States.*

<sup>22</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E003&from=EN>

<sup>23</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E004&from=EN>

<sup>24</sup> <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12008E006:EN:HTML>

## 2. Subsidiarity Principle: Why should the EU act?

### 2.1 Does the proposal fulfil the procedural requirements of Protocol No. 2<sup>25</sup>:

- Has there been a wide consultation before proposing the act?
- Is there a detailed statement with qualitative and, where possible, quantitative indicators allowing an appraisal of whether the action can best be achieved at Union level?

This proposal and the accompanying impact assessment were supported by a wide consultation of stakeholders, both during the preparation of the Horizon Europe proposal and - later on, all the candidates for European Partnerships. Member States were consulted via the Shadow Strategic configuration of the Horizon Europe Programme Committee. On candidates for institutionalised Partnerships based on Article 185/187 of the TFEU, an Open Public Consultation (OPC) was held between 11 September and 6 November 2019. Over 1 600 replies were received. In addition, targeted consultation activities were undertaken to prepare the present impact assessment. In particular, for each of the candidate partnerships, an external consultant interviewed a representative sample of stakeholders. The need for EU action as well as its added value were covered in those interviews.

The explanatory memorandum and the impact assessment (horizontal part, Section 3) contain a dedicated section on the principle of subsidiarity, as explained in question 2.2 below.

### 2.2 Does the explanatory memorandum (and any impact assessment) accompanying the Commission's proposal contain an adequate justification regarding the conformity with the principle of subsidiarity?

The impact assessment accompanying the proposal features a horizontal part on relevant common elements to all the candidate partnerships, including the conformity of the proposed initiative with the principle of subsidiarity (Section 3). Moreover, the individual assessments of each candidate partnership include additional details on subsidiarity, touching in particular on the specificities of a candidate partnership that could not be adequately reflected in the horizontal part of the impact assessment. This will also be reflected in the explanatory memorandum.

### 2.3 Based on the answers to the questions below, can the objectives of the proposed action be achieved sufficiently by the Member States acting alone (necessity for EU action)?

National action alone cannot achieve the scale, speed and scope of support to R&I needed for the EU to meet its long-term Treaty objectives, to deliver on the EU's strategic policy priorities (including the climate and energy goals set out in the Paris Agreement, and the European Green Deal), and to contribute to tackling global challenges and meeting the

<sup>25</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12016E/PRO/02&from=EN>

<p>Sustainable Development Goals (SDGs).</p> <p>R&amp;I funded at the national or organisational level, while potentially contributing to the broader development of the European rail system, is unlikely to enable the rail industry to meet European transport and broader policy objectives. Similarly, it is unlikely to ensure the European RSI's ability to compete in international rail product markets against suppliers based in China and other third countries actively building their indigenous rail sector capability, including through major R&amp;I programmes.</p>
<p>(a) Are there significant/appreciable transnational/cross-border aspects to the problems being tackled? Have these been quantified?</p>
<p>The thematic areas covered by the candidate partnerships feature a series of challenges in terms of cross-border/transnational aspects, need to pool resources, need for a critical mass to meet intended policy objectives, need to coordinate different types of actors (e.g. academia, industry, national and regional authorities) across different sectors of the economy and society, which cannot be tackled to the same degree by Member States alone. This is particularly true for the research and innovation (R&amp;I) dimension of the proposed initiative: the importance of a multi-centre and interdisciplinary approach, cross-country data collection and research, and the need to develop and share new knowledge in a timely and coordinated manner to avoid duplication of efforts are key to achieve high quality results and impact. The Interim Evaluation of Horizon 2020 and the impact assessment of Horizon Europe provide extensive qualitative and quantitative evidence on the above points. In addition, Sections 1 and 2 of the individual impact assessments on the candidate partnerships include more detail on the necessity to act at EU-level in specific thematic areas. Finally, it is worth noting that not all Member States have the same capacity or R&amp;I intensity to act on these challenges. As the desired policy objectives can be fully achieved only if the intended benefits are widespread across the Member States, this requires action at the EU-level.</p>
<p>(b) Would national action or the absence of the EU level action conflict with core objectives of the Treaty<sup>26</sup> or significantly damage the interests of other Member States?</p>
<p>As per Article 4(3) TFEU, national action does not conflict with core objectives of the Treaty in the area of R&amp;I. The absence of EU level action in this area would however prevent the achievement of core objectives of the Treaty. Indeed, national action alone cannot achieve the scale, speed and scope of support to R&amp;I needed for the EU to meet its long-term Treaty objectives on e.g. competitiveness, to deliver on the EU's strategic policy priorities, and to contribute to tackling global challenges and meet the Sustainable Development Goals (SDGs).</p>
<p>(c) To what extent do Member States have the ability or possibility to enact appropriate measures?</p>
<p>As foreseen by Article 4(3) TFEU, this proposal does not hamper Member States' ability to</p>

<sup>26</sup> [https://europa.eu/european-union/about-eu/eu-in-brief\\_en](https://europa.eu/european-union/about-eu/eu-in-brief_en)

enact appropriate measures in the field of R&I. However, the scale and complexity of the policy objectives pursued by the present initiative cannot be fully addressed by acting at national level alone.
(d) How does the problem and its causes (e.g. negative externalities, spill-over effects) vary across the national, regional and local levels of the EU?
As described in the horizontal part of the impact assessment accompanying the present proposal, several problems (e.g. on competitiveness, global challenges, demographic change) and their underlying causes affect the EU as a whole rather than individual Member States. Where important differences between Member States are present, these are described in Sections 1 and 2 of the individual impact assessments.
(e) Is the problem widespread across the EU or limited to a few Member States?
The problem of coordinating R&I efforts in the thematic areas covered by the candidate partnerships affects all Member States, albeit to different degrees. However, from a general EU perspective, available evidence shows that the EU as a whole needs to step up efforts and investments in thematic areas that are crucial to tackle present and future policy challenges on several fronts, e.g. ageing population, global technological trends, and climate change to name a few. The way these problems affect the EU and its Member States is described in the horizontal part of the impact assessment and in Sections 1 and 2 of the individual impact assessments.
(f) Are Member States overstretched in achieving the objectives of the planned measure?
As indicated in the horizontal part of the impact assessment and in Sections 1 and 2 of the individual assessments, the sheer scale, speed and scope of the needed support to R&I would overstretch national resources, without guaranteeing the achievement of the intended objectives. Acting at EU-level would achieve greater impact in a more effective and efficient manner.
(g) How do the views/preferred courses of action of national, regional and local authorities differ across the EU?
No specific differences between the views of national, regional and local authorities emerged from the stakeholder consultation.
<b>2.4 Based on the answer to the questions below, can the objectives of the proposed action be better achieved at Union level by reason of scale or effects of that action (EU added value)?</b>
EU funded R&I activities, including those covered by the present proposal, produce

demonstrable benefits compared to the corresponding national and regional initiatives, due to the scale, speed and scope achievable by acting at the EU level. In addition, the proposed initiatives should be seen as complementary and reinforcing national and sub-national initiatives in the same area.

The development of a common European strategy and objectives for rail-related R&I would help to ensure a more coordinated, market-focused approach to R&I activities. It would provide a vehicle for aligning such activity with the EU policy objectives, and for ensuring collaboration among actors from across Europe and along the industry value chain to define projects and programmes designed to address market needs.

(a) Are there clear benefits from EU level action?

Quantitative and qualitative evidence of the benefits of EU level action are available in the interim evaluation of Horizon 2020 and in the impact assessment of Horizon Europe, among others. An analysis of the emerging challenges in each thematic areas, of the EU's competitive positioning, as well as feedback gathered from different types of stakeholders for the present impact assessment indicate that EU level action remains appropriate also for the present proposal. In addition, the benefits of acting at EU-level have been illustrated by the success and the impact achieved by the predecessors to the proposed initiative.

The coordination of R&I at the European level would help to improve the efficiency of the industry in two important ways. First, it would allow pooling of resources available for R&I and their distribution according to a common strategy, thereby reducing the potential for competing and conflicting projects focusing on the needs of national networks and tending to reinforce the geographical fragmentation discussed in the previous chapter. Second, it would encourage the RSI to develop products and systems that further enable the development of a fully integrated European rail system, thereby advancing the creation of a single European market for equipment and allowing them to exploit economies of scale in production more effectively.

(b) Are there economies of scale? Can the objectives be met more efficiently at EU level (larger benefits per unit cost)? Will the functioning of the internal market be improved?

EU funded R&I activities, including those covered by the present proposal, produce demonstrable benefits compared to the corresponding national and regional initiatives, due to the scale, speed and scope achievable by acting at the EU level. This is the case both in terms of effectiveness in achieving intended policy objectives, but also in terms of efficiency. Positive impact is also visible in terms of competitiveness: recent data on EU funded R&I activities indicate that EU-funded teams grow 11.8% faster and are around 40% more likely to be granted patents or produce patents applications than non-EU funded teams. Efficiency gains are also visible in terms of dissemination of results to users beyond national borders, including SMEs and citizens. EU funded R&I is more effective in leveraging private investment. Finally, there are clear additionality benefits (i.e. EU R&I funding does not displace or replace national funding), as the EU focuses on projects that are unlikely to be funded at national or regional level. Overall, this is beneficial to the functioning of the internal

market in several respects, including human capital reinforcement through mobility and training, the removal of barriers to cross-border activity for economic players including SMEs, easier access to finance and to relevant knowledge and research, and increased competition in the area of R&I.
(c) What are the benefits in replacing different national policies and rules with a more homogenous policy approach?
A homogeneous policy approach in the various thematic areas covered by the present proposal would reduce fragmentation and increase efficiency and effectiveness in meeting the intended policy objectives. Indeed fragmentation, persisting barriers in the internal market and differences in the resources available to Member States are some of the key problems that stand in the way of fully achieving the intended policy objectives and reaching the required critical mass to obtain tangible results. Specific detail on how these issues differ in each thematic area are illustrated in Sections 1 and 2 of the individual impact assessments, so as to reflect the specificities of each case.
(d) Do the benefits of EU-level action outweigh the loss of competence of the Member States and the local and regional authorities (beyond the costs and benefits of acting at national, regional and local levels)?
The proposed initiative does not lead to a loss of competence of the Member States. In fact, the proposed initiative should be seen as complementary and reinforcing national and sub-national initiatives in the same area. Previous quantitative and qualitative assessments of Horizon Europe and Horizon 2020 have shown that the proposed EU-level action do not displace national ones and tend to concentrate on initiatives that would not have been funded by the Member States themselves, or would not have reached the same scale and ambition without EU-level intervention, due to their complexity and trans-national nature.
(e) Will there be improved legal clarity for those having to implement the legislation?
Yes. The proposed initiatives will be implemented in line with the Horizon Europe single set of rules for participation; this will ensure increased clarity and legal certainty for end beneficiaries, other stakeholders and programme administrators. It will also reduce the administrative burden for beneficiaries, and for the Commission services. In addition, the accessibility and attractiveness of the broader Horizon Europe programme, in particular for applicants with limited resources, would be sustained.
<b>3. Proportionality: How the EU should act</b>
<b>3.1 Does the explanatory memorandum (and any impact assessment) accompanying the Commission's proposal contain an adequate justification regarding the proportionality of the proposal and a statement allowing appraisal of the compliance</b>

<b>of the proposal with the principle of proportionality?</b>
<p>The principle of proportionality underpins the entire analysis of the candidate partnerships. Specifically, the analysis included in the accompanying impact assessment is structured along the following logic: 1. Justification of the use of a partnership approach in a given area (including considerations on additionality, directionality, link with strategic priorities) instead of other forms of intervention available under Horizon Europe; 2. If the partnership approach is deemed appropriate, proportionality considerations guide the assessment of which type of partnership intervention (collaborative calls, co-programmed, co-funded or institutionalised partnership) is most effective in achieving the objectives. This will also be reflected in the explanatory memorandum.</p>
<p><b>3.2 Based on the answers to the questions below and information available from any impact assessment, the explanatory memorandum or other sources, is the proposed action an appropriate way to achieve the intended objectives?</b></p>
<p>The proposed initiative only focuses on areas where there is a demonstrable advantage in acting at the EU-level due to the scale, speed and scope of the efforts needed for the EU to meet its long-term Treaty objectives and deliver on its strategic policy priorities and commitments. In addition, the present proposal leaves full freedom to the Member States to pursue their own actions in the policy areas concerned. This will also be reflected in the explanatory memorandum.</p>
<p>(a) Is the initiative limited to those aspects that Member States cannot achieve satisfactorily on their own, and where the Union can do better?</p>
<p>The proposed initiative only focuses on areas where there is a demonstrable advantage in acting at the EU-level due to the scale, speed and scope of the efforts needed for the EU to meet its long-term Treaty objectives and deliver on its strategic policy priorities and commitments.</p>
<p>(b) Is the form of Union action (choice of instrument) justified, as simple as possible, and coherent with the satisfactory achievement of, and ensuring compliance with the objectives pursued (e.g. choice between regulation, (framework) directive, recommendation, or alternative regulatory methods such as co-legislation, etc.)?</p>
<p>For each of the candidate partnerships, the analysis carried out in the accompanying impact assessment has explored several options for implementation. A comparative assessment of the merits of each option also included an analysis of the simplicity of the intervention, its proportionality and effectiveness in achieving the intended objectives. This is reflected in the fact that a tailored approach has been suggested for each candidate partnership, ranging from looser forms of cooperation to more institutionalised ones, depending on the intended policy objectives, specific challenges, and desired outcome identified in each case.</p>

<p>(c) Does the Union action leave as much scope for national decision as possible while achieving satisfactorily the objectives set? (e.g. is it possible to limit the European action to minimum standards or use a less stringent policy instrument or approach?)</p>
<p>The proposed approach leaves full freedom to the Member States to pursue their own actions in the policy areas covered by the present proposal.</p>
<p>(d) Does the initiative create financial or administrative cost for the Union, national governments, regional or local authorities, economic operators or citizens? Are these costs commensurate with the objective to be achieved?</p>
<p>The proposed initiatives do create financial and administrative costs for the Union, national governments and, depending on the chosen mode of implementation, for regional and local authorities. In addition, economic operators and other stakeholders potentially involved in the candidate partnerships will also incur some costs linked to implementation. The financial cost of the proposed initiative is covered under the Horizon Europe programme. Its exact amount is still subject to political decision. As regards the candidate partnerships and the different modes of implementation (co-programmed, co-funded, institutionalised), the relevant costs and benefits are assessed in the individual impact assessments covering each candidate partnership. The additional administrative costs of implementation via partnerships are limited, when compared to the administrative costs of implementation through traditional calls. As indicated by comparable experience with previous initiatives and in feedback provided by a variety of stakeholders, these costs are expected to be fully justified by the benefits expected from the proposed initiative. Where available, additional details on costs are provided in Annex 3 of the impact assessment.</p>
<p>(e) While respecting the Union law, have special circumstances applying in individual Member States been taken into account?</p>
<p>Where relevant, differences between Member States in capacity and stage of advancement of R&amp;I in specific thematic areas have been taken into account in the individual impact assessments.</p>



## 1. BACKGROUND INFORMATION FOR ALL INITIATIVES

### 1.1. Selection criteria of European Partnerships

Partnerships based on Article 185 and 187 TFEU *shall be implemented only where other parts of the Horizon Europe programme, including other forms of European Partnerships would not achieve the objectives or would not generate the necessary expected impacts, and if justified by a long-term perspective and high degree of integration.* At the core of this impact assessment is therefore the need to demonstrate that the impacts generated through a Partnership approach go beyond what could be achieved with traditional calls under the Framework Programme – the Baseline Option. Secondly, it needs to assess if using the Institutionalised form of a Partnership is justified for addressing the priority.

The necessity test for a European Partnership (as set out in the Horizon Europe regulation) has two levels:

1. **The justification for implementing a priority with a European Partnership** to address Horizon Europe and EU priorities. This is linked to demonstrating that a European Partnership can produce added value beyond what can be achieved through other Framework Programme modalities, notably traditional calls in the work programmes (Option 0 – Baseline).
2. **The justification for the use of the form of Institutionalised Partnership:** Once it has been demonstrated that a partnerships approach is justified, co-programmed and/or co-funded forms are considered for addressing the priorities as they are administratively lighter, more agile and easier to set-up (Options 1 and/or 2). As Institutionalised Partnerships require setting up a legal framework and the creation of a dedicated implementation structure, they have to justify higher set-up efforts by demonstrating that it will deliver the expected impacts in a more effective and efficient way, and that a long-term perspective and high degree of integration is required (Option 3).

The outcomes of the ‘necessity test’ is presented together with the preferred option.

Figure 6 Horizon Europe selection criteria for the European Partnerships

Common selection criteria & principles	Specifications
<b>1. More effective</b> (Union added value) clear impacts for the EU and its citizens	Delivering on global challenges and research and innovation objectives
	Securing EU competitiveness
	Securing sustainability
	Contributing to the strengthening of the European Research and Innovation Area
	Where relevant, contributing to international commitments

<b>Common selection criteria &amp; principles</b>	<b>Specifications</b>
<b>2. Coherence and synergies</b>	Within the EU research and innovation landscape
	Coordination and complementarity with Union, local, regional, national and, where relevant, international initiatives or other partnerships and missions
<b>3. Transparency and openness</b>	Identification of priorities and objectives in terms of expected results and impacts
	Involvement of partners and stakeholders from across the entire value chain, from different sectors, backgrounds and disciplines, including international ones when relevant and not interfering with European competitiveness
	Clear modalities for promoting participation of smes and for disseminating and exploiting results, notably by smes, including through intermediary organisations
<b>4. Additionality and directionality</b>	Common strategic vision of the purpose of the European Partnership
	Approaches to ensure flexibility of implementation and to adjust to changing policy, societal and/or market needs, or scientific advances, to increase policy coherence between regional, national and EU level
	Demonstration of expected qualitative and significant quantitative leverage effects, including a method for the measurement of key performance indicators
	Exit-strategy and measures for phasing-out from the Programme
<b>5. Long-term commitment</b> of all the involved parties	A minimum share of public and/or private investments
	In the case of institutionalised European Partnerships, established in accordance with article 185 or 187 TFEU, the financial and/or in-kind, contributions from partners other than the Union, will at least be equal to 50% and may reach up to 75% of the aggregated European Partnership budgetary commitments

## 1.2. Overview of potential functions for a common back office among Joint Undertakings

<b>Functions</b>	<b>Current situation</b>	<b>Option of joint back-office</b>	<b>Comments</b>
<b>Organising calls for grant and proposal evaluations</b>	Each JU organises this independently.	A central organisation of evaluation, logistics, contracting evaluators, managing the data of the evaluation results  Central database of potential evaluators with domain expertise in thematic areas of partnerships	The evaluations would still need to be supervised by the Scientific staff of the individual Joint Undertakings (consensus meetings of expert evaluators etc)
<b>Human Resources related matters</b>	Each JU has own HR policy and resources  Quite some resources spent on recruitment in some JUs	More generic resources and expertise for HR matters  More consistency in HR	Ensuring consistency with EC HR policies is already in place

	<p>Some HR facilities are procured from external contractors</p> <p>Some JUs have a Service Level Agreement with COM for HR</p>	<p>policy</p> <p>Shared HR investment for specialised expertise (IP and legal)</p>	
<b>Financial management</b>	<p>Each JU conducts own financial contract management; differences between JUs</p> <p>Each JU is audited separately.</p> <p>Auditing at project level more frequent than in other Horizon 2020 parts and outsourced by JUs thus differences</p> <p>ECA: too many audits on JUs</p>	<p>Financial management by one core team of financial staff</p> <p>Would reduce the number of interfaces for audits and simplifies the auditing of the all JUs</p> <p>Harmonisation of project auditing</p>	<p>Simplifies the harmonisation of financial management across JUs in line with Horizon Europe</p>
<b>Communication (internal and external)</b>	<p>Each JU has a separate communication strategies, teams and resources</p>	<p>A common back-office can support activities such as event organisation, dissemination of results, setting up website communication</p> <p>Can help create a more visible Partnership brand</p>	<p>A considerable share of communication activity is partnership specific (addressing particular target groups, synthesising project results) however there are generic communication activities that can be shared</p> <p>Needs to avoid duplication of efforts</p>
<b>Data management on calls, project portfolios, information on project results</b>	<p>Most JUs but not all use e-Corda for project data</p> <p>Overall IT integration of JUs still difficult</p>	<p>Harmonised data management</p> <p>Reduction of IT systems and support that is procured</p>	<p>This will need to happen regardless of the common back office but will likely be more smooth if managed centrally</p>

## **2. BACKGROUND INFORMATION FOR THIS SPECIFIC INITIATIVE**

### **General information on current transport policy**

In 2011, the Commission published a ‘Roadmap to a Single European Transport Area – towards a competitive and resource efficient transport system’ (the Transport White Paper)<sup>27</sup>, which set out a series of plans and associated targets for improving the competitiveness, efficiency and sustainability of European transport, removing barriers and bottlenecks in transport infrastructure and addressing societal challenges linked to increasing mobility and connectivity. It described a vision for the European transport network, broadly defined, which included several rail-related goals, in particular:

- A shift of 30% of road freight travelling over 300 km to rail or waterborne transport by 2030, and a shift of more than 50% by 2050, enabled through efficient rail freight corridors and further infrastructure development;
- Completion of the European high-speed rail network by 2050, with most medium-distance passenger transport moving by rail by the same date;
- The delivery of a fully functional, Union-wide and multimodal TEN-T core network by 2030 (with further quality and capacity enhancements completed by 2050);
- Connection of all core airports to rail (preferably high-speed rail) services and connection of all core seaports to rail freight networks by 2050; and
- Deployment of the European Rail Traffic Management System (ERTMS) (among other comparable transport management systems) in accordance with the associated deployment plan.

These goals have set the framework for EU rail policy during the period of Horizon 2020 and have been echoed in the objectives for both the S2R JU and the proposed new partnership for Transforming Europe’s Rail System. The goals are critically dependent on the uptake of technological innovation that can help to deliver a fully integrated railway system for Europe and ensure a step-change in the attractiveness of rail services from the perspective of both passengers and freight customers.

### **The Fourth Railway Package**

The proposal for a new partnership must also be seen in the context of recent rail industry reforms, notably the Fourth Railway Package, which completes the legal framework governing a process of industry restructuring, harmonisation and market opening that began some 30 years ago with Directive 91/440/EEC on the development of the Community’s railways. The Fourth Railway Package is a set of six legislative texts<sup>28</sup> designed to implement the final elements of the Single European Railway Area (SERA) with a view to revitalising

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<sup>27</sup> European Commission (2011), Roadmap to a Single European Transport Area – towards a competitive and resource efficient transport system, 28 March 2011, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>.

<sup>28</sup> Legislative texts, together with further information on the Fourth Railway Package is available at: [https://ec.europa.eu/transport/modes/rail/packages/2013\\_en](https://ec.europa.eu/transport/modes/rail/packages/2013_en)

the sector and making it more competitive relative to other transport modes. It is comprised of two pillars:

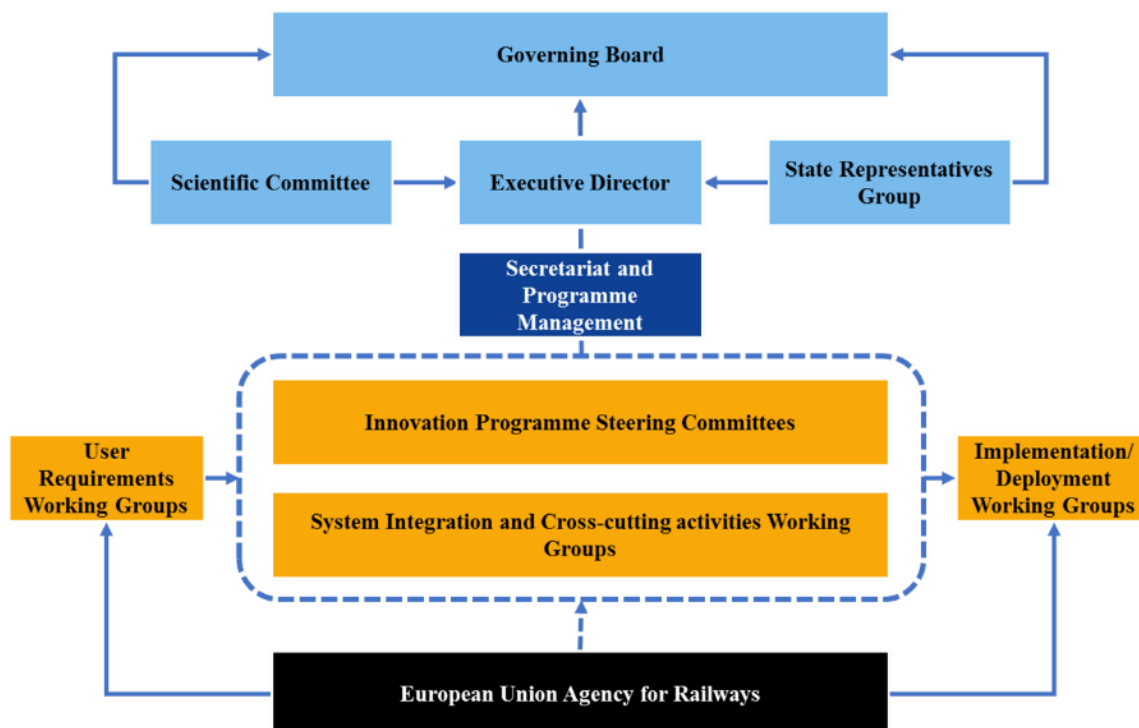
- A technical pillar focusing on a more streamlined, pan-European approach to safety certification and vehicle authorisation, measures to improve interoperability across different national rail networks and an enhanced role for the European Union Agency for Railways (ERA); and
- A market pillar, strengthening previous legislation designed to separate infrastructure management and train operation, providing a more level playing field for rail market access and for greater competitive tendering of public service contracts for rail services.

The implementation of a coordinated R&I effort under Horizon Europe will be complementary to the completion of SERA, since it can be expected to generate opportunities for innovation that can be exploited more effectively in a dynamic rail market environment. At the same time, it will provide a platform for collaboration between different industry players now subject to a greater degree of organisational separation than was previously the case.

## The Shift2Rail Joint Undertaking

### *Organisation and governance*

The organisation and governance of the S2R JU are illustrated in the figure below.



Source: Eric Fontanel, Roderick Smith, Heather Allen, Michael Dooms (2017)

As shown, the organisation comprises:

- A Governing Board, including representatives of the founding members, associate members and observers (from ERA and the States Representative Group);
- An Executive Director, supported by a secretariat and programme management department, responsible for oversight of the work programme and day-to-day management of the organisation;
- A series of Steering Committees overseeing each of the five Innovation Programmes (IPs) described below;
- A Scientific Committee and a States Representative Group, providing advice to both the Executive Director and the Governing Board; and
- Various Working Groups considering user requirements, implementation of the outputs of the R&I activity and integration across the IPs as well as various cross-cutting themes.

### ***Innovation programme funding***

The R&I activity coordinated by the JU is organised according to a number of innovation programmes (IPs). The table below sets out the budget allocation across IPs expected following adoption of the Annual Work Plan for 2020, as provided to us by the JU. At the time of writing this had not yet been formally approved.

*Table 3: S2R JU Innovation Programmes and Cross Cutting Activities*

<b>Innovation Programmes/activity</b>	<b>Areas of activity</b>
IP1 – cost-efficient and reliable trains, including high capacity and high-speed trains Budget: €212 M	Train interiors Doors and intelligent access systems Traction Train control and monitoring system Lighter car body shell Running gear Brakes
IP2 – advanced traffic management and control systems Budget: €197 M	Smart, fail-safe communication and positioning systems Traffic management evolution Automation Moving blocks and train integrity Smart procurement and testing Virtual coupling Cyber security
IP3 – cost-efficient, sustainable and reliable high-capacity infrastructure Budget: €153 M	New directions in switch and crossing Innovative track design and materials Cost-effective tunnel and bridge solutions Intelligent system maintenance Improved station concepts Energy efficiency
IP4 – IT solutions for attractive railway services	Technical framework Customer experience applications

Budget: €75 M	Multi-modal travel services
IP5 – Technologies for sustainable attractive European freight Budget: €87 M	Implementation strategies and business analytics Freight electrification, brakes and telematics Access and operation Wagon design Novel terminals, hubs, marshalling yards and sidings New freight propulsion concepts Sustainable rail transport of dangerous goods Long term vision for an autonomous rail freight system
IPX – Disruptive concepts and technologies and system architecture Budget: €20 M	Development of a functional system architecture for the next generation of railway systems
<b>Cross cutting activities</b>	
Total budget: €31 M	Long-term needs and socio-economic research
	Smart materials and processes
	System integration, safety and interoperability
	Energy and sustainability
	Human capital

### Contribution to administrative costs

Budget share: €13.5	European Union
Budget share: €13.5	Industry

Source: S2R JU

### *Contribution to rail sector development*

The Council Regulation establishing the JU requires it to meet several objectives that, inter alia, align its activities with the aims of Horizon 2020 and the completion of SERA. The Regulation also sets out key performance indicators (KPIs) that provide a means of measuring its impact on the European rail transport industry. More specifically, the JU is required “to develop, integrate, demonstrate and validate innovative technologies and solutions” that can be measured against the following five KPIs:

- A 50% reduction in the life-cycle costs of the rail system through greater efficiency in the provision of both infrastructure and rolling stock as well as greater energy efficiency;
- A 100% increase in the capacity of the system with a view to accommodating increased demand for both passenger and freight services;

- A 50% increase in the reliability and punctuality of rail services (expressed as a 50% reduction in the percentage of cancellations and late arrivals);
- Removal of the remaining obstacles to interoperability, particularly by closing outstanding open points in the Technical Specifications for Interoperability (TSIs) through the identification of appropriate technological solutions; and
- A reduction in noise, vibration, emissions and other environmental impacts arising from rail transport.

***Status of Key Performance Indicators specific for the S2R JU<sup>29</sup>***

#	Key Performance Indicator	Objective	Baseline at the start of H2020	Target at the end of H2020	Automated	Result 2019
1	% reduction in the costs of developing, maintaining, operating and renewing infrastructure and rolling stock and increase energy efficiency compared to "State-of-the-art"	Reduce the life-cycle cost of the railway transport system	"State-of-the-art" 2014	> 50 %	No	See table IV
2	% increase the capacity of railway segments to meet increased demand for passenger and freight railway services compared to "State-of-the-art" 2014	Enhance the capacity of the railway transport system	"State-of-the-art" 2014	100%	No	See table IV
3	% decrease in unreliability and late arrivals compared to "State-of-the-art" 2014	Increase in the quality of rail services	"State-of-the-art" 2014	> 50%	No	See table IV
4	Reduce noise emissions and vibrations linked to rolling stock and respectively infrastructure compared to "State-of-the-art" 2014	Reduce the negative externalities linked to railway transport	"State-of-the-art" 2014	> 3 - 10 dBA	No	-2 dB overall noise limits (FINE1) -4 dB parking operation (FINE1) Specific examples: -6 dB noise damping mechanical absorption solutions (FR8RAIL) -15-20 dB reduced electromagnetic

<sup>29</sup> Source: Annual Activity Report 2019



#	Key Performance Indicator	Objective	Baseline at the start of H2020	Target at the end of H2020	Automated	Result 2019
						noise on main transformer (PINTA)
5	Addressing open points in TSIs, compared to "State-of-the-art" 2014	Enhance interoperability of the railway system	"State-of-the-art" 2014		No	One open point of the TSI Infra (tender and IN2TRACK-2)
6	Number of Integrated Technology Demonstrators (ITDs) and System Platform Demonstrations (SPD)	Improve market uptake of innovative railway solutions through large-scale demonstration activities	Multi-Annual Action Plan	4 SPD	No	Updated SPD definition is available (IMPACT-2, deliverable D3.1)
7	Share of the fund allocated to the different Innovation Programmes and to cross-cutting themes	Ensure that funding covers the railway system as a whole	n.a.	> 80%	No	100% of the operational funding
8	Percentage of topics resulting in signature of GA	Ensure a sufficiently high call topics success rate	n.a.	> 90%	Yes	94%
9	% of resources consumption versus plan (members only)	WP execution by members - resources	n.a.	> 80%	Yes	* o/s
10	% of deliverables available versus plan (members only)	WP execution by members - deliverables	n.a.	> 80%	No	- 85.77% (2015-2019) - 81.82% (2019 only)